THE RELATIONSHIP BETWEEN SCREEN MEDIA EXPOSURE
AND EARLY LANGUAGE DEVELOPMENT

A thesis submitted to The University of Manchester for the degree of

Doctor of Philosophy

in the Faculty of Humanities

2018

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SCHOOL OF ARTS, LANGUAGES AND CULTURES
Table of Contents

List of Tables .......................................................................................................................... 5
List of Figures .......................................................................................................................... 7
Abstract .................................................................................................................................. 8
Declaration .............................................................................................................................. 9
Copyright Statement ............................................................................................................ 9
Dedication ................................................................................................................................ 10
Acknowledgements ............................................................................................................... 11

Chapter 1: General Introduction ................................................................................................. 12
  Thesis Overview ...................................................................................................................... 12
  Rationale for Conducting Research on Young Children’s Screen Media Use .................. 13
  Screen Media Use and Language Development: Issues to Consider ............................ 15
  Theoretical Framework for Screen Media Use and Language Development .................. 17
  Association Between Screen Media Use and Language Development: Literature Review .... 25
  Identification of Gaps in the Literature .............................................................................. 49
  How Does This Thesis Contribute to Existing Knowledge? ............................................. 50
  Research Aims ...................................................................................................................... 51
  Research Questions ............................................................................................................ 52
  Contribution of Author and Co-Authors ......................................................................... 52

Chapter 2: Paper 1 ..................................................................................................................... 53
  Abstract ............................................................................................................................... 54
  Introduction ......................................................................................................................... 55
  Methods ............................................................................................................................... 62
    Participants ....................................................................................................................... 62
    Procedures ....................................................................................................................... 67
    Survey ............................................................................................................................. 67
    Analysis ............................................................................................................................ 70
  Results .................................................................................................................................. 71
  Discussion ............................................................................................................................ 88
  Limitations ........................................................................................................................... 97
  Conclusions ......................................................................................................................... 99
Chapter 3: Paper 2 ................................................................. 134

Abstract .................................................................................. 135
Introduction .................................................................................. 136
Methods ....................................................................................... 151
  Participants ............................................................................... 151
  Procedures ............................................................................... 154
  Survey ....................................................................................... 154
  Analysis .................................................................................... 156
Results ......................................................................................... 157
Discussion ................................................................................... 170
Limitations .................................................................................. 176
Conclusions ................................................................................. 178
References ................................................................................... 180
Appendices .................................................................................... 208
  Appendix A. Paper 2 - Study Survey ......................................... 208

Chapter 4: Paper 3 ................................................................. 222

Abstract ...................................................................................... 223
Introduction ................................................................................ 225
Methods ....................................................................................... 250
  Participants ............................................................................... 250
  Procedures ............................................................................... 254
  Materials and Measures ............................................................ 256
  Analysis .................................................................................... 262
Results ......................................................................................... 270
Discussion ................................................................................... 286
Conclusion .................................................................................. 286
References ................................................................................... 295
Appendices .................................................................................... 331
  Appendix A. Paper 3 - Participant Information Sheet ................. 332
Appendix B. Paper 3 - Consent Form .......................................................... 335
Appendix C. Paper 3 - Weekly Diary ............................................................ 336
Appendix D. Paper 3 - Study Survey ............................................................ 346
Appendix E. Paper 3 - Study Recruitment Flyer ........................................... 360
Appendix F. Paper 3 - Letter to Gatekeeper ................................................ 361

Chapter 5: General Discussion and Conclusion ........................................... 362
Significance of Studying Children’s Screen Media Use .................................. 362
Summary of Thesis Findings ....................................................................... 364
Limitations ................................................................................................... 373
Future Research Directions ........................................................................ 375
Implications for Practice and Policy ............................................................. 377
Conclusion .................................................................................................. 380

References ................................................................................................. 382

Word count: 60,732 words
List of Tables

Chapter 2
Table 2.1 Socioeconomic Characteristics of the Parents ................................................................. 65
Table 2.2 Socioeconomic Characteristics of the Households/Children ........................................... 66
Table 2.3 Prevalence of Screen Media in Saudi Households with Toddlers ................................. 73
Table 2.4 Amount and Onset Age of Screen Media Use by Demographic Variables .................. 81
Table 2.5 Screen Media and Reading Practices by Demographic Variables .................................. 82
Table 2.6 Percentages of the Frequency of Children’s Viewing/Using of Different Types of Screen Media Programmes and Apps ................................................................. 84
Table 2.7 Comparison Between Media Use Patterns Among Children in Saudi Arabia, the U.S., and the UK ........................................................................................................... 86
Table 2.8 Comparison Between the Onset Age of Screen Media Use Among Children in Saudi Arabia, the U.S., and the UK ........................................................................................................... 87

Chapter 3
Table 3.1 Socioeconomic Characteristics of the Parents ................................................................. 152
Table 3.2 Socioeconomic Characteristics of the Households/Children ........................................... 153
Table 3.3 Caregivers’ Motives for Allowing Screen Media Use .......................................................... 165
Table 3.4 Caregivers’ Motives for Allowing a Media Device in the Child’s Bedroom ...................... 166
Table 3.5 Frequency of Screen Media Mediation Styles Used by Caregivers .................................. 167
Table 3.6 Parental Screen Media Mediation Practices by Demographic Variables ....................... 169

Chapter 4
Table 4.1 Socioeconomic Characteristics of the Parents ................................................................. 253
Table 4.2 Socioeconomic Characteristics of the Households/Children ........................................... 254
Table 4.3 Broad Composite Categories of the Predictor Variables ............................................... 268
Table 4.4 Time Spent Viewing/Using Screens Across Age Groups ............................................... 272
Table 4.5 Descriptive Statistics for the Composite Measures and Outcome Variables Included in the Regression Models for Children Aged 12 to 16 Months ......................................................... 278
Table 4.6 Descriptive Statistics for the Composite Measures and Outcome Variables Included in the Regression Models for Children Aged 17 to 36 Months ......................................................... 278
Table 4.7 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 12 to 16 Months: Full Model.............. 279
Table 4.8 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 12 to 16 Months: Reduced Model ...... 280
Table 4.9 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Understood by Children Aged 12 to 16 Months: Full Model ........ 281
Table 4.10 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Understood by Children Aged 12 to 16 Months: Reduced Model... 282
Table 4.11 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 17 to 36 Months: Full Model.............. 282
Table 4.12 Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 17 to 36 Months: Reduced Model ...... 284
Table 4.13 Multiple Linear Regression Coefficients for the Association Between the Predictors and M3L Produced by Children Aged 17 to 36 Months: Full Model................................. 284
Table 4.14 Multiple Linear Regression Coefficients for the Association between the Predictors and M3L Produced by Children Aged 17 to 36 Months: Reduced Model ......................... 285
List of Figures

Chapter 2
Figure 2.1. Onset age of television viewing .......................................................... 74
Figure 2.2. Onset age of mobile media use............................................................. 75
Figure 2.3. Overall screen time in minutes .............................................................. 76
Figure 2.4. Amount of television viewing time in minutes ...................................... 76
Figure 2.5. Amount of mobile media time in minutes ............................................. 77
Figure 2.6. Time spent using mobile media devices across age groups ................. 77
Figure 2.7. Number of children’s books at home. .................................................. 78
Figure 2.8. Frequency of reading, TV viewing, and mobile media use .................. 79

Chapter 3
Figure 3.1. Caregivers’ beliefs about ideal age to introduce screens to children .......... 157
Figure 3.2. Caregivers’ beliefs regarding the ideal age for screen exposure and children’s actual age of exposure to TV ................................................................................................................. 159
Figure 3.3. Caregivers’ beliefs regarding the ideal age for screen exposure and children’s actual age of exposure to mobile media ........................................................................................................... 160
Figure 3.4. Difference between ideal screen time as per parents’ beliefs and children’s actual screen time ........................................................................................................................................ 161
Figure 3.5. Caregivers’ assessment of their children’s amount of screen time .......... 162
Figure 3.6. Caregivers’ views regarding impact of screen media use on children’s language development ................................................................................................................................. 163

Chapter 4
Figure 4.1. Children’s time spent on daily activities ................................................. 270
Figure 4.2. Distribution of time children spent in activities ..................................... 271
Figure 4.3. Background TV screen exposure ............................................................ 272
Figure 4.4. Use of screen media content based on target audience. ............................ 273
Figure 4.5. Use of screen media content based on screen media content genre. ........... 274
Figure 4.6. Use of screen media content by language variety ................................. 275
Figure 4.7. Solitary viewing and co-viewing ............................................................ 276
Figure 4.8. Frequency of reading to young children .............................................. 277
Figure 4.9. Number of books available to the children at home ............................. 277
Abstract

In recent years, there has been a rising trend in screen media use among young children. This has led to heated debate over the benefits and hazards of technology use, especially in the first few years of life, which represent a time of rapid language development (Bornstein, 2015; Bradley et al., 1989; Cote & Bornstein, 2005; Huttenlocher, 2002; National Research Council and Institute of Medicine, 2000; Rodriguez et al., 2009; Stiles, 2000). The aim of this thesis is to explore screen media use among young children in Saudi Arabia, parents’ roles in mediating their children’s screen media use, and the relationship between screen media exposure and early language development. Three studies were conducted to achieve this aim.

The first study (Paper 1/Chapter 2) explored the home screen media environment of 220 Saudi children aged 1 to 3 years, whose primary caregivers completed an online survey. The findings showed that the vast majority of these children had started watching television and using mobile media devices before the age of 2 years. The majority of the children exceeded the American Academy of Pediatrics’ screen time recommendation for their age. Results also indicated that screen media use rates among Saudi toddlers are higher than those reported in the U.S. and the UK.

The second study (Paper 2/Chapter 3) sought to explore parental beliefs and attitudes regarding young children’s screen media use as well as parental media mediation practices. The study, which was conducted on the same sample in Paper 1, revealed that caregivers’ views of what constitutes the appropriate age to introduce screens and the appropriate amount of daily screen time do not match up with their children’s actual practices. Caregivers were also found to underestimate the amount of time that their children spend with screens and to allow their young children to use screens in an effort to keep them occupied, entertain them, or help them learn languages. Most caregivers said that they believe that screen media use leads family members to spend less time together and that television viewing has a positive impact on children’s language development, while mobile media use has a negative impact.

The third study (Paper 3/Chapter 4) investigated the association between the quantity, content, and social context of screen media exposure and the language development of 85 Saudi children aged 1 to 3 years. Weekly event-based diaries and surveys were employed to track children’s screen media use patterns and the social contexts of their screen media use. Children’s language development was assessed using the JISH Arabic Communicative Development Inventory (JACDI; Dashash & Safi, 2014), the official Arabic adaptation of the MacArthur–Bates Communicative Development Inventories (CDI; Fenson et al., 1993). Out of the three screen media viewing parameters (quantity, content, and context), the most significant predictor of expressive and receptive vocabulary in 12- to 16-month-olds was screen media context (as measured by the frequency of children’s interactive joint media engagements). In older children (17- to 36-month-olds), higher levels of screen media quantity (as measured by the amount of time spent viewing screens daily, the prevalence of background TV in the children’s environment, and the onset age of screen media viewing) had the greatest negative impact on children’s expressive vocabulary and utterance length.

The findings from this thesis have the potential to inform policy and practice related to children’s screen media use and its association with early language development.
Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

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Dedication

To the two people who made me who I am today:

to mum and dad, I dedicate this work.
Acknowledgements

First and foremost, I give thanks to God, the Almighty, for giving me the willpower and strength to overcome all the hurdles that came my way, and for blessing me with the many wonderful people who have supported me these past few years.

This work would not have existed without the continuous support and encouragement from my other half. Muammar, you have loved me, believed in me, kept me going, and have always been by my side throughout the ups and downs of this journey. You have listened to my ideas, endured my frustrations, and celebrated my achievements. Thank you.

To my wonderful children, Abdulaziz and Majida. Your love and consideration (at an early age no less!) allowed me to complete my thesis. We made some sacrifices along the way, but I promise to make it up to you. One day, you will read this and know that with the support of a loving family, determination, and hard work, nothing is impossible. Abdulaziz, you were a small child when I started and have matured into a considerate and independent young man. Thank you for your patience and understanding. Majida, I have not forgotten your 5th birthday wish. Mummy can finally leave her office chair and take you to Disneyland!

Special thanks and sincere gratitude go to my incredible supervisors, Dr Thea Cameron-Faulkner and Professor Ludovica Serratrice. Thea, I am indebted to you for your generous help, guidance, support, and encouragement throughout all stages of this project. You have been a great mentor and advisor. Ludovica, many thanks for your support, constructive criticism, and insightful feedback. My grateful thanks are extended to Dr Eman Abdoh for her valuable advice and constant encouragement.

I would also like to express my gratitude for all of the parents and children who have taken part in this research project. Without their cooperation and participation, it would not have been possible to complete this project.

Many thanks to King Abdulaziz University, Jeddah, Saudi Arabia for funding my PhD. Your support is greatly acknowledged and appreciated.
Chapter 1: General Introduction

Thesis Overview

This thesis is presented in Journal Format, where the core chapters are written in a journal paper style. It consists of three self-contained papers. Each paper has its own abstract, introduction, methods, results, discussion, conclusion, and references. Chapter 1 is an introductory chapter that sets the context for the research, provides a brief review of the theoretical framework relevant to the thesis, presents the basis for the research questions within the three papers, and provides an overarching discussion of the literature pertinent to the research. Chapter 2 (Paper 1) explores the screen media use profiles of young children in Saudi Arabia. Chapter 3 (Paper 2) examines Saudi parents’ attitudes towards their children’s screen media use and parental media mediation styles. Chapter 4 (Paper 3) investigates the association between screen media use and language development in Saudi toddlers. The thesis is concluded by Chapter 5, which gives a summary of the findings from all three papers and discusses limitations of the papers, future research directions, and implications for policy and practice.

This introductory chapter begins by discussing why it is important to study screen media use in young children and its association with their language development in particular, and their health and development in general. It then provides an overview of the theoretical framework and context for this thesis, followed by a review of the literature on the association between screen media use and young children’s language development. Gaps in the literature are then identified, and a description of how this thesis can contribute to existing knowledge is provided. In the last section of this chapter, the main aims of the thesis are stated and the key research questions are presented.
Rationale for Conducting Research on Young Children’s Screen Media Use

It is well established in the literature that the first few years of life mark a time of rapid and substantial brain, cognition, and language development (Bornstein, 2015; Bradley et al., 1989; Cote & Bornstein, 2005; National Research Council and Institute of Medicine, 2000; Rodriguez et al., 2009; Stiles, 2000). Young children are particularly vulnerable as they undergo these critical periods of development. Therefore, it is important to study and pay attention to the impact of screen media use among children at these young ages.

However, many parents are confused about the impact of screen media use on their children’s health and development. In fact, the rapidly and constantly developing and evolving media landscape has created a knowledge gap for parents that makes them vulnerable to the many, often opposing messages that they receive about the topic:

“Give your child more screen-time, here’s why” (Hoh, 2013)
“Give kids’ brains a break from screen time” (Race, 2016)
“Screen time can actually be beneficial to children, claims child media expert” (Petter, 2017)
“Screen-based lifestyle harms children’s health” (Palmer et al., 2016)
“Don’t panic! Here’s how to make screens a positive in family life” (Kamenetz, 2018)
“Don’t panic, screen time can be good for kids” (Garlick, 2018)
“Tablets and smartphones damage toddlers’ speech development” (Knapton, 2017)
“Government should impose screen time limits for children on social media, minister suggests” (Agerholm, 2018)
“Why Hunt’s screen time limits for kids are scientific nonsense” (Orben, 2018)

The quotes above represent just a handful of recent media headlines that show the conflicting and alarming information that parents frequently hear about the effects of screen media use on their children’s health and development. Many parents are also inundated with educational and developmental claims made by screen media producers and app developers and experience an ongoing need to embrace and stay informed about ever-changing technologies.
Knowledge is key to enabling parents to make informed decisions regarding children’s screen media use in today’s media-saturated world. Parents’ understanding of their children’s screen media use patterns can be summarised by answering three questions: (a) how much time does my child spend with screens?, (b) what does my child watch or play on screens?, and (c) how does my child view or use screens? These three questions represent the key main parameters of screen media use: quantity, content, and context. Quantity is the amount of time that children spend with screens, content refers to the type of content that they watch or use, and context includes the social settings in which their screen media use occurs (e.g., solitary viewing/using vs. co-viewing/co-using with others). Furthermore details on each parameter are discussed later in this introduction.

Tracking these parameters and monitoring changes in children’s screen media use patterns are becoming more important than ever, given the increasing prevalence of screen media in our lives. It is vital that we conduct the research needed to guide parents to the best research-driven practices in parental media mediation, as well as to provide parents, policymakers, and the public with evidence-based information around both the positive and the negative effects of screen media use on children’s health and development. Numerous studies have attempted to examine the associations between children’s screen media use and various aspects of children’s health and development such as physical activity; sleep; academic achievement; mental well-being; and social, cognitive, and language skills. This thesis focuses on screen media exposure among children under 3 years of age and its association with their language development.
Screen Media Use and Language Development: Issues to Consider

It is important to bear in mind several points when considering if and how screen media use is related to language development. First, screen media have become an integral part of our lives today. They have reshaped our societies and dramatically changed how we learn and the ways that we interact with each other and with the world around us. Technology is now regarded by some researchers as a component of the Home Literacy Environment (HLE) of children (e.g., Knowland & Formby, 2016; Liebeskind, Piotrowski, Lapierre, & Linebarger, 2014), and research indicates that the HLE is a robust predictor of early language development (e.g., Deckner, Adamson, & Bakeman, 2006; Griffin & Morrison, 1997; Liebeskind et al., 2014; Payne, Whitehurst, & Angell, 1994; Rodriguez et al., 2009).

Second, numerous language development theories posit that language development in early childhood is stimulated by the linguistic input that children receive from their immediate environment. Screen media, which children are often exposed to on a daily basis, are among the sources of this linguistic input (Dixon, Zhao, Quiroz, & Shin, 2012; Hoff, 2006; Lavigne, Hanson, & Anderson, 2015; Linebarger & Vaala, 2010). Third, many types of screen media content that are directed towards young viewers are promoted as educational and may contain materials that aim to develop young children’s language and literacy skills (e.g., letters, sounds, numbers, new words). Fourth, as longer times are spent with screen media and as they are gradually replacing real-life face-to-face interactions, there is concern that the excessive use of screen media by children and their parents may distract them from each other and displace other more important language-promoting practices and activities such as parent–child interactions, reading, and play (Anderson & Subrahmanyam, 2017; Hofferth, 2010; Johnson, 2015; Holloway, Green, & Livingstone, 2013; Hudon, Fennell, & Hoftyzer, 2013; Schmidt, Pempek, Kirkorian,
In the present body of work, television and mobile media devices are both generally referred to as screens. However, it is worth clarifying the differences between these two types of media. First, the mobility of mobile media devices makes them accessible anywhere. This has both advantages and disadvantages with regard to family communication opportunities. While mobile media can help family members stay connected when they are not physically close, they can also distract family members from each other when they have valuable co-located time (e.g., at home, in the car; Taylor, Takeuchi, & Stevens, 2018). Television, on the other hand, can be placed in fixed locations (e.g., living room, bedroom), where it can be co-viewed with others, providing opportunities for family togetherness and interactions.

Second, while several children’s television channels only run for specific scheduled periods (e.g., 7 am to 7 pm), mobile media devices can be accessed at any time, unless caregivers place time restrictions on their children’s mobile media use. Another characteristic to consider is the interactivity of mobile media devices. Recent advances in mobile media technology offer children the opportunity to establish back-and-forth interaction cycles that enable them to interact with the screen or with on-screen characters/partners. Television, on the other hand, can only simulate interactions by having on-screen characters speak to the viewer, ask questions, pause for an answer, and give feedback. These responses, however, are subject to inaccurate or inappropriate reactions and awkward timing. Both television and mobile media can also be used to view media content passively (e.g., a child can watch an episode of a non-interactive show on television or on YouTube).
A fourth difference concerns the types of content that can be viewed on mobile media devices and television. Mobile media devices offer children a great variety of content, which often makes it challenging for parents to select, monitor, and control than the content available on television programmes. Additionally, while television programmes are usually aired after being approved by specific authorities, much of the content available on mobile media is made by amateur content creators. Parents can choose the television channels that they prefer for their children and restrict access to unapproved channels. However, despite the increasing advances in parental control methods that can be utilised to filter and monitor children’s online media use, controlling what children view on mobile devices is still challenging.

A fifth difference is the languages of the content that children view on television and mobile media devices. While a typical child living in England, for example, would usually have access to television channels that are mainly in English, mobile media devices offer opportunities to view content in a wide variety of different languages. This exposure is expected to have implications on children’s first or foreign language development.

Despite the differences noted above, television and mobile media devices include screens that enable children to view content on them. Much of the content that is made for television screens can also be accessed via on-demand online platforms such as YouTube. Therefore, when looking specifically at the associations between certain programme contents and children’s learning and development, television and mobile media devices can both be generally conceptualized as screens.

**Theoretical Framework for Screen Media Use and Language Development**

Investigating child language development has been a fertile interdisciplinary field of research for many decades. The study of child language development has given rise to a number
of theories and schools of thought such as social interactionism, behaviourism, nativism, constructivism, and usage-based theories. These each attempt to explain how children acquire language skills, and evaluate the extent to which the environment plays a role in the development of children’s cognitive and linguistic skills (e.g., Bronfenbrenner, 1979; Bruner, 1983; Tomasello, 2003; Vygotsky, 1978).

In particular, theorists within the social interactionist framework posit that language acquisition is the result of interactions between children and their social environments (Rudd & Lambert, 2011). According to this view, language is conceptualised as a social phenomenon, language development is a social process, and children are social beings who acquire language because of their need to communicate with others (Hoff, 2013). There are numerous opportunities for children to engage in varying degrees of active, social interaction with people in their immediate environments (e.g., parents, siblings, relatives, peers), with other socialisation agents that are part of their daily life (e.g., television), with unseen persons (e.g., on the telephone), and with imaginary companions or pretend participants (e.g., teddy bears, dolls, pets; Garton, 1992). Within the social interactionist model, these opportunities are seen as fundamental to the development of children’s cognitive and linguistic skills and knowledge (Garton, 1992).

In this thesis, the association between screen media exposure, which is seen as an integral element of the environment, and language development is examined by drawing on three theoretical perspectives that have stressed the pivotal role of the environment in children’s development: Urie Bronfenbrenner’s ecological systems theory, Lev Vygotsky’s sociocultural theory, and Michael Tomasello’s usage-based theory.
**Ecological systems theory.** Bronfenbrenner’s (1979) ecological systems theory focuses on the social contexts in which children live and posits that children’s development is influenced by the reciprocal interactions between a series of nested ecological systems (i.e., *microsystem, mesosystem, exosystem, macrosystem, and chronosystem*). The microsystem is the innermost layer of the interacting systems and represents the child’s immediate surroundings and direct contacts (e.g., parents, siblings, peers, teachers). The mesosystem includes the interactions between microsystems (e.g., the relationship between the child’s parents and the child’s teachers). The exosystem contains the contexts that do not directly include the developing child (e.g., the child’s parents’ workplace), but nevertheless influence the child’s life and development. The macrosystem is the set of values, ideologies, and cultural beliefs of the environment where the child lives. The chronosystem includes the transitions and events that occur over the lifetime or the historical period of the child and the child’s world. According to ecological systems theory, each of these systems has direct or indirect influence over the child’s development (Bronfenbrenner, 1979, 1988, 1994; Bronfenbrenner & Morris, 1998).

When ecological systems theory was first introduced in 1979, television was the prevalent technology that was available to children. Television was considered by Bronfenbrenner to be part of the child’s exosystem because it enters the child’s home from an external source. Bronfenbrenner argued that this powerful medium influences parents and parent–child interactions and thus it operates not completely within the child’s microsystem, but rather across the child’s ecological borders.

Obviously, the emergence of ecological systems theory occurred prior to the digital and Internet revolution which has massively changed human life. In today’s digital world, screen media are integrated within various ecological system contexts. For example, parents, their
media mediation practices, media use rules, and access to media at home all fall within the child’s most immediate context, the microsystem; whereas parents’ attitudes and beliefs towards media are part of the child’s macrosystem. The interactions between these systems are likely to influence how children engage with media and how media impact their learning and development (Liebeskind et al., 2014).

The *ecological techno-subsystem* is a dimension of the microsystem that was proposed by Johnson and Puplampu (2008) to account for the presence of the Internet within the ecological system. The techno-subsystem includes children’s interaction with living (e.g., peers) and non-living (e.g., hardware) elements of information, communication, and recreation technologies in their immediate environments. Jones and Park (2015) have argued that this subsystem definition is consistent with Bronfenbrenner’s view that children are not merely passive recipients of their environmental experiences, but that they have influence on, and are influenced by, their reciprocal interactions with their surroundings.

Bronfenbrenner (1979) coined the term *molar activity*, defining it as “an ongoing behavior possessing a momentum of its own and perceived as having meaning or intent by the participants in the setting” (Bronfenbrenner 1979, p. 45), and highlighted the significance of molar activities on learning and development. The idea is that all experiences and activities do not play equal roles in children’s development. Some occur infrequently and/or are not very significant, whereas others (molar activities) occur frequently and have more notable influences on development (Lauricella, Wartella, & Rideout, 2015). Given the often very strong presence of screen media across different contexts within children’s ecological systems, along with the increasing amount of time that children and their families spend engaged with screens, children’s
and parents’ media use, parental attitudes towards media, and parental media mediation practices can all be regarded as molar activities in children’s environments (Lauricella et al., 2015).

As noted above, one of the major concerns associated with children’s excessive use of screens is the reduction, or even possible displacement, of real-life social interactions. This possibility is particularly important in light of the fact that these types of interactions are an essential component of ecological systems theory. Indeed, the concern about time displacement is not new. Bronfenbrenner (1979) wrote,

Like the sorcerer of old, the television set casts its magic spell, freezing speech and action and turning the living into silent statues so long as the enchantment lasts. The primary danger of the television screen lies not so much in the behavior it produces as the behavior it prevents: the talks, the games, the family festivities and argument through which much of the child’s learning takes place and his character is formed. Turning on the television set can turn off the process that transforms children into people. (p. 242)

Sociocultural theory. The second theoretical framework that provides a foundation for the current thesis is Lev Vygotsky’s (1978) sociocultural theory. This theory emphasises the importance of social interaction on language acquisition and cognitive development. According to this theory, a child’s cultural development occurs on two levels: 1) the social level, where the child observes other people’s interactions; and 2) the individual level, where the child develops the ability to communicate by themselves (Vygotsky, 1978).

Vygotsky also developed the notion of the Zone of Proximal Development (ZPD), which is defined as the distance between the child’s Actual Developmental Level (ADL) and the child’s higher Potential Developmental Level (PDL). According to Vygotsky’s ZPD, the PDL is achieved when children socially interact with a More Knowledgeable Other (MKO) to solve a
problem or to perform a task. In these situations, the MKO *scaffolds* the learning process by leading and guiding the child, and eventually the child becomes capable of solving the problem or performing the task independently. *Scaffolding* (Wood, Bruner, & Ross, 1976) refers to the support that an adult provides in the early stages of learning. It enables the child to tackle a task that is beyond the child’s unassisted capabilities, and is removed when the child has gained the competence required to complete the task independently (Wood et al., 1976).

In light of Vygotsky’s views, screen media use can manifest itself in several ways. Social partners that are referred to in Vygotsky’s (1978) ZPD and Wood et al.’s (1976) scaffolding have typically included people in the child’s immediate environment (e.g., parents, teachers, siblings, peers). However, the growing prevalence of screen media in children’s lives suggest that screen media devices themselves may act as MKOs that scaffold children’s development and facilitate learning (Richert, Robb, & Smith, 2011). This concept is particularly applicable to interactive media devices that can provide children with tasks that are just slightly beyond their unassisted capabilities. In these cases, children’s learning from screens can occur as a result of their independent exploration of screen media devices or through scaffolding by an adult (Neumann & Neumann, 2014). Moreover, parent–child interactions that take place during screen media co-viewing or co-using can also scaffold children’s language development (Bittman, Rutherford, Brown, & Unsworth, 2011; Nikken & Schols, 2015). However, as noted above, although screen media devices can provide children with additional linguistic and cognitive input and can serve as an important source of knowledge and information, a major concern is that children’s excessive use of screens may displace real-life social interactions, which are at the core of Vygotsky’s theory of development.
**Usage-based theory of language acquisition.** The association between screen media use and language development can also be explained in light of usage-based theories of language development. The basic tenet of this framework is that language acquisition emerges from language use and experience, that language skills are gradually accumulated through the sociocultural uses of language, and that children construct their language through their interaction with more experienced others by means of cognitive-general processes such as categorisation and analogy (Bybee & Scheibman, 1999; Croft, 2001; Langacker, 1987; Tomasello, 2003, 2005, 2009). Within this view, children build language based on the input that they experience on a daily basis as well as on their own existing linguistic representation (Cameron-Faulkner, Lieven, & Theakston, 2007). The usage-based approach represents a departure from Chomsky’s nativist view of language acquisition, which postulates that children are born with an innate knowledge of language (Universal Grammar).

Two themes of interest to the current research seem to be central within the usage-based approach: joint attention and frequency of input. Within the usage-based framework, joint attention (the shared focus of two individuals towards an object of mutual interest) is thought to be fundamental in language development (Tomasello, 1995, 2003; Tomasello & Farrar, 1986). Joint attention is believed to help children in developing reference, which is an essential skill in word learning (Baldwin, 1991, 1993; Bruner, 1983; Waxman & Gelman, 2009). In addition, it contributes to caregiver–child interactions, which are also known to support early language development (Akhtar, Dunham, & Dunham, 1991; Bruner, 1975; Dunham, Dunham, & Curwin; 1993; Tomasello, 1988; Tomasello & Farrar, 1986). Joint attention skills may also be linked with early language development, as they reflect the maturation of important cognitive, social, and self-regulatory capacities within the child (Mundy & Gomes, 1998).
Another central theme within this framework is the key role that input frequency plays in language development (Bybee, 1985, 2006, 2010; Cameron-Faulkner & Noble, 2013; Ibbotson, 2013; Kidd, Lieven, & Tomasello, 2010; Zyzik, 2009). Usage-based approaches are input-dependent or input-driven, as input is viewed in these approaches as the driving force of language acquisition (Zyzik, 2009). Learners are thought to have various cognitive capacities at their disposal that help them in abstracting regularities from the input they are exposed to in their environments (Zyzik, 2009). Frequency of input is believed to lead to automation of the linguistic elements that repeatedly appear in the input children are exposed to (Bybee & Hopper, 2001; Ellis, 2002).

The usage-based approach suggests that the environment affects the nature and use of language, and therefore environmental influences, such as media and communication technology, may have an impact on the development of language and literacy skills (Watt, 2010). Screen media can be seen as sources of the linguistic input children are exposed to, and as one of the forms of their language experiences. Moreover, screen media can provide children with opportunities for joint attention, which is, as mentioned earlier, a fundamental process within the usage-based approach (Behrens, 2009; Tomasello, 2003, 2008). This is especially true in the case of co-viewing, when children are joined by others (e.g., parents or siblings) while viewing or using screens.

As explained in a recent work by Lech and Harris (2019), learners are exposed to language samples (e.g., phrases, idiomatic expressions, slang) that are present in the media materials they view. Older children and adults can use interactive media or social media to actually use language and co-create linguistic structure through the use of language (Lech & Harris, 2019). Passive media-related activities such as watching television shows and movies
help the viewer in creating a strong basis of the language construction in the viewer’s mind (Lech & Harris, 2019). Frequently repeated sayings and phrases motivate later imitation of these language exemplars. This way, frequency of input, which is regarded by usage-based researchers as a key element in language learning, is achieved (Lech & Harris, 2019).

**Association Between Screen Media Use and Language Development: Literature Review**

Do screen media have a positive or a negative impact on children’s language development? The answer to this question is not straightforward. The reported findings to date vary widely across studies based on their differing foci on variables such as the child’s age, the screen medium examined (e.g., television, touchscreen, computer), screen media parameters (quantity, content, or context), and language outcomes (e.g., expressive language skills, receptive language skills, vocalisations, vocabulary size, novel word learning, imitation, gestures). In this section, the literature will be briefly reviewed based on the three screen media parameters described above (quantity, content, and context). This review of the literature is mainly limited to studies that were conducted with children under the age of 5 years. A more detailed review of the literature is provided in the introduction of Paper 3 (Chapter 4).

**Quantity of screen media exposure.** Research on the quantity of screen media exposure involves three aspects: (a) the amount of time that children spend actively engaged with screens (*foreground exposure*), (b) the amount of time that children spend exposed to screens in the background without actively viewing or using them (*background exposure*), and (c) the onset age at which children start viewing or using screens, which contributes to the total cumulative amount of time children are exposed to screens.
**Amount of foreground screen media exposure.** Previous research and policy statements on children’s media use have mainly focused on the amount of children’s foreground screen exposure (screen time) and its impact on their health and development. Several international health bodies recommend no screen time for children under 2 years and 1 to 2 hours per day of screen time for children 2 to 5 years old (e.g., American Academy of Pediatrics, 2016a; Australian Department of Health, 2017; Canadian Paediatric Society, 2017; German Federal Ministry of Health, 2016; New Zealand Ministry of Health, 2017). The recommendations and guidelines issued by these health organizations are often based on research findings regarding the effects of screen media use not only on language and cognitive development, but also on various aspects of children’s health, well-being, and development such as obesity, physical activity, mental well-being, sleep, attention, and learning. Although many of these recommendations are informed by recent research findings and are updated regularly, there is still no agreement among researchers on the exact amount of time that children at different ages should spend with media. This is reflected in a recent guide by the UK’s Royal College of Paediatrics and Child Health (2019), which refrained from recommending a cut-off for children’s screen time, although parents were advised to make sure screen time does not displace physical or social activities and sleep.

The majority of the studies that examined the relationship between the quantity of foreground screen media exposure and language development in young children point to either insignificant or negative relationships. Several studies have found that the amount of foreground screen media exposure is associated with lower expressive language outcomes (e.g., Duch et al., 2013), lower receptive language outcomes (e.g., Duch et al., 2013; Mendelsohn et al., 2010; Pagani, Fitzpatrick, & Barnett, 2013; Zimmerman, Christakis, & Meltzoff, 2007), and language
delays (Chonchaiya & Pruksananonda, 2008). On the other hand, some studies have found no significant associations between the amount of time that children spend with screens and language outcomes (e.g., Alloway, Williams, Jones, & Cochrane, 2014; Schmidt, Rich, Rifas-Shiman, Oken, Taveras, 2009; Taylor, Monaghan, et al., 2018; Patterson, 2002). This is, therefore, an important aspect of screen media use to look at when examining its association with language development.

The discrepancies observed in the studies reviewed could be attributed to differences in several factors including: (1) the age of the children in the samples, (2) the different language assessment tools used, and (3) the different tools used to measure screen time (e.g., 24-hour recall questionnaires, 24-hour recall diaries, interviews). In addition, in some studies (e.g., Taylor et al., 2018), variables such as parental high level of education and high frequency of reading to children could work as buffers to the potential negative effects of screen time, which may explain the insignificant associations between the amount of screen time and vocabulary size. Despite the mixed findings, there seems to be a consensus among most studies that the amount of foreground screen time is not positively associated with vocabulary size in infants and toddlers.

**Amount of background screen media exposure.** The total amount of screen media exposure consists not only of the amount of foreground screen media exposure but also the amount of background screen media exposure (Anderson & Pempek, 2005). It is worth first noting that background screen media exposure is more applicable to TV than to mobile media, as the nature of mobile media devices usually requires active individual engagement. Furthermore, devices often auto-lock or run out of power when they are left on but not in use, and therefore they are less likely to be available in the background. Although research on children and screen
media has typically focused on the amount of foreground screen media, research examining the effects of background TV exposure on young children’s development is particularly important because parents commonly assume that background TV has little or no effect on their young children as they do not seem to pay attention to it (Pempek, Kirkorian, & Anderson, 2014). Contrary to this assumption, some findings on background exposure show that it is associated with lower cognitive and expressive and receptive language skills (e.g., Barr, Lauricella, Zack, & Calvert, 2010; Hudon, Fennell & Hoftyzer, 2013; Tomopoulos et al., 2010; Masur, Flynn, & Olson, 2016; Bittman et al., 2011). These negative effects are probably related to the associations found between background exposure and other practices that are predictive of early language development. For example, background screen media exposure has been linked with reduced quantity and quality of parent–child verbal interactions (e.g., Christakis et al., 2009; Pempek et al., 2014; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Tanimura, Okuma, & Kyoshima, 2007; Masur et al., 2016) and reduced sustained attention during toy play (e.g., Courage, Murphy, Goulding, & Setliff, 2010; Schmidt et al., 2008; Setliff & Courage, 2011). It should be taken into consideration that many of the studies reviewed above measured foreground and/or background TV time only, especially the studies that were conducted prior to the advent and widespread use of mobile media devices.

**Onset age of screen media exposure.** A growing body of research indicates that age is an important factor in determining the potential negative or positive effects that screen media can have on children’s language development. Several studies have reported developmental benefits for screen media use for children above the age of 2 years (e.g., Krcmar, 2014; Krcmar, Grela, & Lin, 2007; Linebarger & Walker, 2005; Nussenbaum & Amso, 2016; O’Doherty et al., 2011; Schmitt & Anderson, 2002; Troseth & DeLoache, 1998). Other studies have found either a lack
of benefits or negative outcomes for children under 2 years of age (e.g., Krcmar, 2014; Krcmar et al., 2007; Richert, Robb, Fender, & Wartella, 2010; Schmitt & Anderson, 2002; Troseth & DeLoache, 1998; Zimmerman et al., 2007).

However, few studies have looked at the impact of the onset age at which screen media viewing starts and its relation to developmental outcomes. One study that did examine this question found that children who started watching TV before the age of 12 months and who watched TV for more than 2 hours per day were about six times more likely to experience language delays as diagnosed by the Denver Developmental Screening Test (Denver II) (Chonchaiya & Pruksananonda, 2008). Another study carried out by Hudon et al. (2013) examined the onset age of TV viewing as a factor contributing to what they called the quality aspect of screen media viewing among toddlers aged 17 to 29 months, along with the frequency with which children were exposed to background television, the frequency with which they were exposed to adult-directed programming, and how often they were accompanied by an adult while viewing. This study found that children with poorer quality viewing experiences (including earlier onset age of television viewing) had lower productive vocabulary scores (Hudon et al., 2013).

However, it should be noted that Hudon et al. (2013) appeared to conflate quantity and content in their study. In the current body of work, onset age of screen media viewing is seen as a factor that comprises the quantity not the quality (content) aspect of screen media viewing. The younger the age at which children start viewing or using screens, the more cumulative time they spend with screens. In addition, like other research (e.g., Anderson & Pempek, 2005; Kostyrka-Allchorne, Cooper, & Simpson, 2017; Li, Mendoza, & Milanaik, 2017), the current work conceptualises background exposure as extra time that children are exposed to screens in
addition to their direct foreground exposure. The combination of foreground and background exposure results in the quantity aspect of screen media use. Moreover, in line with other studies (e.g., Rideout, Vandewater, & Wartella, 2003; Sims & Colunga, 2013; Vandewater & Lee, 2009; Zack & Barr, 2016), in the present work, whether children view screen media on their own or with others is an aspect that is considered to be part of the context of the screen media use experience. Similar to the studies that investigated the quantity of time children spend with screens, the studies that looked at the onset age of viewing reviewed above only assessed the onset age of TV viewing, but not the onset age of mobile media exposure.

**Content of screen media.** Although the focus of most studies in the field has been on the quantity of screen time, numerous investigations maintain that the association between screen media use and language and literacy development primarily depends on the types and features of the content consumed. It is important to note here that most of these studies focus on TV or DVDs, as opposed to mobile media devices. However, their findings may be extended to some of the content types delivered by mobile media devices (e.g., *YouTube* videos) since mobile media devices are sometimes used as on-demand platforms to access shows that originally air on TV.

The term *content* is frequently used in the literature to refer to types or genres of programmes, apps, or videos (e.g., educational, entertainment, child-directed, music) as well as media content features or characteristics (e.g., fast-paced, loud, interactive; Barr & Linebarger, 2017; Barr, Danziger, Hilliard, Andolina, & Ruskis, 2010; Nikken & Schols, 2015; Tomopoulos et al., 2010; Vaala & Jordan, 2017). The content of screen media is sometimes referred to as the *quality* of screen media or the quality of content (e.g., Becker, 2013; Brown, Shifrin, & Hill, 2015; Ciboci, Kanižaj, & Labaš, 2014; Huisman, 2014; Kumpulainen & Gillen, 2017). In these
cases, what is meant is the quality features of the screen media content, not the quality of the media viewing experience.

Research shows that certain media content features are positively associated with language outcomes, while other features are negatively associated. Screen media content are varied and rapidly evolving. Therefore, there is still no agreement on how to classify them. Previous studies on the types of screen media content available to children have looked at several factors, including the media’s target audience (infant/toddler-directed, older children-directed, or adult-directed), their educational value (educational vs. non-educational), their language-related properties (e.g., talking directly to viewers, eliciting participation, limited-language shows), their formal features (e.g., camera cuts and zooms, pace, scene lengths, special effects), and their contingency and interactivity (i.e., contingent vs. non-contingent; interactive vs. non-interactive). The literature that examines each of these content aspects and its association with language outcomes will now be reviewed.

**Target audience.** Numerous longitudinal studies indicate that watching content that is not age-appropriate by young children is negatively associated with cognitive and language outcomes. For example, Wright, Huston, Murphy, et al. (2001) have found that frequent viewing of general-audience programmes between ages 2 and 3 was associated with poorer performance on four measures of academic skills (maths, reading, receptive vocabulary, and school readiness) when assessed at age 3. On the other hand, viewing educational child-directed television programmes was positively associated with subsequent performance on the four measures (Wright, Huston, Murphy, et al., 2001). In their study, Wright et al. (2001) controlled for home environment quality (as assessed by the Home Observational Measure of the Environment Inventory [HOME]; Caldwell & Bradley, 1984) and for primary language spoken in the home.
A study on younger children by Tomopoulos et al. (2010) has found that after adjusting for potential confounding variables, including family sociodemographic characteristics and home environment factors, viewing older child/adult-oriented content on television or videos/DVDs by 6-month-olds was linked with poorer language and cognitive outcomes at age 14 months. Tomopoulos et al. (2010), however, have found no significant association between viewing child-directed educational or non-educational content and language or cognitive outcomes. Another longitudinal study has found that high exposure to adult-directed content on television at ages 1 and 4 was linked to poorer cognitive skills (vocabulary, spatial skills, pre-numeracy skills, and pre-literacy skills) at age 4 even when parental education was controlled (Barr, Lauricella, et al., 2010). In addition to the negative relationship between viewing adult-directed media and children’s developmental outcomes identified above, adult-directed content viewing on television and/or videos/DVDs has been linked to a reduction in the quality and quantity of parent–child interactions, which are fundamental for early language development (e.g., Christakis et al., 2009; Kirkorian et al., 2009; Mendelsohn et al., 2008; Pempek et al., 2014; Tanimura et al., 2007).

**Educational value.** Educational benefits are among the most frequent motives that parents cite for allowing their children to use screens (Baek, Lee, & Kim, 2013; Bentley, Turner, & Jago, 2016; Cingel & Krcmar, 2013; Li et al., 2017; Marsh et al., 2015; Nevski & Siibak, 2016). This belief is likely related to the increasing popularity of child-directed shows and apps that are advertised as having educational and developmental benefits for infants and toddlers (Hirsh-Pasek et al., 2015; Garrison & Christakis, 2005; Linebarger & Vaala, 2010). Young children are among the most targeted age groups in the educational media market. A review of 183 apps gathered from lists of the top 50 educational apps available in popular app stores such
as Google Play and the Apple App Store and from expert review sites, revealed that, when the
target age group was listed, 90% of the apps listed preschool-age children as at least part of their
target audience (Vaala, Ly, & Levine, 2015).

In response to producers’ and developers’ educational claims, several studies have been
carried out to assess the effectiveness of child-directed educational programmes on learning. For
example, numerous investigations have reported positive associations between viewing the
popular children’s TV programme, Sesame Street, and increased vocabulary size, improved
receptive vocabulary, and better school readiness among children above 2 years of age (e.g.,
Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Rice, Huston, Truglio, & Wright,
1990; Wright, Huston, Scantlin, & Kotler, 2001; Zill, Davies, & Daly, 1994). Similarly, children
who viewed television/video educational content more frequently when they were 2 and 3 years
old performed better at age 3 in receptive vocabulary and school readiness tests than did those
who were infrequent viewers of educational content (Wright, Huston, Murphy, et al., 2001).
Wright, Huston, Murphy, et al. (2001) suggest that many of the programmes viewed by the
children in their study presented information with certain techniques that made the programmes
appealing and comprehensible, were targeted towards specific age groups, and were based on
formative research and careful curriculum development.

While developmental benefits from child-directed educational content have been reported
in children aged 2 years and older, watching educational infant-directed DVDs was not
significantly associated with increases in expressive or receptive vocabulary scores in children
under 18 months (DeLoache et al., 2010) even after controlling for age, gender, cognitive
developmental level, parental education, and income (Robb, Richert, & Wartella, 2009). These
findings are consistent with a growing body of research indicating that young children under 2
years do not learn as effectively from screen media as they do from live presentations (e.g., Barr & Hayne, 1999; Barr, Zack, Garcia, & Muentener, 2008; DeLoache et al., 2010; Hayne, Herbert, & Simcock, 2003; Krcmar, 2011; Krcmar et al., 2007; Neuman, Kaefer, Pinkham & Strouse, 2014; Robb et al., 2009; Roseberry, Hirsh-Pasek, Parish-Morris & Golinkoff, 2009; Schmitt & Anderson, 2002). Anderson and Pempek (2005) refer to this phenomenon as the *video deficit effect*. Infants and toddlers also exhibit a deficit in transferring knowledge from two-dimensional (2D) contexts, such as screens, to the three-dimensional (3D) real-world context (Barr, 2010, 2013). However, several studies have shown that the video deficit effect can be ameliorated for children aged 1 to 2 years when the video is repeated (Barr, 2010). Repeated exposure to specific child-directed educational shows/DVDs was associated with better comprehension of the content viewed (Crawley, Anderson, Wilder, Williams, & Santomero, 1999; Linebarger & Vaala, 2010; Sell, Ray, & Lovelace, 1995), higher receptive vocabulary scores (Krcmar, 2014; Vandewater, 2011), and higher gains in learning DVD-specific words (Krcmar, 2014).

**Language-related properties.** Screen media content available to children also differ in the language- and literacy-related properties they feature. Language- and literacy-related properties include content features that aim at enriching and stimulating children’s language and literacy skills, such as labelling, questioning, modelling literacy skills, targeting alphabet knowledge and phoneme awareness, using descriptive talk, extended turn-taking, and establishing joint attention (Vaala et al., 2010). Research does indicate that the language- and literacy-related characteristics employed in children’s media content play a role in facilitating or hindering children’s learning from screens.

Linebarger and Walker (2005) conducted a longitudinal study that measured language outcomes in relation to specific programmes viewed by children starting at 6 months of age for a
period of 2 years. Their study showed that infants and toddlers who viewed programmes that had a strong narrative and a storybook-like nature and that offered viewers multiple opportunities to hear vocabulary items and their definitions, to see visual representations of words, and to hear and see interactions between characters (e.g., Arthur, Clifford, or Dragon Tales) had higher expressive vocabulary scores at age 30 months than non-viewers. The same positive language outcomes were reported for children who watched shows that had on-screen characters that mimicked live interactions, faced the audience, spoke directly to the child, labelled objects, asked questions, elicited participation, and paused for a reply (e.g., Dora the Explorer or Blue’s Clues).

On the other hand, Linebarger and Walker (2005) found that viewing shows that provided poor language models (e.g., the use of baby talk by the characters and very limited use of words), that had little dialogue, and that had a loose narrative structure (e.g., Teletubbies) was related to fewer vocabulary words and smaller expressive language scores. Krcmar et al. (2007) also examined Teletubbies and found that children younger than 22 months were able to fast map (rapidly learn novel words) from an adult speaker, but were not able to accurately fast map from Teletubbies. Krcmar et al. (2007) argue that parents should be aware that overly vivid shows geared towards pre-verbal toddlers may be entertaining, but may not necessarily teach language adequately.

As noted by Linebarger and Walker (2005), given the correlational nature of their study, they were not able to determine causality. Although Linebarger and Walker (2005) controlled for parental education, child’s home environment, and child’s cognitive performance, they note that association between media viewing and language outcomes could also be explained by selection effects. That is, young children who are more cognitively mature may pay greater
attention to certain programmes and may exhibit more communication development as a result of their cognitive maturity, rather than as a result of media viewing contributing to their communication development. It should also be noted that, similar to studies conducted prior to the advent of smartphones and touchscreens, Linebarger and Walker’s (2005) study only examined programmes viewed on TV sets, but not on any other types of media devices.

**Formal features.** Formal features of screen media (e.g., camera cuts and zooms, pace, scene lengths, special effects) may also play a role in enhancing or obstructing children’s language development. Huston and Wright (1983) proposed a theory which distinguishes between *perceptually salient formal features* (e.g., rapid pacing, fast motion, frequent camera cuts, visual special effects, loud music, non-speech vocalisations), which are very common in children’s programming, and *informative formal features* (e.g., dialogue, narration), which aid comprehension. Very young children are more drawn to the perceptually salient formal features. However, children’s attention patterns gradually shift over time, and they become more attracted to informative formal features, more interested in the meaning and content of the programmes that they watch, and less responsive to salient formal features (Frank, Vul, & Johnson, 2009; Huston & Wright, 1983). Goodrich, Pempek, and Calvert (2009) examined 59 DVDs designed for children under 3 years and found that most of them were composed of high concentrations of perceptually salient formal features.

Some studies have examined the relationship between the formal features employed in child-directed shows and apps and children’s learning, attention, and comprehension. A number of researchers argue that the formal features of fast-paced shows make learning from them challenging for infants and toddlers. They suggest that the features of these shows create additional cognitive load on young children’s limited processing capacity, impair selective
attention to target content, and inhibit young children’s ability to transfer learning from a 2D source (e.g., screen) to a 3D world (Barr, Shuck, Salerno, Atkinson, & Linebarger, 2010; Christakis, 2009, 2014; Goodrich et al., 2009; Linebarger & Vaala, 2010; Zimmerman & Christakis, 2007). Eye-tracking research supports these concerns by showing that processing transitions to new scenes is difficult for infants, who require more time than older viewers to orient to new scenes (Kirkorian, Anderson, & Keen, 2012). These concerns are also supported by many studies indicating that toddlers’ and pre-schoolers’ viewing of fast-paced shows is associated with lower executive functioning skills, which are essential to social, cognitive, and linguistic functioning (e.g., Friedrich & Stein, 1973; Geist & Gibson, 2000; Huber, Yeates, Meyer, Fleckhammer & Kaufman, 2018; Lillard & Peterson, 2011).

Age seems to be an important factor to consider when studying the effects of salient formal features on children’s learning. Whereas viewing violent television shows, which usually contain higher amounts of perceptually salient formal features, before age 3 has been found to be significantly associated with subsequent parent-reported attentional problems at age 7, exposure to any television content type (educational, non-violent entertainment, and violent entertainment) at age 4 to 5 has been found not to be associated with subsequent attentional problems (Zimmerman & Christakis, 2007). Although toddlers and pre-schoolers may be particularly interested in, and attracted to, salient formal features, such features are often difficult to comprehend and more likely to have a negative impact on young viewers, particularly if they are under 3 years of age. Therefore, producers who claim that their shows are educational must consider the suitability of the formal features they use for the cognitive capacities of their target audience (Goodrich et al., 2009).
**Contingency and interactivity.** Research is emerging on other qualities specific to digital media and their association to learning outcomes. Contingency and interactivity are two qualities that are often discussed and studied. Traditionally, *social contingency* is defined as the reciprocal interaction that occurs between a child and an adult when a social behaviour emitted by the child (e.g., vocalisation while gazing at the adult partner) is met by another social behaviour emitted by the adult (Dunham & Dunham, 1995). More broadly, the term is defined as addressing the child and responding to the child’s words and actions as in real-life interactions (Cantor & Cornish, 2016). In the context of digital media technologies, the term *interactivity* refers to “the phenomenon of mutual adaptation, usually between a communication medium such as the Internet or a video game and a human user of that medium” (Neuman, 2008, p. 2305). Interactive digital media offers a different type of contingent interaction: a physical touch that leads to an on-screen response (Russo-Johnson et al., 2017).

Contingency plays a key role in learning and serves as a social cue for language development (Hirsh-Pasek et al., 2015; Ramírez-Esparza, García-Sierra, & Kuhl, 2014; Roseberry, Hirsh-Pasek, & Golinkoff, 2014). Research has shown that learning can occur when a back-and-forth cycle is established between two speakers, in which each speaker reacts in response to the other (Hirsh-Pasek et al., 2015). Recent advances in technology offer users the opportunity to establish this back-and-forth cycle with other users on a screen via live video chat. A socially contingent partner in a video chat can give more immediate, reliable, and accurate responses (Roseberry et al., 2014). Pre-recorded videos, on the other hand, can only simulate video chat interactions by asking questions, pausing for an answer, and giving neutral feedback, but may not respond accurately and appropriately to children’s interactions (Myers, Lewitt, Gallo, & Maselli, 2017).
Several investigations have shown that children as young as 24 months can learn from video when an on-screen partner interacts with them in socially contingent ways (Troseth, Saylor, & Archer, 2006; Roseberry et al., 2014; Myers et al., 2017; Russo-Johnson, Troseth, Duncan, & Mesghina, 2017). A number of studies have compared children’s learning from live, contingent video chats with non-contingent, pre-recorded videos. Roseberry et al. (2014), for instance, found that toddlers aged 24 to 30 months were able to learn novel verbs from contingent video chat interactions and from face-to-face interactions, but not from a non-contingent pre-recorded video. Myers et al. (2017) carried out a study examining how children learn from a *FaceTime* partner compared to a pre-recorded video partner. Their research found that 2-year-old children were able to form a social connection with a virtual partner and to learn novel words, actions, and patterns more readily from the *FaceTime* condition than from the pre-recorded video condition (Myers et al., 2017). As with a number of other factors noted above, age plays a role in the relationship between contingency and children’s learning. Although children under 16 months in the Myers et al. (2017) study were able to pay attention to, imitate, and respond to their partners in both conditions, they did not remember their partners or what they had learned from them when they met their partners in person for the first time at the end of a total of six *FaceTime/video* sessions. Myers et al. (2017) suggested that this was probably due to either a failure of retention or a failure of transfer to the new context. Taken together, studies to date suggest that social contingency has the potential of facilitating children’s word learning from screens starting at 2 years of age.

Digital media interactivity is another important screen media feature that has been increasingly examined in recent studies. Meaningful, engaged, and socially interactive experiences aid learning, and if interactive features are integrated within touchscreen apps, there
would likely be significant potential for learning from screens in early childhood (Hirsh-Pasek et al., 2015). Traditional media such as television have attempted to create interactive experiences by having television characters speak directly to child viewers and pause in anticipation of responses from the viewers. However, as mentioned earlier, pre-recorded videos are subject to awkward timing and inaccurate or inappropriate reactions from the on-screen characters (Liebeskind & Bryant, 2017). On the other hand, interactive apps can provide contingent responses to children’s activities by bringing animations to life when tapped, offering immediate feedback on the child’s answers, and adapting to children’s abilities and knowledge levels by scaling task difficulty based on previous performances rather than presenting increasingly challenging tasks over a set period of time (Liebeskind & Bryant, 2017).

Researchers have argued that when properly designed, interactive features can scaffold and facilitate children’s learning (Hirsh-Pasek et al., 2015; Huber et al., 2018; Russo-Johnson et al., 2017; Takacs, Swart, & Bus, 2015). An experimental study found that toddlers aged 24 to 30 months learned more words from interactive touchscreen videos than from non-interactive touchscreen videos (Kirkorian, Choi, & Pempek, 2016). Prior work has also indicated that interactivity can facilitate children’s abilities to transfer what they learn on screens to real-life experiences. In a study by Lauricella, Pempek, Barr, and Calvert (2010), toddlers aged 30 to 36 months joined a hide-and-seek object retrieval game in which they either (a) played an interactive computer game that revealed where objects were hidden by pressing the spacebar, (b) watched a recorded video of a computer game that another person had previously played, or (c) observed an adult who was demonstrating a hide-and-seek game through a one-way mirror. After this exposure, the children were asked to search for the objects in a room that looked like the room in the game. The study showed that children who played the interactive game and
those who observed the adult performed significantly better than those who viewed the video. As Sheehan and Uttal (2016) noted, although this study was not conducted on touchscreens, its findings suggest that contingency and interactivity can facilitate children’s understanding of symbol-referent relations compared to passively viewing a video.

However, not all interactive features are useful for learning. Many researchers have agreed that interactive features in apps need to be used strategically in order to facilitate young children’s learning rather than cause distractions (Russo-Johnson et al., 2017; Nussenbaum & Amso, 2016; Takacs et al., 2015). As Takacs et al. (2015) have noted, additional non-verbal information such as background sounds, music, and animated visualisations can aid children’s comprehension as long as they are congruent with the narration. The types of interactive features such as games and hotspots that are used in most children’s electronic books (e-books), however, are often unrelated to the books’ stories (Guernsey, Levine, Chiong, & Severns, 2012). In a meta-analysis of 43 studies with children aged 3 to 10 years, multimedia features (e.g., animated pictures, music, and sound effects) were found to have a significant positive effect on story comprehension and expressive vocabulary compared to traditional print books (Takacs et al., 2015). However, digital books with interactive features (e.g., hotspots, games, and dictionaries) had no significant advantage over traditional print books in measures of story comprehension and expressive word learning (Takacs et al., 2015).

In a study on younger children, Strouse and Ganea (2016) examined 19- to 23-month-olds’ learning of a novel label from an interactive e-book in four conditions: (1) a non-contingent condition, where book pages turned regardless of the child’s touch; (2) a contingent distracting condition, where a correct touch triggered an animation and a child-friendly sound effect that was irrelevant to the novel label; (3) a contingent neutral condition, where a correct touch
triggered a page turn; and (4) a contingent supporting condition, where a correct touch triggered a “good job” and a page turn. Toddlers learned the novel words in the contingent neutral and contingent supporting conditions, but failed to learn from the non-contingent and contingent distracting conditions. These findings demonstrate that simple, relevant, interactive features appear to aid learning, whereas irrelevant interactivity seems to distract children and interfere with learning.

**Context of screen media exposure.** There has been a recent, growing interest in examining the context of screen media use rather than its quantity or content type. Context refers to how children watch or use screens and whether it is a solitary or a shared activity. The term *co-viewing* has long been used to refer to when someone, especially a parent, engages with the child in viewing television (Austin, 1993; Dorr, Kovaric, & Doubleday, 1989; Valkenburg, Krcmar, Peeters, & Marseille, 1999).

Co-viewing is traditionally classified in the literature as one of the three main forms of *parental media mediation*: (1) *restrictive mediation*, (2) *active mediation*, and (3) *co-viewing* (Nathanson, 2001; Valkenburg et al., 1999; Warren, 2003, 2005). Parental media mediation is a term that refers to the various strategies parents use to manage and regulate their children’s experiences with screen media and to mitigate the risks that could result from negative uses of technology (Blum-Ross & Livingstone, 2016; Clark, 2011; Nathanson, 2002; Takeuchi & Stevens, 2011; Valkenburg et al., 1999). In restrictive mediation, parents set rules to limit their children’s exposure to media, specifically with regard to the type of content and the amount of time (Nathanson, 2001; Valkenburg et al., 1999). In active mediation, or what is also known as *instructive mediation*, parents discuss with and/or explain to their children the media content they view together (Barkin et al., 2006; Valkenburg et al., 1999). Active mediation may take place
during or after viewing (Valkenburg et al., 1999). In active mediation, parents express their approval or disapproval of media messages (Valkenburg et al., 1999; Warren, Gerke, & Kelley, 2002). Co-viewing is traditionally used in the literature to refer to watching or using media together with the child, often without engaging in purposeful or critical discussion of content (e.g., Austin, Bolls, Fujioka, & Engelbertson, 1999; Clark, 2011; Hwang, Choi, Yum, & Jeong, 2017; Takeuchi & Stevens, 2011; Valkenburg et al., 1999; Warren, 2001).

Despite the distinction between active mediation and co-viewing, the term co-viewing is sometimes used in the literature in contexts where it refers to co-engaging with children in viewing media with or without discussions or interactions (e.g., Fidler, Zack, & Barr, 2010; Lavigne et al., 2015; Mendelsohn et al., 2010; Richert et al., 2011; Sims & Colunga, 2013; Strouse, Troseth, O’Doherty, & Saylor, 2018; Troseth, Russo, & Strouse, 2016; Zaman, Nouwen, Vanattenhoven, de Ferrerre, & Looy, 2016). In this thesis, similar to many researchers (e.g., Austin, 2007; Austin, Hust, & Kistler, 2009; Buerkel-Rothfuss & Buerkel, 2001; Clark, 2012), we use the term interactive co-viewing to refer to active mediation (co-viewing media while also engaging in interactions around media content), and the term passive co-viewing to refer to situations where parents co-view media with their children without engaging in conversations about media content.

More recently, the term Joint Media Engagement (JME) was coined by Takeuchi and Stevens (2011) to refer to both television co-viewing and mobile media co-use. JME includes viewing, playing, reading, searching, contributing, and creating with digital or traditional media (Takeuchi & Stevens, 2011). The term is used in several studies to refer to shared media use experiences that may or may not include verbal interactions between co-viewers (e.g., Rideout, 2014; Taylor, Takeuchi, & Stevens, 2018; Zosh, Lytle, Golinkoff, & Hirsh-Pasek, 2017).
As Wartella (2015) has noted, JME, and socially interactive learning in general, provide young children with an environment that can facilitate their learning through the Vygotskian concept of scaffolding, and through extending children’s learning beyond what they could learn on their own. Joint participation in screen media use can increase children’s interest in the screen media content, maintain their attention, and scaffold their learning, especially when the educational content is challenging (Vaala et al., 2015).

Most research shows that JME with a responsive adult is associated with better learning and language outcomes than the solo use of media. In its most recent guidelines, the American Academy of Pediatrics (AAP) described interactive co-viewing as the chief factor that can facilitate toddlers’ learning from screen media starting at age 15 months (American Academy of Pediatrics, 2016a). JME’s role in facilitating children’s learning from screens appears to be especially important in younger children. A series of experimental studies that were carried out by Roseberry et al. (2009) found that while children above the age of 3 years were able to learn novel verbs from watching a video on their own, those below 3 years were only able to learn the verbs when the video was supported by live social interaction from an adult in the same room. Singer and Singer (1998) also found that pre-schoolers who viewed Barney & Friends without a co-viewer learned fewer words than those who viewed the show with an adult. Similar findings were also reported in younger children by DeLoache et al. (2010), who found that 12- to 18-month-olds were able to learn more words when viewing a bestselling baby DVD with interactive parents than those who viewed the DVD alone and those who did not view the DVD.

In a recent investigation, Strouse, Troseth, O’Doherty, and Saylor (2018) assessed 28- to 32-month-old children’s word learning via four conditions: (1) a contingent video chat with parent modelling; (2) a contingent video chat with no parent modelling; (3) a non-contingent,
pre-recorded video with parent modelling; and (4) a non-contingent, pre-recorded video with no parent modelling. Parents in the modelling conditions faced the screen and participated by modelling behaviours in response to the on-screen partner. This behaviour was hypothesised by the researchers to provide social cues that support children in learning and transferring new information presented on the screen. The study findings showed that children in the two groups with parent modelling performed significantly better in the word learning test than those in the two groups without parental modelling. This suggests that co-viewing is a key factor in facilitating young children’s learning words from both contingent and non-contingent media.

A distinction should be noted between passive co-viewing (silently viewing screen media with children without talking to them or discussing the media content being co-viewed) and interactive co-viewing (verbally interacting with children around the media content being co-viewed). Being in the same room while children are viewing screens does not equate to high-quality co-viewing (Richert et al., 2011). It is important for parents to be actively engaged and responsive while co-viewing, just as they would be when they are engaged in 3D play with their children (Lerner, 2017). In a recent study, Myers, Crawford, Murphy, Aka-Ezoua, and Felix (2018) found that co-viewers’ responsiveness during video chats was the most significant factor influencing 24- to 30-month-old children’s own responsiveness as well as learning. Children who co-viewed a Skype video chat with a responsive co-viewer were more attentive to the on-screen partner and learned more novel words than children who were accompanied by an unresponsive co-viewer (Myers et al., 2018).

The way that parents speak to their children while co-viewing seems to also impact children’s language gains. For instance, parents’ use of Whitehurst et al. (1988)’s dialogic reading questioning techniques while co-viewing educational television with their 3-year-olds
was associated with better content comprehension as well as higher expressive vocabulary scores (Strouse, O’Doherty, & Troseth, 2013).

In addition, the type of programming co-viewed seems to also influence both parent–child interactions and children’s language outcomes. Some previous work has found that parent–child interactions are more common when viewing educational programming than when viewing non-educational programming (e.g., Mendelsohn et al., 2008). Mother–child interactions with their 6-month-old children during co-viewing of educational programming, but not during co-viewing of non-educational programming, were predictive of expressive and receptive language skills at age 14 months (Mendelsohn et al., 2010).

Various mechanisms have been proposed to explain how JME can positively support children’s learning from screens. JME provides an opportunity for joint attention, which is critical for early social, cognitive and language development (Ahktar, Dunham, & Dunham, 1991; Bakeman & Adamson, 1984; Bates, 1979; Bruner, 1983; Scott et al., 2013; Tomasello, 1988, 1995). Children as young as 1 year old were found to follow their parents’ gaze to the television screen during co-viewing of child-directed programmes (Demers, Hanson, Kirkorian, Pempek, & Anderson, 2013). Another mechanism by which JME can impact child language development is through influencing parent–child interactions, which are consistently proven to be a strong predictor of language development (e.g., Bornstein, Haynes, & Painter, 1998; Hart, 2000; Hart & Risley, 1975, 1995; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Rodriguez & Tamis-LeMonda, 2011; Weisleder & Fernald, 2013; Weizman & Snow, 2001). In fact, co-viewing has been found to have both positive and negative influences on parental child-directed speech. Whereas a number of studies have reported a reduction in the quantity of parent–child interactions during co-viewing sessions (e.g., Anderson & Hanson, 2017; Christakis
et al., 2009; Kirkorian et al., 2009; Lavigne et al., 2015; Tanimura et al., 2007), other studies have showed that interactive co-viewing positively influences the quality of parent–child interactions (e.g., Lavigne et al., 2015; Anderson & Hanson, 2017). Although parents have been found to direct fewer words to their toddlers when the parents were engaged with foreground TV viewing of adult-directed shows (background exposure for the children) compared to when the TV was off, the complexity of parental vocabulary was higher during co-viewing and free play that followed co-viewing (Anderson & Hanson, 2017). As Anderson and Hanson (2017) explain, parents pick up on the new concepts and words introduced by programmes and incorporate them into their speech during and after viewing. During interactive co-viewing, parents can engage in practices that can support children’s cognitive and language development such as labelling, engaging in back-and-forth conversations about the content being viewed, explaining difficult words and concepts, asking children to repeat words heard on the screen, and relating screen content to the child’s prior knowledge and experience (Anderson & Hanson, 2017; Troseth, Russo, & Strouse, 2016). As such, co-viewing can actually be viewed as an opportunity for additional parent–child interactions and for more diverse parental input (Richert et al., 2011).

Despite the importance of JME, a review of the most popular language- and literacy-focused apps available in major app stores showed that very few apps are designed to promote JME (Vaala et al., 2015). Hirsh-Pasek et al. (2015) argued that social interaction should be one of the four pillars of learning included when designing educational apps. They explained that social interaction can be incorporated into children’s apps in several ways: (a) children and their parents, siblings, or peers can engage in face-to-face interactions while competing or collaborating in a game; (b) app users can interact with each other virtually or through video-
conferencing or texting; and (c) as with television, apps can support the development of parasocial relationships with on-screen characters and animations that are designed to respond to children’s behaviours with simulated two-way interactions. Furthermore, even when apps are not explicitly designed to encourage JME, families can still actually co-use apps and engage in interactions around app content (Vaala et al., 2015).

The review of the literature above attempted to include studies that were conducted to examine one or more of the three screen media viewing parameters (quantity, content, and context) and their association to language outcomes. In fact, very few studies have comprehensively measured all three screen media parameters and their association to language outcomes in children (e.g., Hudon et al., 2013).

**Conditions for positive impact of screen media on language development.** Now that the literature on the associations between each of the three screen media parameters (quantity, content, and context) and language development in young children has been reviewed, we are now better able to identify the scenarios in which screen media use may have a positive impact on infants and toddlers (especially in relation to language and learning outcomes): (a) a moderate amount of screen media exposure (specific to certain age groups); (b) an older onset age of screen media use (preferably after 2 years of age); (c) age-appropriate, educational, child-directed content; (d) fewer salient formal features for younger children; (e) salient formal features (when used) that are relevant to the content; (f) apps and shows that are interactive and promote JME with other social partners; and (g) co-viewing with a contingently responsive adult.
Identification of Gaps in the Literature

The review of the literature reveals the following gaps. First, children under 3 years are under-represented in research, as well as in official investigations into the impact of screen media use on children’s health and development in general and language development specifically. For example, the most recent discussions in the UK Parliament on the impact of social media and screen use on young people’s health have been mainly focused on the mental health outcomes associated with screen media use in older children and adolescents (UK Parliament, 2018). In Saudi Arabia, where the current work is conducted, research on children under 3 years has also often been neglected.

Second, non-Western cultures are under-represented in the literature, as most of what is known about children’s screen media use and its effects on language development comes from Western cultures. In particular, despite the increasing availability of and access to new media platforms in Saudi Arabia (Dubai Press Club & Dubai Media City, 2016; Northwestern University in Qatar, 2017), the growing interest in adopting technology in education, and the country’s ambitious 2030 Vision, which promises to invest particularly in early childhood care and education (Saudi Council of Economic and Development Affairs, 2016), no prior research has been conducted to explore the screen media practices of young Saudi children or the impact of these practices on their development.

Third, research up until this point has tended to focus on the impact of television on children’s health and development. Recent investigations that examined that effects of new media on children seemed to exclude traditional media, although it is important to understand that children and adults today usually engage in multitasking with media. For example, the family could be sitting in the living room watching television together and at the same time each
of the family members could be engaged with her/his mobile media device. Therefore, any investigation of screens should take into account the various outlets used to access media content.

Finally, most of the public debate and research efforts to date have mainly focused exclusively on either the quantity, content, or context of screen media use. Very few studies have comprehensively examined the impacts of all three aspects together. In order to better understand the screen media use behaviours of children and the impact of these behaviours on their health and development in general and language development in particular, a comprehensive examination of the three parameters is needed.

**How Does This Thesis Contribute to Existing Knowledge?**

This thesis sets out to address the gaps identified above. First, by focusing on children under the age of 3 years, we can better understand the processes taking place during the most critical time for children’s language development (Bornstein, 2015; Bradley et al., 1989; Cote & Bornstein, 2005; Goldfield & Reznick, 1990; National Research Council and Institute of Medicine, 2000; Rodriguez et al., 2009). Early childhood is also a crucial period for the establishment of lifelong media habits and routines and a critical window for intervention (Certain & Kahn, 2002; Courage & Howe, 2010; Radesky & Christakis, 2016; Radesky, Silverstein, Zuckerman, & Christakis, 2014). Furthermore, the significance of conducting research on this young population is particularly important in Saudi Arabia, a demographically young country with a population of over 32 million, where almost 40% are under the age of 20, with 10% under the age of 4 years, constituting the largest age group in the population (Saudi General Authority for Statistics, 2016).
Furthermore, by studying children’s screen media use in a non-Western culture, this work adds to existing knowledge on the topic. To the best of knowledge, this is the first study in the Middle East and North Africa (MENA) region to investigate the association between screen media exposure and language development in young children. Saudi Arabia provides a good setting for this study as it is the largest media market in the MENA region, contributing to over one third of its revenues (Dubai Press Club & Dubai Media City, 2016), and boasts the world’s highest per capita consumer usage of YouTube (Dubai Press Club & Dubai Media City, 2016; Smith, 2013).

Moreover, this thesis aims to fill gaps identified in previous studies by providing a holistic, comprehensive view of screen media use that examines both traditional media (e.g., television) and new media (e.g., tablets and smartphones). This study also accounts not only for the amount of time children spend with screens (quantity), but also for what children watch (content), and how they watch it (context), as well as the associations between each of these variables and children’s language development.

**Research Aims**

The main objective of this work is to investigate the association between toddlers’ screen media use and their language development. However, as this is the first study that looks at screen media use in Saudi children under the age of 3 years, there was a need to first form a clearer picture of the screen media use patterns of Saudi young children. Therefore, the work was conducted in three stages. In the first stage (Paper 1), a survey was used to collect information about the screen media use patterns of 220 1- to 3-year-old Saudi toddlers. The second stage (Paper 2), conducted on the same sample as Paper 1, explores parental attitudes towards their children’s screen media use and parental media mediation styles and practices.
The third stage (Paper 3) was conducted on a separate sample of 85 Saudi children aged 1 to 3 years and examines the association between screen media use and children’s language development. In Paper 3, both a survey and an event-based diary were used to collect information about children’s screen media use, as well as a language assessment tool to measure language outcomes. Details of the methods used in each study are provided in each of the self-contained papers.

**Research Questions**

Based on the theoretical frameworks discussed earlier and the research gaps identified, this thesis aims to answer the following main questions:

1. What are Saudi toddlers’ screen media use patterns? (Paper 1)
2. What are Saudi parents’ attitudes towards their children’s screen media use, and what are their media mediation styles and strategies? (Paper 2)
3. Which of the three screen media use parameters (quantity, content, or context) is most predictive of toddlers’ language outcomes? (Paper 3)

**Contribution of Author and Co-Authors**

I conceptualised and designed the studies presented within this thesis, designed the data collection instruments, collected data, coded and entered data, carried out the analyses, interpreted the results, drafted all the chapters within this thesis, and reviewed and revised the thesis. My main supervisor Dr Thea Cameron-Faulkner and my co-supervisor Professor Ludovica Serratrice participated in the conceptualisation and design of the studies presented within this thesis, supervised data collection, and critically reviewed and revised the thesis.
Chapter 2: Paper 1

The Home Screen Media Environment of Saudi Toddlers

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Paper prepared for publication (not yet submitted)
Abstract

The past few years have witnessed a rapid increase in the use of screen media by adults and children alike. This has led to a heated debate over the potential effects of screen media on children’s health and development. Despite the widespread use of technology in Saudi Arabia, previous findings on Saudi children’s screen media use have been inconsistent and contradictory. The current study provides a comprehensive picture of screen media use among young children in Saudi Arabia. It explored the home screen media environment of 220 Saudi children aged 1 to 3 years, whose primary caregivers completed an online survey. The findings showed that the vast majority of these children had started watching television and using mobile media devices before the age of 2 years. On average, Saudi toddlers aged 1 to 3 years watched television for about 2 hours a day and used mobile media devices for about 1 hour a day. Their overall screen time was about 3 hours a day. Results also indicated that screen media use rates among Saudi toddlers are higher than those reported in the United States and the United Kingdom. The majority of the children exceeded the American Academy of Pediatrics’ recommendation for screen time for their age. *Baraem* (a pan-Arab pre-school TV channel) was Saudi toddlers’ most favourite TV channel, *Iftah Ya Simsim* (the Arabic version of the American children’s TV series *Sesame Street*) was their most favourite TV show, *YouTube* was their most favourite mobile media app, and children’s songs were their most viewed content genre on all screen types. Future studies are needed in the Middle East and North Africa (MENA) region in general and in Saudi Arabia in particular to guide the development of recommendations for parents, educators, healthcare providers, and policymakers on the use of screen media by young children.

**Keywords**: children, electronic devices, media use, mobile media, screen time, technology, toddlers, TV exposure
Introduction

The first three years of life are of critical importance for the development of the brain, language abilities, and cognitive skills (Bornstein, 2015; Bradley et al., 1989; Cote & Bornstein, 2005; National Research Council and Institute of Medicine, 2000; Rodriguez et al., 2009; Stiles, 2000). Research indicates that children’s home literacy environments (HLE), particularly within the first few years of life, are robust predictors of early linguistic and cognitive development (e.g., Deckner, Adamson, & Bakeman, 2006; Griffin & Morrison, 1997; Liebeskind, Piotrowski, Lapierre, & Linebarger, 2014; Payne, Whitehurst, & Angell, 1994; Rodriguez et al., 2009).

Screen media, which can refer to any type of visual content viewed from a screen of any device, including traditional media devices (e.g., television) and new media devices (e.g., mobile media or touchscreens), have become an integral part of everyday life and an important component of the HLE of young children (Knowland & Formby, 2016; Lavigne, Hanson, & Anderson, 2015; Liebeskind et al., 2014, Piotrowski, 2017; Rideout, 2017). The last few years have witnessed a phenomenal growth in media technology. Yet, scientific research and policy statements on children’s screen media use lag behind the pace of digital innovation (American Academy of Pediatrics, 2016; Kabali et al., 2015; Lauricella, Blackwell, & Wartella, 2017; Lovato & Waxman, 2016).

The latest guidelines from the American Academy of Pediatrics (American Academy of Pediatrics, 2016) recommend zero screen time for children under the age of 2 and no more than 1 hour per day of high-quality programming for children aged 2 to 5 years. The American Academy of Pediatrics (AAP) is the largest paediatric society in the world and is regarded as the leading authority on children’s health care in the United States, as well as internationally.
(American Academy of Pediatrics, 2013; Fitzpatrick & Montgomery, 2003). In numerous policy statements, the AAP has warned about problems associated with excessive screen media use, including obesity, sleep issues, aggressive behaviour, lower academic achievement, and language delays (American Academy of Pediatrics, 2011, 2013, 2016). Several international health bodies also recommend limiting screen time for children under 5 years old (e.g., Australian Department of Health, 2017; Canadian Paediatric Society, 2017; German Federal Ministry of Health, 2016; New Zealand Ministry of Health, 2017). A number of research centres and organisations in the United Kingdom, the United States, and other countries (e.g., Childwise based in the UK, Common Sense Media based in the U.S., EU Kids Online based in the UK, the National Center for Infants, Toddlers and Families based in the U.S.) work to provide parents, educators, and policymakers with up-to-date information and evidence-based data on children’s use of screen media and its impact on their emotional, social, cognitive, and physical development.

Previous research has shown that several aspects of screen media use among children (e.g., quantity, content, context, onset age, ownership, and accessibility) are associated with developmental (including cognitive and language) outcomes in children (e.g., Anderson & Pempek, 2005; Barr, Lauricella, Zack, & Calvert, 2010; Becker, 2013; Blum-Ross & Livingstone, 2016; Chonchaiya & Pruksananonda, 2008; Duch et al., 2013; Hudon, Fennell & Hofyzer, 2013; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Linebarger & Vaala, 2010; Masur, Flynn, & Olson, 2016; Pagani, Fitzpatrick, & Barnett, 2013; Pempek, Kirkorian, & Anderson, 2014; Tomopoulou et al., 2010; von Kries, von Suchodoletz, Stränger, & Toschke, 2006; Zack & Barr, 2016; Zimmerman, Christakis, & Meltzoff, 2007). In particular, younger children (under 2 years) may experience greater negative effects from screen media than older children (above 2 years; e.g., American Academy of Pediatrics, 2016; Anderson & Pempek,
A major concern is that screen media use may displace time young children spend in other stimulating activities such as *shared reading* (e.g., Anderson & Subrahmanyam, 2017; Christakis, 2014; Hofferth, 2010; Seo & Lee, 2017; Tomopoulos et al., 2007). Shared reading, or what is sometimes referred to as *joint book reading*, is an activity in which a caregiver and a child share reading a book together (Celano, Hazzard, McFadden-Garden, & Swaby-Ellis, 1998; Saracho & Spodek, 2010; van Steensel, McElvany, Kurvers, & Herppich, 2011; Zucker, Cabell, Justice, Pentimonti, & Kaderavek, 2012). The adult’s involvement in shared reading encompasses several literacy activities, including looking with the child at the book, identifying pictures and discussing them, reading the book or helping the child to read it, and discussing the book content (Celano et al., 1998). Shared reading is one of the most important HLE components that are positively linked with concurrent and long-term literacy and language outcomes (e.g., Bus, van IJzendoorn, & Pellegrini, 1995; Farrant & Zubrick, 2011; Evans, Shaw, & Bell, 2000; Foy & Mann, 2003; Frijters, Barron, & Brunello, 2000; Lonigan & Whitehurst, 1998; Ninio, 1983; Payne et al., 1994; Scarborough & Dobrich, 1994; Snow, 1983; Whitehurst & Lonigan, 1998).

Saudi Arabia is the largest media market in the Middle East and North Africa (MENA) region, contributing to almost a third of its revenues (Dubai Press Club & Dubai Media City, 2016). Despite the increasingly prevalent use of mobile media in Saudi Arabia (Dubai Press Club & Dubai Media City, 2016; Northwestern University in Qatar, 2017), Saudi organisations and societies fall short of providing data or giving guidelines and recommendations on screen
media use for all ages, including children. Furthermore, most of the data available about Saudis’ use of screen media are in the form of market research reports, press releases, or summaries of unpublished survey results that primarily focus on the screen media practices of adult users.

A review of the literature conducted for the current study yielded a limited number of reports that shed light on Saudi children’s screen media use. It is worth noting here that, in order to focus the scope of this literature review, studies prior to the advent of mobile media technology and tablets in 2010, which has dramatically reshaped the global media landscape, were not included. Among the most extensive research contributions to the field of media use in the MENA region is the Media Use in the Middle East Survey conducted by the Northwestern University in Qatar, which has carried out annual waves of surveys since 2013 across a number of MENA countries. The most recent survey showed an increase between 2013 and 2017 in the number of Saudi nationals (aged 18 years and above) who used the Internet (81% in 2013; 91% in 2017), an increase in the number of those who read books (33% in 2013; 47% in 2017), and a slight decrease in those who watched TV (99% in 2013; 96% in 2017). As with the findings of Dubai Press Club and Dubai Media City (2016), the Media Use in the Middle East Survey also indicates that smartphones are the most popular platform from which to access the Internet.

The only years when the Media Use in the Middle East Survey examined children’s media use were 2014 and 2016. Neither of the surveys provided data on children’s screen media use, but they focused on parental attitudes towards screen media. The 2014 survey indicated that households with children under 18 years in the Gulf States see both benefits and drawbacks of the entertainment media to which their children are exposed. The survey showed that parents with higher education levels had greater concerns about the negative effects of media use on their children (Northwestern University in Qatar, 2014). The 2016 survey was conducted in six
MENA countries, including Saudi Arabia. The survey findings indicated that one in six children under the age of 6 years spent time online every day, and that 73% of adult respondents wanted the government to do more to protect children from certain screen media content (Northwestern University in Qatar, 2016).

Previous research findings on the amount of Saudi children’s screen time have been inconsistent and contradictory. Al-Agha, Nizar, and Nahhas (2016) found that the majority of 2- to 18-year-olds in their sample spent 2 hours or more watching television and 2 hours or more using mobile media, daily. They did not, however, provide exact information on the average amount of time in minutes or hours that children spent with screen media. In another investigation, the Saudi National Center for Public Opinion Polls (2017a) found that the vast majority (91%) of Saudi children in their sample used mobile media and electronic games. According to their data, the average amount of time children spent on using smart devices and electronic games was 4 hours per day (Saudi National Center for Public Opinion Polls, 2017a). More than half of the children in the poll reported spending 2 to 5 hours a day using smart devices and electronic games, whilst one in four children noted spending more than 5 hours a day with mobile media and electronic games. However, the only available information on this investigation was a short summary that did not report the ages of the children in the sample and did not provide information on children’s television viewing time.

The non-specific and sometimes contradictory findings on the amount of screen time among children in Saudi Arabia may be attributed to differences in target age groups, in types of screen media platforms examined, or in sampling methods or methodology. Regardless of the exact amount of screen time, there seems to be some evidence to indicate that viewing screens,
especially TV, is the most common pastime among Saudi children (Al-Agha, Nizar, & Nahhas, 2016; Alghadir, Gabr, & Iqbal, 2016).

A scant number of studies provide some data on other aspects of children’s screen media exposure in Saudi Arabia, including accessibility of screens in children’s households, the onset age of consuming screen media, and the genre of screen media content. Reports indicate that TV still dominates children’s screen media exposure in the Middle East (Turner Broadcasting System International, 2016). About half of Saudi children started using smart devices and electronic games before the age of five (Saudi National Center for Public Opinion Polls, 2017a). In addition, it has been shown that entertainment screen media content is more popular among Saudi children than educational content (Saudi National Center for Public Opinion Polls, 2017a).

Despite the research noted above, there remain significant gaps in the literature and in our understanding of media usage patterns among children across the world, as well as in the MENA region and in Saudi Arabia in particular. Globally, research on digital media is at an early stage, and much of what is known in this area is informed by studies on older children and adolescents (Przybylski & Weinstein, 2017). In the MENA region, the few studies that have dealt with children’s media use report inconsistent findings on the quantity of screen media use and do not address its content or context. To better understand today’s screen media use among children and its implications on their development, research efforts need to be more comprehensive by reporting on all popular screen platforms and involving what Guernsey and Levine (2015) have termed the three Cs of screen media use: content (what do children watch?), context (how and with whom do children watch?), and the child (the distinct characteristics, abilities, needs, and interests among individual children at different developmental stages).
Research on children under the age of 3 in Saudi Arabia has often been a neglected area in child development research. The importance of conducting research on this young population is further emphasised in Saudi Arabia, a demographically young country, where almost 40% of the population is under the age of 20 (Saudi General Authority for Statistics, 2016). Additional research is further necessitated in the country due to its rapidly increasing access to diverse media platforms (Dubai Press Club & Dubai Media City, 2016; Northwestern University in Qatar, 2017) and its ambitious 2030 Vision, which calls for investing in early childhood care and education (Saudi Council of Economic and Development Affairs, 2016).

The current study is the first of three studies that collectively address Saudi toddlers’ (1-to 3-year-olds) screen media practices, parental attitudes towards their children’s screen media use, parental media mediation styles, and the impact of these practices, attitudes, and styles on toddlers’ language development. In this study, screen media refers to any type of visual content viewed or played on a screen of any device, including TV sets, DVD players, computers, video game players, game consoles, smartphones, tablets, or other digital devices (Rideout, 2017). Mobile media refers to handheld devices such as smartphones, tablets, and similar devices that can connect to the Internet, display videos, and download apps (Rideout, 2017).

The scope of this study focuses on elements of the screen media environment that have been found to impact language development (e.g., Anderson & Pempek, 2005; Barr et al., 2010; Chonchaiya & Pruksananonda, 2008; Christakis et al., 2009; Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004; Duch et al., 2013; Hudon et al., 2013; Kirkorian et al., 2009; Linebarger & Vaala, 2010; Linebarger & Walker, 2005; Pempek et al., 2014; Tomopoulos et al., 2010; von Kries et al., 2006; Zimmerman & Christakis, 2007; Zimmerman et al., 2007), including: (a) ownership of, and access to, screen media devices; (b) the amount of foreground
and background screen time; (c) the onset age of screen media viewing; and (d) screen media content types. This study also looks at the prevalence of reading among young children as an important element of the HLE that might be influenced by children’s screen media use practices. In order to provide a better understanding of the home screen media environment of Saudi toddlers, we addressed the following questions:

1. How prevalent is access to screen media in Saudi toddlers’ homes?
2. How early in life do Saudi children start to view/use screen media?
3. How much time do Saudi toddlers spend consuming screen media?
4. How prevalent are screen media, compared to reading, among Saudi toddlers?
5. How do Saudi toddlers’ screen media and reading patterns/practices vary by demographic variables?
6. What are Saudi toddlers’ most favourite channels, shows, apps, and content?
7. How do screen media practices among Saudi children compare to those reported in the U.S. and the UK?

Methods

Participants

The final sample in the present study consisted of 220 primary caregivers of 1- to 3-year-old Saudi children residing in Saudi Arabia. Between April and June of 2016, caregivers of Saudi children aged 1 to 3 years old were recruited via several social media platforms including WhatsApp, Twitter, Snapchat, and Instagram and invited to complete an anonymous online survey (see Appendix A) via an embedded URL. Six hundred and fifteen potential respondents started completing the survey. Four hundred and twenty-two completed the entire survey. The
dropout attrition rate was about 31%. A comparison between respondents who completed the entire survey and those who dropped out revealed no significant differences between the final sample and the dropped-out respondents with regard to child’s gender, child’s birth order, parental education, parental occupation, household income, and place of residence. However, there were small differences in mothers’ ages. Mothers in the final sample were slightly younger than those who dropped-out of the survey. It is worth noting that 12 (6%) of the dropped-out respondents were relatives, but not parents, of the target children. They may have dropped out when asked more details about the target child to which they may not have had accurate answers (e.g., asking about children’s and caregivers’ daily habits and routines). Out of the 193 dropped-out respondents, 27% ($n = 52$) were reporting on children older than 3 years, 5% ($n = 9$) were reporting on children younger than 1 year, and 2% ($n = 4$) gave incorrect responses to the question asking about the target child’s age. Therefore, only 66% ($n = 125$) of the dropped-out responses would have been eligible to be included in the final sample if they had completed their surveys. In addition, 5% ($n = 9$) of the dropped-out respondents were not residing in Saudi Arabia at the time of completing the survey, and thus they would have been removed from the final sample for this reason.

Out of the 422 completed surveys, 202 were eliminated for one or more of the following reasons: (a) the child was younger than 1 year or older than 3 years ($n = 134$), (b) the child was not a Saudi citizen or was not a resident of Saudi Arabia ($n = 31$), or (c) the child had health or developmental issues that may interfere with her/his media or linguistic environment (e.g., autism, hearing impairment, neurological disorder; $n = 37$).

The mean age of the children in the study was 25.34 months ($SD = 6.73$), and they were evenly split between females and males (49% and 51%, respectively). The vast majority of the
respondents in the study were the target children’s mothers (99%). The term target child is used to refer to the toddler in the household who was reported on for this study by the survey respondent. Tables 2.1 and 2.2 provide details of the sample characteristics. The survey gathered demographic information on both parents. As shown in the tables, the majority of parents had a college degree or above (mothers: 83%; fathers: 68%), and mothers were more highly educated than fathers. The majority of fathers were employed (95%), while more than half of the mothers were not (55%). The majority of the children were spoken to by their parents solely in Arabic (fathers: 88%; mothers: 66%). However, about one third of mothers spoke English in addition to Arabic to their children. Forty-one percent of the toddlers in the sample were from middle-income families, just over one third were from lower-income families, and about one quarter were from higher-income families.
### Table 2.1

**Socioeconomic Characteristics of the Parents**

<table>
<thead>
<tr>
<th>Parental SES variable</th>
<th>Mothers</th>
<th></th>
<th>Fathers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 years</td>
<td>2</td>
<td>0.91</td>
<td>9</td>
<td>4.11</td>
</tr>
<tr>
<td>20–29 years</td>
<td>112</td>
<td>50.68</td>
<td>35</td>
<td>15.98</td>
</tr>
<tr>
<td>30–39 years</td>
<td>98</td>
<td>44.75</td>
<td>125</td>
<td>56.62</td>
</tr>
<tr>
<td>40–49 years</td>
<td>8</td>
<td>3.65</td>
<td>47</td>
<td>21.46</td>
</tr>
<tr>
<td>Older than 50 years</td>
<td>0</td>
<td>0.00</td>
<td>4</td>
<td>1.83</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>33</td>
<td>15.00</td>
<td>35</td>
<td>15.98</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>150</td>
<td>68.18</td>
<td>114</td>
<td>51.60</td>
</tr>
<tr>
<td>Some education after high school</td>
<td>12</td>
<td>5.45</td>
<td>33</td>
<td>15.07</td>
</tr>
<tr>
<td>High school certificate (12 years of education)</td>
<td>23</td>
<td>10.45</td>
<td>27</td>
<td>12.33</td>
</tr>
<tr>
<td>Intermediate school certificate (9 years of education)</td>
<td>1</td>
<td>0.45</td>
<td>4</td>
<td>0.00</td>
</tr>
<tr>
<td>Primary school certificate (6 years of education)</td>
<td>0</td>
<td>0.00</td>
<td>5</td>
<td>2.28</td>
</tr>
<tr>
<td>No schooling completed</td>
<td>1</td>
<td>0.45</td>
<td>2</td>
<td>0.91</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed, full time</td>
<td>66</td>
<td>30.00</td>
<td>183</td>
<td>83.18</td>
</tr>
<tr>
<td>Employed, part time</td>
<td>12</td>
<td>5.45</td>
<td>16</td>
<td>7.27</td>
</tr>
<tr>
<td>Self-employed</td>
<td>1</td>
<td>0.45</td>
<td>11</td>
<td>5.00</td>
</tr>
<tr>
<td>Not employed</td>
<td>121</td>
<td>55.00</td>
<td>3</td>
<td>1.36</td>
</tr>
<tr>
<td>Student</td>
<td>20</td>
<td>9.09</td>
<td>2</td>
<td>0.91</td>
</tr>
<tr>
<td>Retired</td>
<td>0</td>
<td>0.00</td>
<td>3</td>
<td>1.36</td>
</tr>
<tr>
<td>Disabled, not able to work</td>
<td>0</td>
<td>0.00</td>
<td>2</td>
<td>0.91</td>
</tr>
<tr>
<td><strong>Language spoken with child</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic</td>
<td>146</td>
<td>66.37</td>
<td>193</td>
<td>87.73</td>
</tr>
<tr>
<td>English</td>
<td>1</td>
<td>0.45</td>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td>Mixture of Arabic and English</td>
<td>73</td>
<td>33.18</td>
<td>26</td>
<td>11.82</td>
</tr>
</tbody>
</table>
Table 2.2
Socioeconomic Characteristics of the Households/Children

<table>
<thead>
<tr>
<th>Household characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Place of residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riyadh, Saudi Arabia</td>
<td>95</td>
<td>43.18</td>
</tr>
<tr>
<td>Jeddah, Saudi Arabia</td>
<td>42</td>
<td>19.09</td>
</tr>
<tr>
<td>Other, Saudi Arabia</td>
<td>83</td>
<td>37.73</td>
</tr>
<tr>
<td><strong>Type of tenure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rented</td>
<td>111</td>
<td>50.68</td>
</tr>
<tr>
<td>Owned</td>
<td>98</td>
<td>44.75</td>
</tr>
<tr>
<td>Provided by employer</td>
<td>4</td>
<td>1.83</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>2.74</td>
</tr>
<tr>
<td><strong>Monthly household income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-income</td>
<td>70</td>
<td>32.11</td>
</tr>
<tr>
<td>Middle-income</td>
<td>89</td>
<td>40.83</td>
</tr>
<tr>
<td>Higher-income</td>
<td>59</td>
<td>27.06</td>
</tr>
<tr>
<td><strong>Availability of domestic helper/ nanny</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73</td>
<td>33.18</td>
</tr>
<tr>
<td>No</td>
<td>147</td>
<td>66.82</td>
</tr>
<tr>
<td><strong>Child characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child’s age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12–23 months</td>
<td>86</td>
<td>39.09</td>
</tr>
<tr>
<td>24–36 months</td>
<td>134</td>
<td>60.91</td>
</tr>
<tr>
<td><strong>Child’s gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>48.64</td>
</tr>
<tr>
<td>Male</td>
<td>113</td>
<td>51.36</td>
</tr>
<tr>
<td><strong>Child’s birth order</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest</td>
<td>46</td>
<td>20.91</td>
</tr>
<tr>
<td>Middle</td>
<td>13</td>
<td>5.91</td>
</tr>
<tr>
<td>Youngest</td>
<td>104</td>
<td>47.27</td>
</tr>
<tr>
<td>Only</td>
<td>57</td>
<td>25.91</td>
</tr>
</tbody>
</table>

For the purpose of this study, *lower-income* was defined as families earning less than SAR 10,000 a month; *middle-income* was families earning between SAR 10,000 and SAR 19,999 a month, and *higher-income* was families earning over SAR 20,000 a month (SAR 1 = £ 0.185 as of June 1, 2016; SAR = Saudi Arabian Riyal). According to the Saudi General Authority for Statistics, the median monthly household income in 2013 was SAR 10,723 (The Saudi General Authority for Statistics, 2013).
**Procedures**

Participation in the study was voluntary. Ethical approval for the study was received from the University of Manchester’s Ethics Review Board. Between April and June of 2016, caregivers of Saudi children aged 1 to 3 years old were recruited via several social media platforms and invited to complete an anonymous online survey (see Appendix A) via an embedded URL. A number of social media influencers (CMIs) with interests in childhood and family issues were contacted by the Principal Investigator (PI), the cause of the research project and its aims were explained to them, and they were asked to help share the survey link. This led to considerable increases in the response rate, especially immediately after one CMI tweeted/posted on social media platforms (e.g., Twitter, Instagram) about the survey or liked/retweeted a post that was originally shared by the PI. The survey was constructed using the online data collection engine Survey Monkey and was administered in Arabic. Information on the purpose of the study was provided and informed consent was obtained from all participants.

**Survey**

The survey (see Appendix A) consisted of 72 questions that aimed at collecting information on three main areas: target child’s and parents’ demographic information, child’s linguistic and literacy environment, and child’s screen media environment. In order to ensure content validity when developing the survey, previous research was reviewed and instruments designed to assess similar topics were consulted (e.g., Rideout, 2013; Wartella, Rideout, Lauricella, & Connell, 2014). Then, a list of survey items that aimed to measure the constructs of interest was generated. Items were presented in various formats including yes/no questions, checklists, open-ended questions, and Likert scales. Three experts in the field were sent copies of the draft survey and were asked to comment on ambiguous items, or items that they thought
did not seem to measure the constructs of interest. Based on feedback received, modifications and changes were applied, and the final version of the survey was developed.

To ensure face validity, the survey was pilot-tested on a small group of Saudi mothers of 1- to 3-year-olds \( n = 8 \) for readability, clarity, errors, and completion time, and modifications were carried out accordingly. Survey items were designed to tap on several separate constructs as follows:

- demographic information about the target child and her/his parents (Items No. 1-3, 7-19, 26, 27, 71)
- the target child’s health and developmental milestones (Items No. 20-23)
- the languages spoken at home (Items No. 24, 25, 28)
- reading practices in the target child’s home environment (Items No. 29-32)
- availability of/access to screen media in the child’s household (Items No. 33-37, 39-45, 50)
- the target child’s screen media use habits (Items No. 46, 48, 51, 52, 59-64)
- parental attitudes towards children’s screen media use (Items No. 47, 49, 58, 65-70, 72)
- parental screen media mediation practices (Items No. 38, 53-57)

Nine of the target child’s screen media use items (i.e., Items No. 33, 37, 40, 41, 42, 43, 44, 51, and 52) were adapted from the Common Sense Media Zero to Eight Survey (Rideout, 2013), an instrument that has been used in previous research to assess children’s screen media use (e.g., Bedford, Saez de Urabain, Celeste, Karmiloff-Smith, & Smith, 2016; Kabali et al., 2015; Lauricella, Wartella, & Rideout, 2015; Wartella et al., 2013). Four of the questions regarding parents’ attitudes towards children’s media use and parental media mediation practices (i.e., Items No. 38, 53, 55, and 58) were adapted from the Common Sense Media Zero to Eight Survey (Rideout, 2013) and the Parenting in the Age of Digital Technology Survey (Wartella et
al., 2014). The remainder of the current study’s survey items were developed by the PI. In order to limit the scope of this paper, we did not analyse the items that pertain to parental attitudes toward their children’s media use or parental screen media mediation practices and styles (i.e., Items No. 38, 47, 49, 53, 55 [sub-items No. 1-8], 58, and 67-70), which were the focus of a subsequent paper (Paper 2/Chapter 3). The survey items that were specifically analysed in this paper were Items No. 1, 2, 7, 8, 10-14, 16, 17, 20-25, 27, 31, 35-37, 44-46, 48, 50-52, 55 (sub-items No. 9 and 10), 60-64, and 71.

This survey was designed to be a self-administered web survey. Collecting data online rather than through other modes that require respondents to make responses directly to a researcher or an interviewer (e.g., through telephone or face-to-face) reduces the social desirability bias (Nederhof, 1985; Presser & Stinson, 1998). In addition, respondents had the option to remain anonymous, which increases the chances of honest answers and reduces socially desirable responses. Moreover, survey items were worded in ways that did not represent any of the children’s or parents’ behaviours as favourable or unfavourable. Some of the survey items, (although not analysed in this paper) asked questions about parents’ media mediation practices. However, to reduce social desirability bias, respondents were asked to respond to socially acceptable statements that parents often make regarding children’s screen media use. For example, in Item No. 53, instead of asking parents directly to provide their motives for letting their children use screens (which may make them concerned about whether their response is socially unacceptable), respondents were asked to indicate on a Likert scale the likelihood of several motives often cited by parents for allowing children to use screens (e.g., “because they help distract my child when I have some chores to attend to”, “to get my child to stop crying”,
“because they help in teaching my child language basics such as alphabets and numbers”,
“because they help in teaching my child good manners and habits”).

Analysis

The collected data were manually cleaned and checked for consistencies and completeness. Duplicates and anomalies were removed. Open-ended “other” responses were reviewed to ascertain whether to recode them into existing answer categories, or to add new answer categories. As the survey was in Arabic, the responses were translated into English, Arabic names (e.g., names of places, TV channels, TV programmes, apps) were transliterated into English, and Hijri dates (Islamic calendar) were converted to Gregorian dates.

Statistical analysis was performed using the R statistical package (version 3.4.2). Data were evaluated using descriptive statistics to assess measures of central tendency and variation. When investigating the amount of time children were exposed to screen media, we divided the children into two age groups: a younger group aged 1 to 2 years ($n = 86, M = 18.12$ months, $SD = 3.40$ months) and an older group aged 2 to 3 years ($n = 134, M = 29.98$ months, $SD = 3.43$ months). A Student’s t-test for independent samples was used to determine the significance of differences between these two age groups with regard to amount of screen time. The significance level used was $\alpha = .05$.

We then examined the significance of differences in some of the screen media and reading practices explored in the study by demographic variables (i.e., child age, child gender, parental education, and household income). To compare the difference in the dependent numerical variables (i.e., average daily TV time, average daily mobile media time, average onset age of TV viewing, and average onset age of mobile media use) among the categories of each of
the demographic variables (the independent variables), we performed randomisation tests for 4,999 randomised samples instead of multivariate analyses of variance (MANOVAs), as the normality assumption of the MANOVA was not met. Then, in the presence of significant differences, individual tests were applied to identify which of the dependent variables was significantly different. Student’s t-test, or alternatively two-sample Welch’s t-test for unequal variances, were performed for demographics with two categories (i.e., child age and child gender), while one-way analysis of variance (ANOVA) or alternatively Kruskal-Wallis tests were used for demographics with more than two categories (i.e., parental education and household income). To reduce type 1 error, we applied Bonferroni corrections to adjust for multiple comparisons by dividing the significance level $\alpha = .05$ by the number of tests conducted ($\frac{.05}{4} = .0125$). To test the significance of differences in the qualitative (categorical) variables based on demographics, we used the chi-square test for equality of proportions at significance level $\alpha = .05$.

Results

The results are organised according to the research questions that were presented earlier.

How Prevalent Is Access to Screen Media in Saudi Toddlers’ Homes?

Table 2.3 shows the availability of screen media in the households of Saudi toddlers in this sample. Almost all (97%) Saudi homes with toddlers had at least one television, and television was ‘always’ or ‘often’ left on even if no one was watching it in almost half (44%) of the homes. The majority of Saudi homes in the sample had at least one smartphone (95%), one desktop computer or laptop (92%), and one tablet (77%). Among the children who owned a
mobile media device (26% of the sample), tablet ownership (88%) was much higher than smartphone ownership (9%). Furthermore, tablet ownership was higher among the older group (25%) than among the younger group (17%). Smartphone ownership was very low in both age groups (1% among the younger group; 3% among the older group). iPod devices (21%) and handheld video game players (e.g., PSP; 7%) were not very prevalent among the households in this sample. The majority of children in the sample did not have any media devices in their bedrooms (87%). Among children who did have media devices in their bedrooms, most had a television (89%). Internet connection was available in 95% of the homes and was ‘always’ or ‘often’ available on 43% of the screen media devices that children regularly use. Just over one quarter (26%) of the children ‘always’ or ‘often’ ate their meals while viewing/using screen media.
Table 2.3

*Prevalence of Screen Media in Saudi Households with Toddlers*

<table>
<thead>
<tr>
<th>Screen media devices at home (Survey item No. 35)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that had at least one television set</td>
<td>213</td>
<td>96.82</td>
</tr>
<tr>
<td>Households that had at least one smartphone</td>
<td>210</td>
<td>95.45</td>
</tr>
<tr>
<td>Households that had at least one desktop computer or laptop</td>
<td>203</td>
<td>92.27</td>
</tr>
<tr>
<td>Households that had at least one tablet</td>
<td>169</td>
<td>76.82</td>
</tr>
<tr>
<td>Households that had at least one game console (e.g., PlayStation, Xbox, or Wii)</td>
<td>85</td>
<td>38.64</td>
</tr>
<tr>
<td>Households that had at least one DVD player or VCR</td>
<td>72</td>
<td>32.73</td>
</tr>
<tr>
<td>Households that had at least one iPod Touch or other type of video iPod</td>
<td>46</td>
<td>20.91</td>
</tr>
<tr>
<td>Households that had at least one handheld video game player (e.g., Gameboy or PSP)</td>
<td>15</td>
<td>6.82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Screen media devices in child’s bedroom (Survey item No. 37)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toddlers with a screen media device in their bedroom</td>
<td>28</td>
<td>12.73</td>
</tr>
<tr>
<td>Toddlers with a television in their bedroom</td>
<td>25</td>
<td>11.36</td>
</tr>
<tr>
<td>Toddlers with a game console in their bedroom</td>
<td>6</td>
<td>2.73</td>
</tr>
<tr>
<td>Toddlers with a PC or laptop in their bedroom</td>
<td>5</td>
<td>2.27</td>
</tr>
<tr>
<td>Toddlers with a DVD player in their bedroom</td>
<td>5</td>
<td>2.27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Children who had their own mobile media device (Survey item No. 44)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tablet</td>
<td>49</td>
<td>87.50a</td>
</tr>
<tr>
<td>Smartphone</td>
<td>5</td>
<td>8.93a</td>
</tr>
<tr>
<td>Tablet ownership among the younger group</td>
<td>15</td>
<td>17.44b</td>
</tr>
<tr>
<td>Tablet ownership among the older group</td>
<td>34</td>
<td>25.37c</td>
</tr>
<tr>
<td>Smartphone ownership among the younger group</td>
<td>1</td>
<td>1.16b</td>
</tr>
<tr>
<td>Smartphone ownership among the older group</td>
<td>4</td>
<td>2.99c</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Children who shared a mobile media device with another family member (Survey item No. 45)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>128</td>
<td>58.18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internet connection</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that had an Internet connection (Survey item No. 36)</td>
<td>209</td>
<td>95.00</td>
</tr>
<tr>
<td>Toddlers who ‘always’ or ‘often’ had Internet connection available for the devices they regularly use (Survey item No. 50)</td>
<td>82</td>
<td>42.93</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Background TV &amp; media at mealtime</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households that had TV ‘always’ or ‘often’ on even if no one is actually watching it (Survey item No. 55 [sub-item No. 10])</td>
<td>97</td>
<td>44.09</td>
</tr>
<tr>
<td>Toddlers who ‘always’ or ‘often’ ate their meals while consuming media (Survey item No. 55 [sub-item No. 9])</td>
<td>57</td>
<td>25.91</td>
</tr>
</tbody>
</table>

---

*a* Among children aged 1 to 3 years in the sample who owned their own media device.

*b* Among all children in the younger group.

*c* Among all children in the older group.
How Early in Life Do Saudi Children Start to View/Use Screen Media?

To calculate the mean age of starting to view screens (Survey items No. 63 and 64), children who had never been exposed to television ($n = 8; 4\%$) or mobile media ($n = 22; 10\%$) were excluded. All children who had already started viewing screens began viewing at the age of 2 years or younger. Among children who watched television, the median age of starting to watch television was 12 months ($M = 14.19$ months; $SD = 6.92$; Figure 2.1). Among those who used mobile media, the median age of starting to consume mobile media was 18 months ($M = 18.77$ months; $SD = 7.58$; Figure 2.2).

![Figure 2.1. Onset age of television viewing. The red line represents the mean. The blue line represents the median.](image)

Figure 2.1. Onset age of television viewing. The red line represents the mean. The blue line represents the median.
How Much Time Do Saudi Toddlers Spend Consuming Screen Media?

The current study looked at the amount of time that young Saudi children spent viewing television (Survey item No. 46) and the amount of time that they spent using mobile media (Survey item No. 48), and then measured their overall screen time against the AAP recommendations.

**Overall screen time.** Overall screen time (as reported by the caregivers) was calculated for all children in the sample including those who never used screens. Figure 2.3 shows that the mean overall screen time for 1- to 3-year-old children was about 3 hours per day ($M = 194.1$ minutes, $SD = 154.70$ minutes). Overall screen time was higher for the older group ($M = 206.01$ minutes, $SD = 150.48$ minutes) than the younger group ($M = 175.35$ minutes, $SD = 160.25$ minutes). However, a Student’s t-test for independent samples showed that this difference was not statistically significant, $t(217) = -1.43$, $p = .154$. 

*Figure 2.2. Onset age of mobile media use. The red line represents the mean. The blue line represents the median.*
Amount of television viewing. Respondents were asked to report the number of hours or minutes per day their children spend watching television. The mean television time for 1- to 3-year-old children was about 2 hours per day ($M = 125.30$ minutes, $SD = 111.24$ minutes; Figure 2.4). No significant difference was observed as a function of age group (younger group: $M = 125.12$ minutes, $SD = 113.69$ minutes; older group: $M = 125.37$ minutes, $SD = 110.10$ minutes; $t(217) = -0.02$, $p = .987$).
Amount of mobile media use. Respondents were asked to report the number of hours or minutes per day their children spend using or viewing mobile media. The mean mobile media time for 1- to 3-year-old children was about 1 hour per day ($M = 69.07$ minutes, $SD = 83.28$ minutes; Figure 2.5). A significant difference was observed as a function of age group (younger group: $M = 51.05$ minutes, $SD = 75.83$ minutes; older group: $M = 80.63$ minutes, $SD = 86.02$ minutes; $t(218) = -2.61, p = .010$; see Figure 2.6).

![Figure 2.5. Amount of mobile media time in minutes. Includes non-users. The red line represents the mean.](image1)

![Figure 2.6. Time spent using mobile media devices across age groups. Includes non-users. The bold horizontal lines represent median values.](image2)
The majority (91%) of children in the younger group exceeded the AAP recommendation for screen time for children under 2 years. On average, the 1- to 2-year-olds in this study viewed screens for about 3 hours ($M = 175.35$ minutes, $SD = 160.25$ minutes) more, daily, than the AAP recommendation of zero screen time. The majority (82%) of the children in the older group viewed screens for more than 1 hour a day and thus exceeded the AAP screen time recommendation for their age. On average, the 2- to 3-year-olds viewed screens for about 2 and a half hours more than the AAP recommendation of a maximum of 1 hour of screen time per day ($M = 206.01$ minutes, $SD = 150.48$ minutes).

**How Prevalent are Screen Media, Compared to Reading, Among Saudi Toddlers?**

When asked about the number of children’s print books available to the target children at home, including books shared with siblings (Survey item No. 31), caregivers’ responses indicated that more than a quarter (26%) of Saudi households with toddlers had absolutely no books for children, and about a quarter (27%) had only one or two books (Figure 2.7).

![Figure 2.7. Number of children’s books at home.](image-url)
Figure 2.8 shows a comparison between the frequencies of reading, television viewing, and mobile media use in our sample (Survey item No. 52 [sub-items No. 1, 3, and 7]). Watching television was the most prevalent activity that young children engaged in daily (68%), followed by using mobile media devices such as tablets and smartphones (35%). Viewing screens in general was much more prevalent in children’s lives than reading; only 17% of children were read to daily. Notably, about 41% of mothers ‘never’ read to their children, whereas TV was watched ‘several times a day’ by about 42% of the children.

![Bar chart showing frequency of reading, TV viewing, and mobile media use.](image)

*Figure 2.8. Frequency of reading, TV viewing, and mobile media use.*

**How Do Saudi Toddlers’ Screen Media and Reading Patterns/Practices Vary by Demographic Variables?**

Table 2.4 shows the outcomes of comparison tests for the quantitative numerical variables. The randomisation tests showed that there was a significant difference in the group of numerical dependent variables (items 1, 2, 4, and 5 in Table 2.4) based on child age, \( p < 0.001 \).
Student’s t-test, or alternatively two-sample Welch’s t-test for unequal variances, revealed that the effect of child age was significant for the amount of time children spent using mobile media devices, for the onset age of TV viewing, and for the onset age of mobile media use. Children who were 2 years or above spent significantly more time viewing mobile media devices than children under 2, \( t(218) = -2.61, p = .010 \). On the other hand, children under 2 years started watching television, \( t(184.06) = -2.91, p = .004 \), and using mobile media devices, \( t(196) = -4.72, p < .001 \), significantly earlier than the older children group.

Table 2.5 shows the outcomes of comparison tests for the qualitative categorical variables. The tests showed that children who were 2 years or above used educational apps on mobile media devices significantly more often, \( X^2(1, N = 220) = 4.60, p = .032 \). Girls had more exposure to background TV, \( X^2(1, N = 220) = 3.96, p = .047 \). Households with higher monthly income had significantly more children’s books at home, \( X^2(2, N = 218) = 11.78, p = .003 \). Outcome variables were compared as a function of maternal education and then the same for paternal education. No significant differences were observed in the outcome variables among the three levels of parental education.
### Table 2.4
Amount and Onset Age of Screen Media Use by Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>Child Age</th>
<th>Child Gender</th>
<th>Parental Education</th>
<th>Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;2Y (n = 86)</td>
<td>≥2Y (n = 134)</td>
<td>HS or less (Mo: n = 25) Fa: (n = 38)</td>
<td>Lower (n = 70) Medium (n = 89) Higher (n = 59)</td>
</tr>
<tr>
<td>1. Average time spent watching TV per day (mins) (Survey item No. 46)</td>
<td>125.12 (113.69)</td>
<td>125.37 (110.10)</td>
<td>109.47 (93.03)</td>
<td>142.12 (126.12)</td>
</tr>
<tr>
<td>2. Average time spent using mobile media per day (mins) (Survey item No. 48)</td>
<td><strong>51.05 (75.83)</strong></td>
<td><strong>80.63 (86.02)</strong></td>
<td>72.52 (87.67)</td>
<td>65.42 (78.61)</td>
</tr>
<tr>
<td>3. Average overall screen time per day (mins)</td>
<td>175.35 (160.25)</td>
<td>206.01 (150.48)</td>
<td>181.99 (140.07)</td>
<td>207.03 (168.63)</td>
</tr>
<tr>
<td>5. Average onset age of mobile media use (mos) (Survey item No. 64)</td>
<td><strong>15.54 (7.16)</strong></td>
<td><strong>20.58 (7.23)</strong></td>
<td>18.75 (7.34)</td>
<td>18.78 (7.87)</td>
</tr>
</tbody>
</table>

**Note.** Standard deviations are in parentheses. <2Y = under 2 years; ≥2Y = 2 years or above; M = Male; F = Female; HS = High School; Mo = mothers; Fa = fathers; mos = months. Numbers in bold show significant differences at the .0125 level.
Table 2.5
Screen Media and Reading Practices by Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>Child Age</th>
<th></th>
<th>Child Gender</th>
<th></th>
<th>Parental Education</th>
<th></th>
<th>Household Income</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;2Y (n = 86)</td>
<td>≥2Y (n = 134)</td>
<td>M (n = 113)</td>
<td>F (n = 107)</td>
<td>HS or less Mo: (n = 25) Fa: (n = 38)</td>
<td>Some college Mo: (n = 12) Fa: (n = 33)</td>
<td>College degree or higher Mo: (n = 183) Fa: (n = 149)</td>
<td>Lower (n = 70)</td>
</tr>
<tr>
<td>1. % of children with a media device in their bedroom (Survey item No. 37)</td>
<td>12.79</td>
<td>12.69</td>
<td>9.73</td>
<td>15.89</td>
<td>Mo: 16.00 Fa: 13.16</td>
<td>8.33</td>
<td>9.09</td>
<td>12.57</td>
</tr>
<tr>
<td>2. % of children who had their own media devices (Survey item No. 44)</td>
<td>19.77</td>
<td>27.61</td>
<td>23.89</td>
<td>25.23</td>
<td>Mo: 32.00 Fa: 26.32</td>
<td>41.67</td>
<td>15.15</td>
<td>22.40</td>
</tr>
<tr>
<td>3. % of homes with TV on all or most of the time (Survey item No. 55 [sub-item No. 10])</td>
<td>44.19</td>
<td>44.03</td>
<td>37.17</td>
<td>51.40</td>
<td>Mo: 32.00 Fa: 39.47</td>
<td>50.00</td>
<td>45.45</td>
<td>44.97</td>
</tr>
<tr>
<td>4. % of children who ‘always’ or ‘often’ used educational apps or games on mobile media devices (Survey item No. 51 [sub-item No. 1])</td>
<td>29.41</td>
<td>42.5</td>
<td>40.21</td>
<td>35.16</td>
<td>Mo: 42.86 Fa: 31.25</td>
<td>50.00</td>
<td>39.13</td>
<td>39.10</td>
</tr>
<tr>
<td>5. % of children who ‘always’ or ‘often’ ate their meals while viewing screens (Survey item No. 55 [sub-item No. 9])</td>
<td>19.77</td>
<td>29.85</td>
<td>22.12</td>
<td>29.91</td>
<td>Mo: 20.00 Fa: 26.32</td>
<td>16.67</td>
<td>27.27</td>
<td>25.50</td>
</tr>
<tr>
<td>6. % of children who were read to daily (Survey item No. 52 [sub-item No. 1])</td>
<td>11.63</td>
<td>20.90</td>
<td>15.04</td>
<td>19.63</td>
<td>Mo: 28.00 Fa: 13.16</td>
<td>0.00</td>
<td>21.21</td>
<td>16.94</td>
</tr>
<tr>
<td>7. % of homes with at least 20 children’s books (Survey item No. 31)</td>
<td>8.14</td>
<td>10.45</td>
<td>13.27</td>
<td>5.61</td>
<td>Mo: 8.00 Fa: 2.63</td>
<td>0.00</td>
<td>12.12</td>
<td>10.38</td>
</tr>
</tbody>
</table>

Note. <2Y = under 2 years; ≥2Y = 2 years or above; M = Male; F = Female; HS = High School; Mo = mothers; Fa = fathers. Numbers in bold show significant differences at the .05 level.
What Are Saudi Toddlers’ Most Favourite Channels, Shows, Apps, and Content?

**The most popular TV channels (Survey item No. 60).** At the time of data collection, *Baraem*, a pre-school children’s channel, was by far the most favourite TV channel for Saudi toddlers aged 1 to 3 years (38%), followed by the Arabic children’s song channel *Toyor Al-Jannah* (8%) and the Islamic children’s channel *Simsim* (7%).

**The most popular TV shows (Survey item No. 61).** The three most favourite shows for Saudi toddlers were *Iftah Ya Simsim* (the Arabic version of the American children’s TV series *Sesame Street*; 11%), Arabic children’s songs (which are usually viewed on children’s song channels such as *Toyor Al-Jannah*, *Karameesh*, *Noon*, and *Canari*; 11%), and *Fi Hadeeqat Almarah* (an Arabic dubbed version of the BBC children’s TV series *In the Night Garden*; 10%).

**The most popular mobile media apps (Survey item No. 62).** *YouTube* was the most favourite app among Saudi toddlers. Thirty-seven percent of caregivers named *YouTube* among their children’s most favourite apps, followed by *Lamsa* (15%), an edutainment app with interactive games and digital storybooks. The third most popular app was *Adnan the Quran Teacher* (13%), an app that aims to help children recite and memorise the holy book of Islam.

**The most popular mobile media content types (Survey item No. 51).** Mothers reported how often their children used specific types of apps on a cell phone, iPad, or other tablet device (see Table 2.6). The most popular type of mobile media content was “apps and programmes that have video songs”, as about 43% of the caregivers reported that their children “always” or “often” use them. On the other hand, “creative apps and programmes for things like drawing, making music, or creating videos” was found to be the least popular type of mobile media content among toddlers, with about 18% of the caregivers reporting that their children “always” or “often” use them.
Table 2.6

Percentages of the Frequency of Children’s Viewing/Using of Different Types of Screen Media Programmes and Apps

<table>
<thead>
<tr>
<th>Type of programmes or apps</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apps that have video songs</td>
<td>16.84</td>
<td>11.05</td>
<td>26.32</td>
<td>19.47</td>
<td>23.68</td>
</tr>
<tr>
<td>2. Apps that have photo and video albums</td>
<td>22.75</td>
<td>11.64</td>
<td>26.46</td>
<td>16.93</td>
<td>21.16</td>
</tr>
<tr>
<td>3. Educational games like puzzles, memory games, maths, or reading</td>
<td>30.32</td>
<td>9.57</td>
<td>20.74</td>
<td>21.28</td>
<td>16.49</td>
</tr>
<tr>
<td>4. Apps that have audio songs</td>
<td>30.32</td>
<td>13.30</td>
<td>20.74</td>
<td>17.02</td>
<td>15.43</td>
</tr>
<tr>
<td>5. Games that are just for fun</td>
<td>28.88</td>
<td>13.37</td>
<td>23.53</td>
<td>18.72</td>
<td>14.44</td>
</tr>
<tr>
<td>6. Apps based on a character child knows from a TV show</td>
<td>43.39</td>
<td>10.05</td>
<td>16.93</td>
<td>12.70</td>
<td>13.76</td>
</tr>
<tr>
<td>7. Apps with religious content like teaching the Quran, prayers, and Islamic rituals</td>
<td>26.98</td>
<td>21.16</td>
<td>27.51</td>
<td>9.52</td>
<td>13.23</td>
</tr>
<tr>
<td>8. Creative apps for things like drawing, making music, or creating videos</td>
<td>46.84</td>
<td>18.95</td>
<td>13.68</td>
<td>10.53</td>
<td>7.89</td>
</tr>
<tr>
<td>9. Other types of programmes and apps</td>
<td>52.69</td>
<td>17.74</td>
<td>13.44</td>
<td>3.23</td>
<td>4.30</td>
</tr>
</tbody>
</table>

How Do Screen Media Practices among Saudi Children Compare to Those Reported in the U.S. and the UK?

In order to place the current data in an international context, some of the main findings from this study were compared against those reported for children in the United States (Rideout, 2017) and the United Kingdom (Bedford et al., 2016; CHILDWISE, 2017; Kucirkova & Littleton, 2016). These comparisons, however, should be treated with caution as there are variations in methodologies and children’s age ranges across the studies (Table 2.7 and Table 2.8).

Findings suggest that Saudi children watch screen media more than their counterparts in the other two countries. The percentage of children who start viewing TV and mobile media before the age of 2 is higher in Saudi Arabia (94%) than it is in the U.S. (71%; comparable data were not available for children in the UK). Over three quarters of 1- to 3-year-old children in
Saudi Arabia and 6-month to 3-year-olds in the UK (79% and 81%, respectively), and almost half (46%) of the children in the U.S. (aged 0 to 2 years) start using mobile media before the age of two. Children in the U.S. aged 2 to 4 years had higher ownership of tablets (43%) than Saudi children aged 2 to 3 years (25%); however, Saudi children under 2 had higher ownership of tablets (17%) than children under 2 in the U.S. (5%). Reading to children varied with age; however, in general, young children in the U.S. and the UK were read to more often than were the children in Saudi Arabia.
Table 2.7

Comparison Between Media Use Patterns Among Children in Saudi Arabia, the U.S., and the UK

|                        | Saudi (1-2Y)
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Saudi (2-3Y)</td>
</tr>
<tr>
<td></td>
<td>Saudi (1-3Y)</td>
</tr>
<tr>
<td></td>
<td>U.S. (0-2Y)</td>
</tr>
</tbody>
</table>
|                        | U.S. (2-4Y)
|                        | UK (6-36 mos)   |
| Average TV time per day | 02:05           |
|                        | 02:05           |
|                        | 02:05           |
|                        | 00:29           |
|                        | 01:09           |
|                        | -               |
|                        | -               |
| Average MM time per day | 00:51           |
|                        | 01:20           |
|                        | 01:09           |
|                        | 00:07           |
|                        | 00:58           |
|                        | 00:24f          |
|                        | -               |
| Average overall screen time per day | 02:55 |
|                        | 03:26           |
|                        | 03:14           |
|                        | 00:42           |
|                        | 2:39            |
|                        | -               |
|                        | 2:24g           |
|                        | 2:36g           |
| % of children who own a tablet | 17%  |
|                        | 25%             |
|                        | 22%             |
|                        | 5%              |
|                        | 43%             |
|                        | 10% a.h         |
|                        | -               |
|                        | 33%g            |
| % of children who own a smartphone | 1%  |
|                        | 3%              |
|                        | 2%              |
|                        | 1%              |
|                        | 3%              |
|                        | -               |
|                        | -               |
| % of children who are read to daily | 12% |
|                        | 21%             |
|                        | 17%             |
|                        | 43%             |
|                        | 56%             |
|                        | -               |
|                        | -               |
|                        | 56%             |

Note. Data on children in the U.S. were adapted from Rideout (2017); Y = years; mos = months; MM = mobile media

a Among all children: users and non-users of media
b Based on data adapted from Bedford, Saez de Urabain, Celeste, Karmiloff-Smith, and Smith (2016)
c Based on data adapted from CHILDWISE (2017)
d Based on data adapted from Kucirkova and Littleton (2016)
e In hours and minutes (hh:mm)
f Among those who ever used media
g Not clear from the report whether this value was calculated for all children or for media users only
h Percentage of children who own a touchscreen device
Table 2.8

Comparison Between the Onset Age of Screen Media Use Among Children in Saudi Arabia, the U.S., and the UK

<table>
<thead>
<tr>
<th></th>
<th>Saudi (1-3Y)\textsuperscript{a}</th>
<th>U.S. (0-2Y)\textsuperscript{a}</th>
<th>UK (6-36 mos)\textsuperscript{a,b}</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of children who started watching TV before age 2</td>
<td>94%</td>
<td>71%</td>
<td>-</td>
</tr>
<tr>
<td>% of children who started using MM before age 2</td>
<td>79%</td>
<td>46%</td>
<td>81%</td>
</tr>
</tbody>
</table>

\textit{Note.} Data on children in the U.S. were adapted from Rideout (2017); Y = years; mos = months; MM = mobile media

\textsuperscript{a} Among all children: users and non-users of media

\textsuperscript{b} Based on data adapted from Bedford, Saez de Urabain, Celeste, Karmiloff-Smith, and Smith (2016)
Discussion

The purpose of this study was to provide a better understanding of screen media use among young children in Saudi Arabia, the largest media market in the MENA region. More specifically, the study sought to provide information on the prevalence of screen media devices in Saudi households with toddlers, the age at which young children are introduced to screens, the amount of time they spend with screens, the prevalence of reading among toddlers compared to screen media use, the types of media content children frequently view, variation in children’s screen media use practices based on demographic variables, and how screen media use practices in Saudi Arabia compare to those in other countries.

Saudi homes with toddlers are saturated with media devices and new technology. The vast majority in this study reported ownership of TVs, computers, smartphones, tablets, and an Internet connection. Handheld video game players, however, were not prevalent among households with toddlers. This could be due to the sophistication of video game players and the motor and cognitive skills needed to use them, which young children have not mastered yet. One quarter of children under 3 in this study had their own portable media devices. In line with previous results (e.g., Bedford et al., 2016; Cheung, Bedford, Saez De Urabain, Karmiloff-Smith, & Smith, 2017; Choles & Mindell, 2013; Dennison, Erb, & Jenkins, 2002; Rideout, 2011), the current study showed that ownership of portable devices among young children increases with age.

The current study also shows that more than 90% of children in the sample started watching television and using mobile media devices before the age of 2. This figure is considerably higher than that reported by the Saudi National Center for Public Opinion Polls (2017a), which found that less than half of Saudi children in their sample aged 5 to 12 years
started using smart media devices before the age of 5 years. This discrepancy could be attributed to the different target age groups and the different media platforms examined.

In the current study, Saudi children exceeded the maximum amount of screen time recommended by several international health bodies. The average overall screen time for Saudi toddlers was found to be about 3 hours a day, which exceeds the AAP recommendations of zero screen time for children under the age of 2 and no more than 1 hour of high-quality programming a day for children aged 2 to 5 years. It is worth noting that we looked at screen time among all children in the sample, including those who were never exposed to screens, which may have affected the mean screen time calculated. Although our findings are higher than the AAP recommendations, they are still low compared to results of the Saudi National Center for Public Opinion Polls (2017a), which reported that Saudi children aged 5 to 12 years in their sample spent 4 hours per day using mobile media devices. These discrepancies may be the result of the broader age range examined by the Saudi National Center for Public Opinion Polls.

We found no significant differences by age group with regard to the amount of time children spent viewing television. However, just as older children were more likely to own a mobile media device than younger children (under 2 years of age), in accordance with other studies (e.g., Li, Mendoza, & Milanaik, 2017), they also spent significantly more time using mobile media than younger children. This may be because television viewing can be a shared experience for the whole family and does not require any sophisticated skills, unlike mobile media, which provide a more individual experience that requires higher and more complex cognitive and motor skills.

Put in a global context, ownership of tablets among children aged 2 to 4 years in the U.S. (Rideout, 2017) is almost twice the figure for Saudi children aged 2 to 3 years (as found in the
Interestingly, however, ownership of tablets among Saudi children under 2 is about three times as high as that among children under 2 in the U.S. Saudi children start viewing screens earlier than young children in the U.S. (Rideout, 2017), but at almost the same time as children in the UK (Bedford et al., 2016). In addition, the average amount of time Saudi toddlers are exposed to screen media is higher than in the U.S. (Rideout, 2017) and the UK (Bedford et al., 2016). These findings make sense in light of the observation that the AAP has been successful reaching out to parents in the U.S. through media outlets and paediatricians (Rideout, 2017). The AAP specifically discourages the use of screen media by children under 2 years, and this could explain why parents in the U.S. seem to be more diligent in complying with the AAP guidelines up to the age of 2. No similar guidelines or awareness raising efforts are in place in Saudi Arabia. Similarly, in the UK, there are still no official guidelines on screen time, although the topic of issuing guidelines is highly debated among researchers, educators, and policymakers (Etchells et al., 2017; Palmer et al., 2016; UK Parliament, 2018). This may explain the earlier exposure to screen media among UK children under the age of 2.

The present study revealed notable findings on the prevalence of reading to young children in Saudi Arabia. More specifically, we found that reading to toddlers is very infrequent in Saudi Arabian homes, with reports of more than 40% of children never being read to, one quarter of children having no children’s books at home, and more than half having no more than two children’s books at home. A substantial body of research indicates that shared reading is one of the most prominent home literacy environment components that are positively associated with concurrent and long-term language and literacy outcomes (e.g., Bus et al., 1995; Farrant & Zubrick, 2011; Evans et al., 2000; Foy & Mann, 2003; Frijters et al., 2000; Lonigan & Whitehurst, 1998; Ninio, 1983; Payne et al., 1994; Scarborough & Dobrich, 1994; Snow, 1983;
Whitehurst & Lonigan, 1998). The figures found in the current study are worrying, especially when compared to global figures. For example, previous research in the UK has indicated that more than half of children aged 0 to 8 years are read to daily (Kucirkova & Littleton, 2016), and studies in the U.S. have shown that more than half of children aged 2 to 4 years and more than two fifths of children under 2 years old are read to daily (Rideout, 2017).

It is not entirely clear why the daily reading rates among Saudi parents and children are low. It is possible that the culture of reading for pleasure is not very common among Saudis in general, as indicated from one poll where more than half of the participants surveyed ($N = 1008$) said they had no interest in reading books (Saudi National Center for Public Opinion Polls, 2017b). It could also be that parents thought that their children were too young for reading and may not understand what is read to them. Another possibility is that screen time displaces time spent on reading. This possibility is supported by previous research suggesting that screen media use may displace social, language, and literacy activities such as reading, parent–child interactions, and play (e.g., Anderson & Pempek, 2005; Huston, Wright, Marquis, & Green, 1999; Schmidt & Anderson, 2007; Vandewater, Bickham, & Lee, 2006; Wright et al., 2001).

It is important not only to find out how much children watch, but also what they watch, as media content has been shown to have an effect on the extent to which children learn from media (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Linebarger & Walker, 2005; Rice, Huston, Truglio, & Wright, 1990; Tomopoulous et al., 2010; Wright, Huston, Murphy, et al., 2001; Wright, Huston, Scantlin, & Kotler, 2001; Zill, Davies, & Daly, 1994). This study is one of the first to explore what Saudi children watch or view on television and mobile media. The current study found that Baraem, a pan-Arab pre-school TV channel that targets children aged 3 to 6 years old, was the most favourite channel among the children in our sample. Baraem
and its sister channel, *Jeem TV*, which was toddlers’ fifth most favourite channel and caters to older children aged 7 to 12 years old, are both managed by Al Jazeera Children’s Channel (JCC) and funded by the Qatar Foundation for Education, Science and Community Development. The two channels both use Modern Standard Arabic in all of their programmes. They produce in-house, high quality children’s shows and show carefully-selected foreign shows dubbed in Arabic (Lustyik, 2013; Steemers & Sakr, 2017). During the time of data collection, *Baraem* and *Jeem TV* were free-to-air channels. Soon after, however, they were moved to a paid TV package and were no longer available to most children in the MENA region. In addition, the Gulf Rift, which started in May of 2017, has led Saudi Arabia and several other countries in the region to cut their relations with Qatar. These dramatic changes in the ease of access to Qatari channels will definitely have an impact on viewership. We expect children to switch to other channels and thus future studies will most likely reveal different results.

*Toyor Al-Jannah*, the second most popular TV channel among Saudi toddlers, was the first channel that started a new genre of children’s programming in the Middle East in 2008; that is, channels that broadcast children’s songs non-stop on a daily basis. The songs, sometimes called *anasheed*, are usually loud, fast-paced, and have several attention-grabbing features such as quick-changing scenes, rapid zooms and pans, and flashes of colour. Child experts around the MENA region have raised their concerns over the potential harmful effects of viewing what they describe as highly addictive channels (Aboussaad, 2016; Al-Mishal, 2013; Alrajbani, 2014; Barakat, 2013; Mubarak, 2014). Most of what is known about the impact of these types of channels on children is not backed up by rigorous scientific evidence. No prior studies have examined the amount of time spent on viewing these types of channels, the quality of their content, or their effects on children’s health and development. However, a number of studies
have investigated the association between the perceptually salient formal features (e.g., rapid pacing, fast motion, frequent camera cuts, loud music) employed in child-directed shows and children’s attention, learning, and comprehension. Eye-tracking research has shown that processing transitions to new scenes is difficult for young children, who often need longer time than older viewers to orient to new scenes (Kirkorian, Anderson, & Keen, 2012). Research also indicates that viewing fast-paced shows by toddlers and preschoolers is linked to lower executive functioning skills, which are crucial for social, cognitive, and linguistic functioning (e.g., Friedrich & Stein, 1973; Geist & Gibson, 2000; Huber, Yeates, Meyer, Fleckhammer & Kaufman, 2018; Lillard & Peterson, 2011). Such findings seem to be the reason why the AAP specifically warns against fast-paced programmes and programmes with distracting content for young viewers (American Academy of Pediatrics, 2016).

The three most favourite shows for Saudi toddlers in this study were *Iftah Ya Simsir*, Arabic children’s songs, and *Fi Hadeeqat Almarah*. Arabic children’s songs are songs that are usually viewed on channels such *Toyor Al-Jannah*, discussed above. *Iftah Ya Simsir* is an authorised Arabic-language version of the famous American children’s TV show *Sesame Street*. *Iftah Ya Simsir* first launched in 1979, but was taken off the air during the Gulf War in 1990. In September of 2015, the show was relaunched, appearing on 15 Arabic stations, and has since become very popular among Gulf Arab children. It targets 4- to 8-year-old children and is designed around an educational curriculum that focuses on the Arabic language, maths, and other subjects related to young viewers (BBC, 2015). The first version of *Iftah Ya Simsir* was found to promote language acquisition, increase vocabulary size, develop expressive abilities and reading skills, and improve mathematical knowledge and reasoning in Arabic Iraqi children (Al-
Khayr and Al-Samira’i, 1995). To date, no research has been conducted on the impact of the new version of the show on children’s development.

The third most popular show among Saudi toddlers was *Fi Hadeeqat Almarah*, which is an Arabic dubbed version of the BBC children’s television series *In the Night Garden*, which targets 1- to 4-year-old children. The show airs daily on *Baraem* at around bedtime and features colourful toy characters living in a magical place, caring for each other, having fun together, and saying short repetitive phrases and singing songs. The show also has soothing storylines, lilting music, and a dreamlike setting (Conlan, 2010). A study by Hanvey and DeBold (2015) analysed the original English *In the Night Garden* show and found that it has only 9% of speech alone with no background noise, 16% of speech with background noise including music, 51% of music, and 24% of noise which is non-speech and non-music. One should note that the dubbed Arabic version may have different features and sound tones, although it has similar, limited comprehensible speech.

The minimal dialogue and nonsense phrases in *Fi Hadeeqat Almarah/ In the Night Garden* are similar to the features of *Teletubbies*, which is a show that has raised concerns among many researchers. Linebarger and Walker (2005), for example, found that viewers of *Teletubbies* tended to use fewer words and were more likely to use vocalisations than non-viewers, suggesting that children imitate what they watch on television. The poor modelling of language (i.e., the use of baby talk by the characters and the very limited use of words) as well as the loose narrative structure are features associated with the negative impact of these programmes on vocabulary development (Linebarger & Walker, 2005). Krcmar, Grela, and Lin (2007) found that although children aged 22 to 24 months were able to learn novel words taught via an edited clip from *Teletubbies*, children aged 15 to 21 months were not. Children from both
age groups in their study were more likely to learn novel words from an adult speaker to whom they were paying attention, whether the adult was live or on video, than from a voiceover during the children’s programme. It seems from these studies that the extent of learning words from children’s shows depend on various factors, including child age and programme language-related features.

The finding that *YouTube* was the most favourite app among Saudi toddlers in this sample is not surprising, given that Saudi Arabia is the world’s biggest user of *YouTube*, per capita (Smith, 2013). With a simple click, *YouTube* can provide children access to a variety of materials and an unlimited number of videos. It can also be seen as an on-demand platform to access and view children’s TV shows. In their open-ended responses, mothers in the study indicated that their children often viewed on *YouTube* the content they would usually watch on television, as well as the videos that immediately appear on the app’s main screen, including the highly subscribed-to *YouTube* channels, the most highly viewed children’s *YouTube* channels, and recommended videos based on previously viewed content.

Among the most popular *YouTube* channels as reported by caregivers were unboxing channels and channels with nursery rhymes. Unboxing refers to the “act or instance of removing a newly purchased product from its packaging and examining its features, typically when filmed and shared on a social media site” (unboxing, n.d.). Toy unboxing videos are videos that feature adults or children unpacking, assembling and demonstrating toys (Craig & Cunningham, 2017). Children’s unboxing channels usually rank among the top 10 most viewed *YouTube* channels (Socialblade, 2017). They typically include videos showing a pair of hands unboxing toys, Lego, *Play-Doh*, or *Kinder Eggs*, and they usually do not contain any language (background music only or sounds of unwrapping toys and playing with them). *Super Simple Songs*, *ChuChuTV*,
*Little Baby Bum, Mother Goose Club,* and *Hoopla Kids* are examples of popular channels featuring kids’ songs and nursery rhymes. There is currently a rising trend in which many of these types of channels have videos featuring a compilation of multiple songs with long running times advertised in large fonts on the thumbnails of the videos. It may be that these videos are in demand because it is easier for parents to play one video for their child, attend to their chores, and not have to search for another video and play it again after the first one ends.

The second most popular app among Saudi toddlers in this study was *Lamsa.* *Lamsa* is a high-quality edutainment app that targets children aged 1 to 8 years old and offers educational games and interactive Arabic children’s story e-books. The findings from the current study are aligned with statistics provided by *Lamsa*’s producers, who state that 40% of *Lamsa* users (as of April 2016) are from Saudi Arabia (Twofour54, 2016). The third most popular app among Saudi children was *Adnan the Quran Teacher,* which aims to teach children about the Quran and to train them to memorise its verses. There is a preference for Islamic and religious content in the Saudi conservative Muslim society. Moreover, teaching the Quran and Islamic principles is seen as an integral part of good parenting in the country. The popularity of this app may be influenced by parents downloading the app for their children and encouraging them to use it.

The study revealed that the most viewed content genre on mobile media devices was children’s songs. Educational apps and games were used less often than apps with video clips and video songs. This is in contrast to the findings of Rideout (2013) and Li et al. (2017), who found that toddlers and pre-schoolers in the U.S. engage with educational games and apps more than with other types of apps. Confirming the findings of the Saudi National Center for Public Opinion Polls (2017a), creative apps for activities such as drawing, making music, or creating
videos were the least popular among children in our sample. This could be attributed to the sophistication of these types of apps and the higher cognitive and motor skills that they require. The current study suggests a few differences in screen media and reading practices by demographic variables. We found that older children (2 years or older) used mobile media devices more than younger children (under 2 years old). This finding is in agreement with most of the studies that investigated similar age groups (e.g., Bedford et al., 2016; Kayiran, Soyak, & Gürakan, 2010; Li, Mendoza, Milanaik, 2017; Rideout, 2017; Taylor, Monaghan, & Westermann, 2018). Older children also viewed educational material more often than younger children. This finding lends support to previous results in the literature (Mukherjee, Gupta, & Aneja, 2014; Rideout, 2013). Older children using media more often and watching educational content more often could be attributed to the higher language, cognitive, and motor skills they possess, which make manipulating handheld devices and understanding educational content easier. No significant differences were observed in screen media and reading practices among the three levels of maternal and paternal education, which is probably due, at least in part, to the small sample sizes in each of the groups.

Limitations

There are limitations to this study. First, parent-reported measures are susceptible to social desirability and recall bias (Byeon & Hong, 2015; Duch et al., 2013; Neumann, 2014; Sudman & Bradburn, 1973; Tourangeau, Rips, Rasinski, 2000). However, as the target age group in this study was children under 3 years, obtaining data directly from the children was not an option. In order to reduce the potential for social desirability effects, when constructing the
survey, we phrased questions carefully so respondents could provide answers about their children’s media practices without fear of being judged. We did not mention, nor hint at, any negative or positive aspects associated with screen media use by young children.

Second, tools other than surveys or questionnaires may be more accurate in reporting children’s media use practices. Time-use and event-based diaries, for example, have been found to be less subject to social desirability bias and memory lapses than checklists and questionnaires (Anderson, Field, Collins, Lorch, & Nathan, 1985; Ellis-Davies, Sakkalou, Fowler, Hilbrink & Gattis, 2012; Huston, Wright, Rice, Kerkman, & St. Peters, 1990). Diaries, which we used in another study (Paper 3/ Chapter 4), can be difficult to complete, though, which may negatively affect the response rate and the sample size. Another alternative is the use of electronic monitoring techniques such as apps that can be downloaded on children’s devices to track their mobile media use and media content viewed, or the use of digital recorders that can track and analyse speech, sounds, and noise in the child’s environment including television and electronic sounds, such as LENA (LENA Foundation, 2011). However, due to technical and ethical restrictions, these methods were not viable for this study. Surveys were thus more useful and practical for obtaining information about children’s screen media use patterns from their primary caregivers.

Finally, the majority of the mothers in the study were well-educated and therefore our findings might not accurately generalise to the larger population. Regardless, future work should examine whether the same media profiles can be found in children of mothers from a more widely distributed educational attainment spectrum.
Conclusions

The current study sought to provide a better understanding of the home screen media environment of Saudi toddlers. We found that the majority of Saudi toddlers start viewing screens prior to the age recommended by several child health organisations. We also found that Saudi toddlers’ screen time exceeds the maximum amount of recommended screen time for their age. A large number of Saudi toddlers prefer to watch channels that use formal features that may negatively impact their cognitive and language development. Furthermore, we found that many Saudi households do not regularly engage in reading to their toddlers.

The first three years of life are very critical, and exposure to screen media during these years is likely to play a significant role in children’s development. However, research on exposure to screen media among Saudi children under 3 years of age is scarce. Our findings contribute to the literature by focusing on specific types of content viewed and screen media environment elements that are associated in the literature with early language development. These findings can serve as an impetus for replication and future research on the impact of screen media on various aspects of children’s development, especially with regard to language. We recommend that future studies be conducted in the MENA region in general, and in Saudi Arabia in particular, to guide the development of recommendations for parents, educators, healthcare providers, and policymakers on the use of screen media by young children.
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doi:10.1037/h0087330

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associated with less parent–child shared reading aloud and teaching activities?


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https://en.oxforddictionaries.com/definition/unboxing


doi:10.3389/fpsyg.2016.01264


Appendices

Appendix A. Paper 1 - Study Survey

Home Literacy & Media Survey

Thank you for agreeing to take part in this survey which is conducted as part of a research project aiming to explore the literacy and media environment of young Saudi children.

All of your answers and comments will remain confidential and anonymous. If you have any questions about the survey, please contact the Principal Investigator, Haifa Alroqi (Mobile: +966- 531666108/ Email: haifa.alroqi@postgrad.manchester.ac.uk).

1. Child’s Gender: □ Female □ Male
2. Child’s Date of Birth? ........... / ........... / ...........
   (Day) (Month) (Year)
3. Child’s Place of Birth .............................................................. (City/ Country)
4. Your Name/ pseudonym (Optional) ................................................................
5. Your email address (Optional) ........................................................................
6. Your phone number (Optional) ........................................................................
7. Your relationship to the child: □ Mother □ Father □ Other, please specify ..........
8. What is your age?
   □ 17 or younger
   □ 18-20
   □ 21–24
   □ 25–29
   □ 30–34
   □ 35–39
☐ 40–44
☐ 45–49
☐ 50 or older

9. Which of the following best describes your current marital status?
☐ Single
☐ Married
☐ Widowed
☐ Divorced
☐ Separated

10. What is the highest level of school you have completed or the highest degree you have received?
☐ No schooling completed
☐ Elementary School Certificate
☐ Intermediate School Certificate
☐ High School Certificate
☐ Post HSC Diploma
☐ Bachelor degree
☐ Master degree
☐ Doctoral Degree
☐ Other, please specify ........................................................................................................................................

11. Which of the following categories best describes your employment status?
☐ Employed, working full-time
☐ Employed, working part-time
☐ Not employed, currently looking for work
☐ Not employed, NOT currently looking for work
☐ Businesswoman
☐ Student
☐ Retired
☐ Disabled, not able to work
☐ Other, please specify ........................................................................................................................................

12. What is the age of the child’s father?
☐ 17 or younger
☐ 18-20
13. What is the highest level of school the father has completed or the highest degree he has received?
   - No schooling completed
   - Elementary School Certificate
   - Intermediate School Certificate
   - High School Certificate
   - Post HSC Diploma
   - Bachelor degree
   - Master degree
   - Doctoral Degree
   - Other, please specify ………………………………………………………………………………………

14. Which of the following categories best describes the father’s employment status?
   - Employed, working full-time
   - Employed, working part-time
   - Not employed, currently looking for work
   - Not employed, NOT currently looking for work
   - Businessman
   - Student
   - Retired
   - Disabled, not able to work
   - Other, please specify ………………………………………………………………………………………

15. How many children age 12 or younger live in your household (including the child)? ………………..

16. What is the birth order of the child?
   - Oldest
   - Middle
   - Youngest
17. How much total combined money do all members of your household earn every month?

- □ SR 0 to SR1,999
- □ SR 2,000 to SR4,999
- □ SR 5,000 to SR9,999
- □ SR 10,000 to SR14,999
- □ SR 15,000 to SR19,999
- □ SR 20,000 to SR24,999
- □ SR 25,000 to SR29,999
- □ SR 30,000 to SR34,999
- □ SR 35,000 to SR39,999
- □ SR 40,000 and up

18. Which of the following best describes the type of tenure of your housing?

- □ Rented
- □ Owned
- □ Provided by employer
- □ Other, please specify: ……………………………….

19. What is the name of the district where you currently live? ……………………………… (District/ City)

20. Were there any problems during pregnancy, birth, or right after the child was born? (premature, low birth weight, maternal infections, low Apgar, transfusion)

- □ No
- □ Yes

If yes, please explain: ………………………………………………………………………………………………………

21. Was the child delayed in any of the following?

- □ Babbling
- □ Talking
- □ Sitting
- □ Walking
- □ child was not delayed in any of the above
22. Do you have any concerns about your child’s hearing?

☐ No
☐ Yes

If yes, please explain: ……………………………………………………………………………………………………………………………

23. Do you have any concerns about your child’s speech/language development?

☐ No
☐ Yes

If yes, please explain: ……………………………………………………………………………………………………………………………

24. What language do you use when speaking to the child?

☐ Arabic
☐ English
☐ Mixture of Arabic and English
☐ Other, please specify: ……………………………………………………………………………………………………………………………

25. What language does the father use when speaking to the child?

☐ Arabic
☐ English
☐ Mixture of Arabic and English
☐ Other, please specify: ……………………………………………………………………………………………………………………………

26. Are there other people (other than parents) living at the same place where the child lives?

☐ No
☐ Yes

If yes, please specify how many and their relationship to the child
…………………………………………………………………………………………………………………………………………………………

27. Is there a domestic helper/ au pair who regularly interacts with the child at home?

☐ Yes
☐ No → (Skip to 29)

28. For each domestic helper, please identify the following:

☐ The domestic helper’s nationality.
☐ The language she uses when interacting with the child (e.g., Arabic, English, Mixture of Arabic & English, etc.)
Her proficiency level in that/those language(s) (i.e., High, Medium, or Low)

DH1: Nationality: ……………………. Language: ……………………. Proficiency: …………………….
DH2: Nationality: ……………………. Language: ……………………. Proficiency: …………………….
DH 3: Nationality: ……………………. Language: ……………………. Proficiency: …………………….
Other, please specify: …………………………………………………………………………………

29. How often do you read to your child?

□ Never    □ rarely    □ Once a week    □ 2-3 times a week    □ Everyday

30. How often do you read bedtime stories to your child?

□ Never    □ Rarely    □ Sometimes    □ Often    □ Always

31. Approximately, how many books does your child have (including books shared with siblings, & excluding school textbooks)?

□ No books    □ 1-2 books    □ 3-9 books
□ 10-19 books    □ 20-49 books    □ 50 plus

32. What is the language of the books you often read to your child? (Please mark all the apply)

□ Arabic only
□ English only
□ Arabic and English books equally
□ Arabic books more than English books
□ English books more than Arabic books
□ Wordless picture books
□ Other, please specify: …………………………………………………………………………………

33. Is there a TV set in your household?

□ Yes
□ No → (Skip to 35)

34. How many TV sets do you have in your household? ……………………………………………

35. How many of the following do you have in your household? (If any is not available, please put 0)

TV (Local or Satellite) ………………………………
Desk computer or laptop ………………………………
DVD player or VCR ………………………………
Games console e.g., PlayStation, Xbox, or Wii ………………………………
An iPod Touch or other type of video iPod ………………………………
A smartphone such as iPhone, Galaxy, or BlackBerry
A tablet device, such as iPad, Galaxy Tab, or Galaxy Note
A handheld video game player e.g., Gameboy or PSP

36. Do you have an internet connection at home?
   □ Yes
   □ No

37. Which of the following items, if any, does your child have in her/his bedroom? (Please mark all the apply)
   □ TV (Local or Satellite)
   □ Desk computer or laptop
   □ DVD player or VCR
   □ Games console e.g., PlayStation, Xbox, or Wii
   □ A music CD player or audiocassette
   □ High speed Internet access
   □ None of the above

38. How likely is it that your child has a media device (e.g., TV, Games console, DVD player, Computer, etc.) in her/his bedroom because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>I let my child watch TV and/or use electronic devices …</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Because it helps her/him fall asleep</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Because it keeps her/him occupied in their room so I can do other things around the house</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Because it frees up the other TVs so other family members can watch their own shows</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Because it was a reward for good behaviour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Because she/he shares a room with an older brother or sister</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Because she/he shares a room with an adult</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Because she/he sleeps in a family room that has a TV in it</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Because we bought a new TV and decided to give her/him the old one</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. To get her/him to sleep in her/his own room</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
39. Which of the following items do you have, if any?

- [ ] Your own smartphone
- [ ] Your own tablet or iPad
- [ ] Your own iTouch or other video iPod
- [ ] None of these → (Skip to 44)

40. What type of cell phone, if any, do you have?

- [ ] I have a smartphone (you can send email, watch videos, or access the Internet on it)
- [ ] I have a regular cell phone (just for talking or texting)
- [ ] I don't have a cell phone

41. Approximately, how many apps, if any, have you downloaded onto your own:

a. Smartphone: ........................................

b. Tablet (e.g., iPad) ....................................

c. iPod Touch ...........................................

42. Approximately, how many of the apps that you've downloaded were for your child/children to use on your:

a. Smartphone: ........................................

b. Tablet (e.g., iPad) ....................................

c. iPod Touch ...........................................

43. Approximately, how many of the apps you've downloaded for your child/children are educational apps (i.e., apps that are designed to teach kids something)?

a. Smartphone: ........................................

b. Tablet (e.g., iPad) ....................................

c. iPod Touch ...........................................

44. Which of the following items does your child have, if any?

- [ ] her/his own smartphone
- [ ] her/his own iPad or tablet
- [ ] her/his own iTouch or other video iPod
- [ ] her/his own handheld video game player like a Gameboy or PSP
- [ ] None of the above

45. Which of the following items does your child share with someone else (e.g., parent, siblings, etc.)?

- [ ] A smartphone
- [ ] A tablet or an iPad
☐ An iTouch or other video iPod
☐ A handheld video game player like a Gameboy or PSP
☐ None of the above

46. How many hours per day does your child spend on watching TV? .............................................

47. How do you evaluate your child’s TV watching time?
☐ She/he never watches TV
☐ She/he rarely watches TV
☐ She/he moderately watches TV
☐ She/he frequently watches TV
☐ She/he excessively watches TV

48. How many hours per day does your child spend on using electronic media? .........................

49. How do you evaluate your child’s electronic media use?
☐ She/he never uses electronic media → (Skip to 52)
☐ She/he rarely uses electronic media
☐ She/he moderately uses electronic media
☐ She/he frequently uses electronic media
☐ She/he excessively uses electronic media

50. How often is internet connection available for the devices your child regularly uses?
☐ Never    ☐ Rarely    ☐ Sometimes    ☐ Often    ☐ Always

51. How often, if ever, does your child use the following kinds of apps on a cell phone, iPod, iPad, or other tablet device? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Educational games, like puzzles, memory games, math, or reading</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Games that are just for fun</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Creative apps and programmes for things like drawing, making music, or creating videos</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Apps and programmes based on a character my child knows from a TV show</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Apps and programmes that have audio songs</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
6. Apps and programmes that have video songs

7. Apps and programmes with religious content like teaching Quran, prayers, and Islamic rituals.

8. Apps and programmes that have photo and video albums

9. Other types of apps and programmes

52. How often does your child do each of the following activities? (Please mark ONE answer for each statement below. Answer options are: Never, Once a week, Several times a week, Once a day, Several times a day)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Once a week</th>
<th>Several times a week</th>
<th>Once a day</th>
<th>Several times a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read or be read to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Watch DVDs or videotapes</td>
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<tr>
<td>3. Watch TV</td>
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<tr>
<td>4. Use the computer</td>
<td></td>
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<tr>
<td>5. Play video games on a console player like an Xbox, PlayStation, or Wii</td>
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<td></td>
</tr>
<tr>
<td>6. Play games on a handheld player like a Gameboy or PSP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Use a mobile device (like a smartphone, tablet, iPad, iPod Touch, or similar device) to play games, use apps, or watch videos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

53. How likely is it that you let your child watch TV and/or use electronic devices because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. because my child wants to watch TV or use electronic devices to have fun</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. because I find it difficult to say ‘No’ to my child when she/he asks to watch TV or use electronic devices</td>
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<tr>
<td>3. as a reward for good behaviour</td>
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<td></td>
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<tr>
<td>4. because they make parenting easier</td>
<td></td>
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</tr>
</tbody>
</table>
5. because they help distract my child when I have some chores to attend to

6. to get my child to remain quiet or not move when in public (restaurants, social gatherings, waiting areas, etc.)

7. to distract my child so she/he can eat

8. to get my child to stop crying

9. because my child needs to be skilled with computers and new tablet devices to be successful in life

10. because they have educational materials that are good for my child's brain development

11. because they help in teaching my child language basics such as alphabets and numbers

12. because they help in teaching my child new vocabulary

13. because they help in teaching my child religious values and morals

14. because they help in teaching my child good manners and habits

15. because they help in teaching my child languages (e.g., Arabic, English or French)

54. If there are other reasons, other than the ones mentioned above, please explain below. Otherwise, leave blank.

55. How often does each of the following happen? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always, I don’t know.)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you watch TV together with your child?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. How often do you use electronic devices together with your child?</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. When the child is watching TV, how often does someone else watch with her/him?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. When the child is using electronic devices, how often does someone else use/play with her/him?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|   | Question                                                                                      | Options
|---|-----------------------------------------------------------------------------------------------|---
| 5. | How often do you or someone else discuss/explain the content of the programme viewed on TV or electronic devices to your child? | □ □ □ □ □ □ 
| 6. | How often do you or someone else specify in advance the programmes/ applications that may be viewed/ played? | □ □ □ □ □ □ 
| 7. | How often do you or someone else set specific media viewing/ playing hours for your child? | □ □ □ □ □ □ 
| 8. | How often do you or someone else tell your child to turn off the TV/electronic device or switch the channel/quit an application when she/he is viewing an unsuitable content? | □ □ □ □ □ □ 
| 9. | How often does your child eat her/his main meals while watching TV or using electronic devices? | □ □ □ □ □ □ 
| 10. | On a typical day, how often do you leave the TV on, even if no one is actually watching it? | □ □ □ □ □ □ 

56. Do you or someone else forbid your child to watch/play certain programmes/ channels/ applications?
   □ Yes
   □ No → (Skip to 58)

57. Please specify the channels, programme types, or programme titles that you or someone else forbid your child to view/ play

..................................................................................................................................................................................
..................................................................................................................................................................................

58. In general, do the media in your home—TVs, computers, video games, and mobile devices—cause your family to spend more time together with other family members, less time together with other family members, or don’t they make much difference one way or the other?
   □ Media cause us to spend more time with other family members
   □ Media cause us to spend less time with other family members
   □ Media don’t make much difference in how much time we spend with other family members

59. What is your child’s favourite activity? If more than one, list all.

..................................................................................................................................................................................

60. What is your child’s favourite TV channel? If more than one, list all.

..................................................................................................................................................................................

61. What is your child’s favourite TV programme? If more than one, list all.

..................................................................................................................................................................................
62. What is your child’s favourite tablet/smartphone application? If more than one, list all.


63. At what age did your child start watching TV?


64. At what age did your child start using electronic devices (e.g., smartphone, tablets, computers, etc.)?


65. From your point of view, which channel(s) or programme(s) do you think is beneficial for your child? Please provide details.


66. From your point of view, which channel(s) or programme(s) do you think is harmful for your child? Please provide details.


67. From your point of view, what is the ideal amount of screen time (TV & mobile devices) for children in your child’s age?


68. From your point of view, when is the ideal age to introduce children to screens?

□ Younger than 1 year
□ 1 to 2 years
□ 2 to 3 years
□ 3 to 4 years
□ 4 to 5 years
□ Older than 5 years

69. From your point of view, does TV viewing impact your child’s language development negatively or positively?

□ TV viewing negatively impacts my child’s language development
□ TV viewing positively impacts my child’s language development
□ TV viewing does not have any impact (positive or negative) on my child’s language development

70. From your point of view, does using mobile devices impact your child’s language development negatively or positively?

□ Using mobile devices negatively impacts my child’s language development
□ Using mobile devices positively impacts my child’s language development
□ Using mobile devices does not have any impact (positive or negative) on my child’s language development
71. Does your child attend day care?

☐ Yes
☐ No

72. If you have anything to add in regard to your child’s media use and its relation to your child’s language development, please use the space provided below to write your input.

.............................................................................................................................................
.............................................................................................................................................
Parental Attitudes Towards Young Children’s Screen Media Use and Parental Media Mediation Practices in Saudi Arabia

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Paper prepared for publication (not yet submitted)
Abstract

Screen media have become deeply integrated into our day-to-day lives. In many parts of the world, children are now immersed in media-saturated environments. Research indicates that parents can play a vital role in shaping and mediating their children’s screen media use behaviours and experiences. The current study sought to explore parental beliefs and attitudes regarding young children’s screen media use as well as parental media mediation practices in Saudi Arabia. A survey of 220 primary caregivers of 1- to 3-year-old Saudi children revealed that caregivers’ views of what constitutes the appropriate age to introduce screens and the appropriate amount of daily screen time do not match up with their children’s actual practices. Caregivers were found to underestimate the amount of time that their children spend with screens. In addition, the most likely parental motives behind allowing young children to use screens is to keep them occupied, entertain them, or help them learn languages. Most caregivers believe that screen media use leads family members to spend less time together and that television viewing has a positive impact on children’s language development, while mobile media use has a negative impact. Although children’s screen media use is a hot topic among Saudis, access to evidence-based information on the topic is limited, and most of what circulates on social media in Arabic is inaccurate. The results of this study have the potential to inform efforts of parents, educators, and policymakers and to help parents make mindful choices regarding their role in actively and positively mediating their children’s screen media use in ways that foster, not hinder, their development, especially their language development.

Keywords: children, media mediation, media use, mobile media, parental control, screen time, technology, toddlers
Introduction

In today’s digital world, screen media have become an integral part of everyday life and an important component of children’s Home Literacy Environment (HLE), which is well-established to be of fundamental importance for children’s linguistic and cognitive development, especially in the first few years of life (e.g., Deckner, Adamson, & Bakeman, 2006; Griffin & Morrison, 1997; Liebeskind, Piotrowski, Lapierre, & Linebarger, 2014; Payne, Whitehurst, & Angell, 1994; Rodriguez et al., 2009). Young children in many parts of the world are immersed in constantly evolving and dynamic media-saturated environments. The increasing prevalence of screens has raised issues over the potential negative and positive effects of screen media on children’s health and development. Although the impact of screens on children is still a highly debated subject, researchers suggest that mitigating the negative effects and maximising opportunities for positive effects largely depend on how children’s screen media use is managed and mediated (Clark, 2011; Livingstone, Nandi, Banaji, & Stoilova, 2017; Mendelsohn et al., 2010).

The rapidly changing screen media landscape poses challenges for parents of digital natives (Prensky, 2001), those who have grown up with technology, are quite comfortable adapting to new technologies that arise on an ongoing basis, and can readily figure out how to use touchscreens from short exposures (American Academy of Pediatrics, 2016; Cristia & Seidl, 2015; Paudel, Leavy, & Jancey, 2016). Parents of these children often find it difficult to keep pace with their children’s adeptness with new technologies and, therefore, understanding how screen media is used and putting guidelines on screen exposure can be challenging. In addition, the increasing availability and frequency of use of portable mobile media devices among young
children have made it less feasible for parents to monitor their children’s mobile media use. Despite these challenges, parents’ beliefs, attitudes and perceptions regarding their children’s screen media use, as well as the mediation strategies they utilise, are regarded as key contributors to children’s screen media use (Cingel & Krcmar, 2013; Hiniker, Schoenebeck, & Kientz, 2016; Lauricella, Wartella, & Rideout, 2015).

In this study, we examine parental attitudes towards children’s screen media use and parental media mediation practices and styles in light of two theoretical perspectives: Bronfenbrenner’s (1979) ecological systems theory and Vygotsky’s (1978) Zone of Proximal Development (ZPD). Bronfenbrenner (1979) has posited that children’s development is influenced by the reciprocal interaction between their various ecological systems (i.e., broad environmental contexts in which people live). Each of these systems has direct or indirect influences over the child’s development (Bronfenbrenner, 1979, 1988, 1994; Bronfenbrenner & Morris, 1998). Based on ecological systems theory, parents are significant contributors to their children’s microsystem. The microsystem is the innermost layer of the interacting systems and it represents the child’s direct contacts and immediate surroundings (e.g., parents, siblings, peers, teachers). In addition, parents’ attitudes and beliefs are part of their children’s macrosystem (i.e., the set of values, ideologies, and cultural beliefs of the environment where the child lives). Bronfenbrenner has also discussed the significance of everyday molar activities (“ongoing behavior possessing a momentum of its own and perceived as having meaning or intent by the participants in the setting”; Bronfenbrenner, 1979, p. 45) on learning and development. As explained by Lauricella et al. (2015), the idea is that activities and experiences do not all play equal parts in children’s development. Some of them take place infrequently and/or are not very notable, whereas others (molar activities) occur more frequently and have more significant
influences on children’s development. Given the amount of time that children and their families spend with screens and the presence of media technology across the various contexts of children’s ecological systems, parents’ own screen media consumption, their attitudes about screen media, and their screen media mediation practices can be seen as molar activities that may directly influence the home life and media habits of young children (Lauricella et al., 2015).

Bronfenbrenner’s theory can be used to explain the impact that screen media use and parental media mediation practices may have on children’s language development through several scenarios. First, media use manifests itself across several influential ecological systems in children’s lives and contributes to the linguistic input children receive within their immediate environments, and therefore it is expected to have an impact on their language development. Second, the excessive use of screen media may lead to a reduction in, or even a displacement of, real-life social interactions and other language-stimulating activities, and this could indirectly influence children’s early language development (Anderson & Subrahmanyam, 2017; Bronfenbrenner, 1979; Hofferth, 2010; Holloway, Green, & Livingstone, 2013; Hudon, Fennell, & Hoityzer, 2013; Johnson, 2015; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008; Seo & Lee, 2017; Zimmerman & Christakis, 2007). Parents’ media mediation practices and their attitudes towards media use shape young children’s media use habits, which in turn can impact their language development.

Parental screen media attitudes and screen media mediation practices can also be examined using Vygotsky’s (1978) ZPD. Based on this sociocultural approach, children can reach their higher Potential Developmental Level (PDL) when they interact with a More Knowledgeable Other (MKO) (e.g., a parent) who scaffolds the children’s learning processes (i.e., provides support that enables children to carry out tasks that are beyond their unassisted
efforts; Wood, Bruner, & Ross, 1976). Within this framework, parental mediation can be seen as playing a key role in developing children’s skills in dealing with screen media, preventing its potential negative effects, and fostering associated positive outcomes in a range of domains, including literacy, learning, and language development (Nikken & Schols, 2015).

The parental screen media mediation literature has shown that parents vary their mediation practices in accordance with their beliefs, attitudes, and perceptions regarding children’s screen media use (Nikken & Schols, 2015). Research to date has shown that parents have mixed views and attitudes towards their children’s screen media use. On the one hand, many parents think that screen media exposure helps their children’s learning and social skills (Chaudron, 2015; Livingstone, Blum-Ross, Pavlick, & Ólafsson, 2018; Rideout, 2017), language and vocabulary development (Bentley, Turner, & Jago, 2016; De Decker et al., 2012), literacy skills (Neumann, 2014), creativity (Livingstone et al., 2018; Rideout, 2017), and technology skills (De Decker et al., 2012; Livingstone et al., 2018), and better prepares them for the workforce (Chaudron, 2015; Livingstone et al., 2018; Vittrup, Snider, Rose, & Rippy, 2016). On the other hand, many parents have concerns about children’s excessive, addictive, or compulsive use of screens (Bentley et al., 2016; Rideout, 2017; Seo & Lee, 2017; Wartella, Rideout, Lauricella, & Connell, 2014), as well as their exposure to sexual, violent, and scary content (Bentley et al., 2016; Chaudron, 2015; Livingstone, Marsh, Plowman, Ottovordemgentschenfelde, & Fletcher-Watson, 2015; Rideout, 2017). Many parents also worry about the potential negative influences of screen media use on social development (Bentley et al., 2016), cognitive development (Seo & Lee, 2017), physical activity (Hinkley, Carson, Kalomakaefu, & Brown, 2017; Rideout, 2017; Seo & Lee, 2017; Wartella et al., 2014), vision and posture (Livingstone et al., 2015; Seo & Lee, 2017), attention span (Wartella et al., 2014),
and family time (Hiniker et al., 2016; Rideout, 2013; UK Office of Communications, 2016). Parents also fear that screen media may displace the types of free, traditional, or outdoor play that can be beneficial to children (Chaudron, 2015; Livingstone et al., 2015; Marsh et al., 2015; Rideout & Hamel, 2006).

Research to date indicates that positive parental attitudes towards screen media predicts higher screen media consumption among young children (Carson & Janssen, 2012; Cingel & Krcmar, 2013; Elias & Sulkin, 2017; Lauricella et al., 2015; Seo & Lee, 2017; Vandewater et al., 2007; Vittrup et al., 2016) and that parents with negative attitudes and perceptions are more likely to apply time and content restrictions on their children’s screen media use (Brown & Hayes, 2001; Hoffner & Buchanan, 2002; Lee, Jung, Park, & Chun, 2014; Nikken & Jansz, 2014; Seo & Lee, 2017). However, negative parental attitudes towards screen media do not always result in less screen media time among their children (Cingel & Krcmar, 2013). Even among parents who hold negative attitudes about screen media, beliefs about the perceived educational value of screen media and their ability to keep children occupied when necessary may play key roles in increasing children’s media consumption rates even within this population (Bentley et al., 2016; Cingel & Krcmar, 2013).

Parental motives to allow or even encourage their children to use screens is an important aspect to explore. Research shows that screen media are often used by parents as a tool for managing daily life. For example, screen media are used to calm upset children, offer children down time, occupy or distract children when in public, keep children quiet (Bentley et al., 2016; Cingel & Krcmar, 2013; Samaha & Hawi, 2017; Wartella et al., 2014), reward good behaviour, deliver consequences for bad behaviour (e.g., by taking a media device away; Bentley et al., 2016; Cingel & Krcmar, 2013; Samaha & Hawi, 2017; Wartella et al., 2014), and entertain
children (Cingel & Krcmar, 2013; Nevski & Siibak, 2016; Wartella et al., 2014). Keeping children occupied while parents attend to other chores has been shown to be the most likely reason parents report in several studies (e.g., Chaudron, 2015; Cingel & Krcmar, 2013; Nevski & Siibak, 2016; Seo & Lee, 2017; Vittrup et al., 2016; Wartella et al., 2014). Chiong and Schuler (2010) have called this activity the *pass-back effect*, where caregivers pass screen media devices to children to keep them occupied.

In addition, although several health bodies specifically advise against this practice (American Academy of Child and Adolescent Psychiatry, 2014; American Academy of Pediatrics, 2016), some parents place screen media devices in their children’s bedrooms. Research has shown that some of these parents cite their reasons for doing so as: keeping the children occupied in their rooms, freeing up other TV sets so parents can watch their own shows, and/or helping the children to fall asleep (Haines et al., 2013; Rideout, 2013).

Several studies have also found that screen media, especially computers and mobile media devices, are often used by parents as educational tools (Baek, Lee, & Kim, 2013; Bentley et al., 2016; Cingel & Krcmar, 2013; Marsh et al., 2015; Nevski & Siibak, 2016). This particular motive is likely related to the increasing availability and popularity of apps that are promoted as educational and targeted to infants, toddlers, and pre-schoolers (Garrison & Christakis, 2005; Hirsh-Pasek et al., 2015; Linebarger & Vaala, 2010; Vaala, Ly, & Levine, 2015).

Parents’ beliefs regarding the appropriate age to introduce screens to children and the appropriate amount of daily screen time for children, as well as their estimations of their children’s actual screen times, are important aspects to consider when investigating parents’ roles in influencing children’s screen media use. Little is known in the literature about parents’ perception of the appropriate age to introduce screens, but most official health guidelines advise
parents not to introduce screens before the age of 2 years (e.g., American Academy of Pediatrics, 2016; Australian Department of Health, 2017; Canadian Paediatric Society, 2017; German Federal Ministry of Health, 2016; New Zealand Ministry of Health, 2017).

Many health bodies recommend no screen time for children under 2 years of age and 1 to 2 hours of screen time for children 2 to 5 years old (e.g., American Academy of Pediatrics, 2016; Australian Department of Health, 2017; Canadian Paediatric Society, 2017; New Zealand Ministry of Health, 2017). Research has shown that parents tend to underestimate their own children’s screen media use (Livingstone, et al., 2015; Ruangdaraganon et al., 2009; Vittrup et al., 2016; Vittrup, 2009). According to parents’ reports in the most recent Common Sense Media study, a majority of young children under 8 years old in the United States exceed the recommendations of the American Academy of Pediatrics (AAP) for their age, even though these parents indicated that they thought their children were spending the right amount of time viewing screen media (Rideout, 2017). In the United Kingdom, Livingstone et al. (2015) found that parents’ estimates of the amount of time their children spent with screens was less than their children’s accounts. Livingstone et al. (2015) have speculated that the difference between parents’ and children’s reports might be due to children using screen media to fill time when their parents are otherwise engaged.

Research indicates that parents mediate their children’s screen media viewing in a number of different ways. Three major forms of parental mediation have been identified in the literature: active mediation, restrictive mediation, and co-viewing or co-using (Atkin, Greenberg, & Baldwin, 1991; Austin, 1993; Bybee, Robinson, & Turow, 1982; Dorr, Kovaric, & Doubleday, 1989; Takeuchi & Stevens, 2011; Valkenburg, Krcmar, Peeters, & Marseille, 1999). In active mediation, which is sometimes referred to as evaluative, instructive (Valkenburg et al.,
1999), or pre-arming (Padilla-Walker & Coyne, 2011), parents discuss or explain media content with their children or express their approval or disapproval of certain media content. In restrictive mediation, parents set rules for the amount of screen time children can spend on viewing, the type of content children are allowed to view (Valkenburg et al., 1999), or the placement of media (e.g., no TV in the bedroom; Padilla-Walker & Coyne, 2011). Co-viewing or co-using refers to adults and children viewing screen media together. This is also known as Joint Media Engagement (JME) (Takeuchi & Stevens, 2011). JME can be seen as an opportunity for joint attention – the shared focus of two individuals towards an object of mutual interest – which has been shown to be critical for early social, cognitive and language development (Bakeman & Adamson, 1984; Bates, 1979; Bruner, 1975, 1977, 1983; Moore & Corkum, 1994; Scott et al., 2013; Tomasello, 1988, 1995).

Two types of co-viewing or co-using have been identified: passive or silent co-viewing and active or interactive co-viewing (Austin, Hust, & Kistler, 2009; Buerkel-Rothfuss & Buerkel, 2001; Clark, 2012). Passive co-viewing entails watching screen media with children without engaging in conversation or discussion about the media content (Austin et al., 2009). On the other hand, when parents actively co-view with their children, they interact with them while watching or using screen media. In its most recent screen time guidelines, the AAP (2016) described interactive co-viewing as a key factor in helping children aged 15 months or older learn from screen media. Many studies have shown that co-viewing educational programmes with a contingently responsive adult can have better outcomes on children than solitary viewing or passive silent co-viewing (Anderson & Pempek, 2005; Krcmar, Grela, & Lin, 2007; Roseberry, Hirsh-Pasek, Parish-Morris, & Golinkoff, 2009; Strouse, O’Doherty, & Troseth, 2013). Contingency refers to talking to the child about what is in the child’s current focus of
attention (Matthews, McGillion, & Pine, 2016; McGillion et al., 2013; McGillion, Pine, Herbert, & Matthews, 2017). **Responsiveness** refers to a caregiver’s sensitivity to a child’s attempts to interact, recognition of child’s cues and needs, and responding to these attempts, signals, and needs appropriately and promptly (Dunst, Raab, & Trivette, 2012; Helmerhorst, Riksen-Walraven, Fukkink, Tavecchio, & Gevers Deynoot-Schaub, 2017; World Health Organization, 2004; McGillion et al., 2013). Caregiver responsiveness and contingency have consistently been found to predict infants’ and toddlers’ communicative and cognitive skills (Bloom, 1993; Bornstein, Tamis-LeMonda, & Haynes, 1999; Hoff, 2006, 2009; Landry, Smith, Miller-Loncar, & Swank, 1997; Matthews et al., 2016; McGillion et al., 2013; McGillion et al., 2017; Murray & Hornbaker, 1997; Snow, Perlmann, & Nathan, 1987; Tamis-LeMonda, Bornstein, & Baumwell, 2001; Tamis-LeMonda, Kuchirko, & Song, 2014; Tomasello & Farrar, 1986).

Some studies have addressed the rapid changes in today’s digital environment and have identified additional types of parental mediation practices that tend to be utilised by digitally literate parents. Examples include staying nearby children to keep an eye on them when they are using mobile media devices, checking up on children’s online activities after use, applying technical restrictions through filtering, blocking, or monitoring apps or software, turning off devices’ Wi-Fi connections, and selecting apps that can be installed (Livingstone & Helsper, 2008; Matsumoto et al., 2016; Nevski & Siibak, 2016; Nikken & Jansz, 2014; Nikken & Schols, 2015; Zaman, Nouwen, Vanattenhoven, de Ferrerre, & Looy, 2016).

Several factors have been found to influence parents’ choice of media mediation styles including (a) parents’ attitudes towards children’s media use, (b) parents’ beliefs/concerns about certain types of media content, (c) the age of the child, (d) the type of media device or platform used, and (e) cultural context. With regard to parents’ attitudes towards children’s media use,
parents with negative attitudes tend to use more restrictive mediation techniques to monitor and supervise children while they are using media. They also tend to engage in active mediation through critically talking to their children about media content (Brown & Hayes, 2001; Hoffner & Buchanan, 2002; Lee, Jung, Park, & Chun, 2014; Matsumoto et al., 2016; Nathanson, 2001; Nikken & Jansz, 2006, 2014; Nikken & Schols, 2015; Seo & Lee, 2017; Sonck, Nikken, & de Haan, 2013). On the other hand, parents with positive attitudes tend to co-use media with their children (Mendoza, 2009; Nikken & Jansz, 2014; Nikken & Schols, 2015; Sonck et al., 2013).

Beliefs and concerns about certain media content (e.g., violence) tend to result in parents engaging in more restrictive mediation over particular media content types (Nathanson, 2001; Nikken & Jansz, 2006; Warren, 2001).

Mixed findings have been reported regarding mediation styles used for children of different age groups. Whereas some studies have indicated that restrictive mediation and active mediation are more likely to be used with older children than with younger children (Nikken & Jansz, 2014; Sonck et al., 2013), others have reported that restrictive mediation is primarily used with younger children (Livingstone et al., 2018; Seo & Lee, 2017; Warren, 2003). Research consistently has shown, however, that co-use is more likely to occur with younger children than with older children (Warren, 2003; Wartella et al., 2014).

As noted above, parental mediation styles may vary based on the media platform used. Traditional media (e.g., TV) are usually more co-used or co-viewed than new media (e.g., smartphones and tablets; Connell, Lauricella, & Wartella, 2015; Seo & Lee, 2017; Wartella et al., 2014). In addition, cultural contexts seem to play a role in parents’ choice of mediation styles. Some studies have indicated that Western parents are more likely to engage in active mediation or co-using (Livingstone & Haddon, 2009; Nikken & Jansz, 2014; Sonck et al., 2013;
Valkenburg et al., 1999; Wartella et al., 2014), whereas Asian parents tend to impose screen time restrictions and supervise their children (from a distance) while they are using screens (Lee, 2013; Seo & Lee, 2017; Shin & Li, 2017).

In summary, research shows that parents’ media mediation styles and parents’ attitudes towards the use of screen media by young children play important roles in shaping and managing children’s media use practices, including the amount of time spent using screens, the types of media content viewed or used, and the social contexts of media use experience. Therefore, it is especially important for researchers interested in studying the effects of screen media use on children’s learning and development in general, and children’s literacy and language development in particular, to investigate this area of interest.

There are several research gaps in the parental media mediation literature. First, previous work on parental mediation has mainly focused on television viewing (e.g., Barkin et al., 2006; Mendoza, 2009; Valkenburg et al., 1999; Warren, 2005). While there have been some studies that have examined parental mediation of children’s use of screen media that included other types of platforms, their focus was mainly limited to children’s engagement in single-screen media activities such as using the Internet (e.g., De Morentin, Cortés, Medrano, & Apodaca, 2014; Eastin, Greenberg, & Hofshire, 2006; Kalmus, Blinka, & Ólafsson, 2015; Lee, 2013; Livingstone, Haddon, Görzig, & Ólafsson, 2010; Livingstone & Helsper, 2008), video gaming (e.g., Kutner, Olson, Warner, & Hertzog, 2008; Nikken & Jansz, 2006; Nikken, Jansz, & Schouwstra, 2007; Shin & Huh, 2011), or, more recently, using touchscreens (e.g., Brito, Francisco, Dias, & Chaudron, 2017; Hwang, Choi, Yum, & Jeong, 2017; Knowland & Formby, 2016; Leaver, 2017; Nevski & Siibak, 2016; Seo & Lee, 2017; Smahelova, Juhová, Cermak, & Smahel, 2017). However, young children today are exposed to screens across various platforms,
and, not unlike many adults, children can tend to be multitaskers, engaging in simultaneous media activities through accessing single or multiple media platforms (Courage, Bakhtiar, Fitzpatrick, Kenny, Brandeau, 2015; Kabali et al., 2015; Kostyrka-Allchorne, Cooper, & Simpson, 2017; Rideout, 2017). Therefore, to more comprehensively understand children’s screen media exposure as well as parental attitudes and mediation practices, studies need to account for the various and numerous screen platforms accessed by children.

Additionally, research has tended to focus on parental mediation practices, perceptions, attitudes, and concerns over older children and adolescents’ screen media use (e.g., De Morentin et al., 2014; Livingstone et al., 2017; Nelissen & Van den Bulck, 2018; Padilla-Walker & Coyne, 2011; Rich, Bickham, & Shrier, 2015). Little research exists on the mediation strategies adopted by parents of infants and toddlers (Shin & Li, 2017). Given that parents of younger children likely have notable control over their children’s activities, their own attitudes towards screen media use may be highly influential in shaping their children’s screen media habits (Lauricella et al., 2015).

Another gap in the literature has to do with where the research studies have taken place. The majority of studies in this field have been conducted in the United States and Europe. Given that cultural and value orientations may play significant roles in determining parental concerns, attitudes, and mediation practices (Kirwil, 2009; Livingstone et al., 2017; Piotrowski, 2017; Shin & Li, 2017), research from different cultures is needed to help better understand parental screen media attitudes and mediation practices (Piotrowski, 2017).

Saudi Arabia provides a unique setting for studying parental screen media attitudes and mediation styles for several reasons. Saudi Arabia is a well-connected and technologically advanced country with a population of 32 million, 40% of whom are under the age of 20 (Saudi
General Authority for Statistics, 2016). It is the largest media market in the Middle East and North Africa (MENA) region, contributing to over one third of its revenues (Dubai Press Club & Dubai Media City, 2016). As of 2016, there were 20.81 million Internet users in Saudi Arabia (Dubai Press Club & Dubai Media City, 2016). It is also the world’s highest per capita consumer of YouTube content, with more than 90 million views per day (Dubai Press Club & Dubai Media City, 2016; Smith, 2013). Although children in Saudi Arabia spend excessive amounts of time viewing or using screen media (Al-Agha, Nizar, & Nahhas; 2016; Alroqi, Serratrice, & Cameron-Faulkner, 2018a; Saudi National Center for Public Opinion Polls, 2017) and account for more than one third of the country’s population (Saudi General Authority for Statistics, 2016), little is known about Saudi parents’ attitudes toward their children’s screen media use or parents’ screen media mediation practices.

The use of screen media by children is a subject that has been recently receiving increased attention among parents and educators in Saudi Arabia, yet a review of the literature only yielded two reports on Saudi parents’ attitudes towards children’s media use and parental mediation practices. The National Center for Public Opinion Polls in Saudi Arabia (2017) recently conducted a poll that explored parental attitudes and mediation styles with regard to their children’s screen media use. The poll revealed that parents were more likely to believe that smart devices and electronic games have a negative impact on their children (37%) than a positive impact (24%), although the majority remained neutral on the matter (39%) (Saudi National Center for Public Opinion Polls, 2017). The poll did not, however, provide any specific details about the perceived negative and positive impacts. With regard to mediation practices, the majority of parents in this poll reported that they ‘always’ or ‘sometimes’ monitor their children’s use of mobile media.
Details about perceived positive and negative effects associated with screen media use were reported in the 2014 and 2016 waves of the Media Use in the Middle East Survey conducted by Northwestern University in Qatar. These findings suggested that parents in Saudi Arabia are becoming increasingly concerned with the negative effects of screen media use on their children (Northwestern University in Qatar, 2014, 2016). More specifically, parents’ positive opinions about the impact of screen media use on children dropped from 2014 to 2016. Parents who completed the survey in 2014 were more likely than those who responded in 2016 to believe that entertainment media help children become more creative and imaginative (80% in 2014, 42% in 2016), help with hand-eye coordination and fine motor skills (69% in 2014, 46% in 2016), and help children learn skills needed in school (70% in 2014, 50% in 2016; Northwestern University in Qatar, 2014, 2016). In addition, negative opinions slightly increased from 2014 to 2016. In 2016, almost half of the parents (48%) reported the belief that entertainment media use creates a lack of focus and concentration (vs. 41% in 2014). Finally, almost half of Saudi parents in the 2016 wave reported that the entertainment content viewed by their children is chosen or approved by an adult.

The current study represents an extension of previous work conducted by the authors in which we provided a description of the screen media use practices of young Saudi children (Alroqi et al., 2018a). The aim of the current study is to offer a comprehensive picture of Saudi parents’ attitudes toward their children’s screen media use, as well as the screen media mediation practices that these parents adopt. Findings from the current study, in combination with results from the previous work (Alroqi et al., 2018a), will piece together a fuller exploration of the screen media use profiles of Saudi children and parents’ roles in shaping their children’s screen media use experiences – two areas that have not been examined sufficiently in previous
investigations. The results of these two studies are expected to help us better understand the screen media environment of young Saudi children, before investigating the impact of children’s and parents’ screen media use practices on children’s language development, which is the topic of another work underway (Paper 3/Chapter 4). Therefore, the current study mainly focused on exploring attitudes and styles that have been found in the literature to be related to children’s language development. To achieve the current study’s aim, the following questions were asked:

1. What are Saudi parents’ beliefs regarding the ideal age to introduce screens to children and the ideal amount of daily screen time for toddlers? And how do these beliefs compare to children’s actual behaviours?

2. How do Saudi parents assess their children’s actual amount of screen time?

3. What are Saudi parents’ views regarding the impact of screen media use on:
   a. family time?
   b. their children’s language development?

4. What are Saudi parents’ motives for:
   a. allowing their children to use screens?
   b. having a screen media device in their child’s bedroom?

5. What are Saudi parents’ screen media mediation styles?

6. How do Saudi parents’ screen media mediation practices differ by demographic variables?
Methods

The present study employed the same sample, procedures, and survey as Alroqi et al. (2018a). However, for the current study, we analysed questions that were not analysed in the previous work. In some cases, we compared results from the current study with findings from the previous work in an effort to provide a more comprehensive understanding of children’s screen media behaviours and parents’ attitudes and mediation practices.

Participants

The sample consisted of 220 primary caregivers of Saudi children aged 1 to 3 years residing in Saudi Arabia. The vast majority of the respondents were the target children’s mothers (99%). The mean age of the children was 25.34 months (SD = 6.73), and they were equally split between females and males (49% and 51%, respectively). The survey gathered demographic information on both parents. Tables 3.1 and 3.2 (from Alroqi et al., 2018a) show details of the sample characteristics.
Table 3.1

Socioeconomic Characteristics of the Parents

<table>
<thead>
<tr>
<th>Parental SES variable</th>
<th>Mothers</th>
<th>Fathers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 20 years</td>
<td>2</td>
<td>0.91</td>
</tr>
<tr>
<td>20–29 years</td>
<td>112</td>
<td>50.68</td>
</tr>
<tr>
<td>30–39 years</td>
<td>98</td>
<td>44.75</td>
</tr>
<tr>
<td>40–49 years</td>
<td>8</td>
<td>3.65</td>
</tr>
<tr>
<td>Older than 50 years</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>33</td>
<td>15.00</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>150</td>
<td>68.18</td>
</tr>
<tr>
<td>Some education after high school</td>
<td>12</td>
<td>5.45</td>
</tr>
<tr>
<td>High school certificate (12 years of education)</td>
<td>23</td>
<td>10.45</td>
</tr>
<tr>
<td>Intermediate school certificate (9 years of education)</td>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td>Primary school certificate (6 years of education)</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>No schooling completed</td>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed, full time</td>
<td>66</td>
<td>30.00</td>
</tr>
<tr>
<td>Employed, part time</td>
<td>12</td>
<td>5.45</td>
</tr>
<tr>
<td>Self-employed</td>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td>Not employed</td>
<td>121</td>
<td>55.00</td>
</tr>
<tr>
<td>Student</td>
<td>20</td>
<td>9.09</td>
</tr>
<tr>
<td>Retired</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Disabled, not able to work</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Language spoken with child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic</td>
<td>146</td>
<td>66.37</td>
</tr>
<tr>
<td>English</td>
<td>1</td>
<td>0.45</td>
</tr>
<tr>
<td>Mixture of Arabic and English</td>
<td>73</td>
<td>33.18</td>
</tr>
</tbody>
</table>

### Table 3.2

*Socioeconomic Characteristics of the Households/Children*

<table>
<thead>
<tr>
<th>Household characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Place of residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riyadh, Saudi Arabia</td>
<td>95</td>
<td>43.18</td>
</tr>
<tr>
<td>Jeddah, Saudi Arabia</td>
<td>42</td>
<td>19.09</td>
</tr>
<tr>
<td>Other, Saudi Arabia</td>
<td>83</td>
<td>37.73</td>
</tr>
<tr>
<td><strong>Type of tenure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rented</td>
<td>111</td>
<td>50.68</td>
</tr>
<tr>
<td>Owned</td>
<td>98</td>
<td>44.75</td>
</tr>
<tr>
<td>Provided by employer</td>
<td>4</td>
<td>1.83</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>2.74</td>
</tr>
<tr>
<td><strong>Monthly household income</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower-income</td>
<td>70</td>
<td>32.11</td>
</tr>
<tr>
<td>Middle-income</td>
<td>89</td>
<td>40.83</td>
</tr>
<tr>
<td>Higher-income</td>
<td>59</td>
<td>27.06</td>
</tr>
<tr>
<td><strong>Availability of domestic helper/nanny</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>73</td>
<td>33.18</td>
</tr>
<tr>
<td>No</td>
<td>147</td>
<td>66.82</td>
</tr>
<tr>
<td><strong>Child characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child’s age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-23 months</td>
<td>86</td>
<td>39.09</td>
</tr>
<tr>
<td>24-36 months</td>
<td>134</td>
<td>60.91</td>
</tr>
<tr>
<td><strong>Child’s gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>48.64</td>
</tr>
<tr>
<td>Male</td>
<td>113</td>
<td>51.36</td>
</tr>
<tr>
<td><strong>Child’s birth order</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oldest</td>
<td>46</td>
<td>20.91</td>
</tr>
<tr>
<td>Middle</td>
<td>13</td>
<td>5.91</td>
</tr>
<tr>
<td>Youngest</td>
<td>104</td>
<td>47.27</td>
</tr>
<tr>
<td>Only</td>
<td>57</td>
<td>25.91</td>
</tr>
<tr>
<td><strong>Relationship of respondent to child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>217</td>
<td>98.64</td>
</tr>
<tr>
<td>Father</td>
<td>1</td>
<td>0.46</td>
</tr>
<tr>
<td>Sister</td>
<td>1</td>
<td>0.46</td>
</tr>
<tr>
<td>Aunt</td>
<td>1</td>
<td>0.46</td>
</tr>
</tbody>
</table>


<sup>a</sup> For the purpose of this study, *lower-income* was defined as families earning less than SAR 10,000 a month; *middle-income* was families earning between SAR 10,000 and SAR 19,999 a month, and *higher-income* was families earning over SAR 20,000 a month (SAR 1 = £0.185 as of June 1, 2016; SAR = Saudi Arabian Riyal). According to the Saudi General Authority for Statistics, the median monthly household income in 2013 was SAR 10,723 (The Saudi General Authority for Statistics, 2013).
Procedures

Participation in this study was voluntary, and ethical approval was granted by the University of Manchester’s Ethics Review Board. From April to June of 2016, participants were recruited via multiple social media platforms (Twitter, Instagram, WhatsApp, and Snapchat) and were asked to complete an anonymous online survey (Alroqi et al., 2018a; see Appendix A). The survey was administered in Arabic and was constructed using the online survey tool Survey Monkey. Prior to starting the survey, the purpose of the study was clarified, and informed consent was obtained from all respondents.

Survey

As noted above, the current study used the same survey (see Appendix A) that was utilised by Alroqi et al. (2018a). However, the present study analysed different questions than those examined in Alroqi et al. (2018a). All findings in the current study were based on the responses of caregivers to questions about their screen media mediation practices and their attitudes and perceptions about their child’s screen media use. The survey consisted of 72 questions which were based on the study aims and existing literature. To ensure content validity, the literature was reviewed and instruments that measure similar topics were consulted (e.g., Rideout, 2013; Wartella, Rideout, Lauricella, & Connell, 2014). A list of items that aimed to examine the constructs of interest was developed. Items were written in various formats including yes/no questions, checklists, open-ended questions, and Likert scales. Copies of the survey were sent to three experts, and they were asked to independently review the survey items with regard to their readability, clarity, and suitability to study aims. Adjustments were made based on feedback received, and the final version of the survey was developed.
To ensure face validity, the survey was piloted on a small group of Saudi mothers of 1- to 3-year-olds (n = 8) for clarity, readability, errors, and completion time, and changes were made accordingly. Survey items were designed to tap on several separate constructs as follows:

- demographic information about the target child and her/his parents (Items No. 1-3, 7-19, 26, 27, 71)
- the target child’s health and developmental milestones (Items No. 20-23)
- the languages spoken at home (Items No. 24, 25, 28)
- reading practices in the target child’s home environment (Items No. 29-32)
- availability of/ access to screen media in the child’s household (Items No. 33-37, 39-45, 50)
- the target child’s screen media use habits (Items No. 46, 48, 51, 52, 59-64)
- parental attitudes towards children’s screen media use (Items No. 47, 49, 58, 65-70, 72)
- parental screen media mediation practices (Items No. 38, 53-57)

Four of the items regarding parents’ attitudes towards children’s media use and parental media mediation practices (i.e., Items No. 38, 53, 55, and 58) were adapted from the Common Sense Media Zero to Eight Survey (Rideout, 2013) and the Parenting in the Age of Digital Technology Survey (Wartella, Rideout, Lauricella, & Connell, 2014). Nine of the survey items (i.e., Items No. 33, 37, 40, 41, 42, 43, 44, 51, and 52) were adapted from the Common Sense Media Zero to Eight Survey (Rideout, 2013), but were not analysed in this paper. The remainder of the survey items were developed by the Principal Investigator (PI). The survey items that were specifically analysed in this paper were Items No. 1, 2, 7, 8, 10-14, 16, 17, 20-25, 27, 38, 47, 49, 53, 55 [sub-items 1-8], 58, and 67-71.

To reduce social desirability effects, the survey was designed to be self-administered and to be completed online. Moreover, respondents had the option of remaining anonymous, which
increases the probability of truthful answers and minimises socially desirable responses. In addition, survey items were phrased in ways that did not represent any of the parents’ or children’s behaviours or attitudes as acceptable or unacceptable. For example, in Item No. 53, rather than asking parents to directly provide their motives for allowing their children to use screen media (which might make them concerned about the social acceptability of their answers), respondents were asked to indicate on a Likert scale the likelihood of a number of motives that parents often report for letting their children use screens (e.g., “because they help distract my child when I have some chores to attend to”, “to distract my child so she/he can eat”, “because they help in teaching my child language basics such as alphabets and numbers”, “because they help in teaching my child good manners and habits”).

Analysis

The data were cleaned and checked for completeness and consistencies. Anomalies and duplicates were removed. Open-ended “other” responses were reviewed to decide whether to recode them into existing coding categories, or to add new categories. Responses were translated from Arabic into English, Arabic names (e.g., TV channels, TV programmes, apps, names of places) were transliterated into English, and Hijri dates (Islamic calendar) were converted to Gregorian dates.

Statistical analysis was carried out using the R statistical package (version 3.4.2). Descriptive statistics were used to assess measures of central tendency and variation. Two-sample Welch’s t-tests for unequal variances were used to determine the significance of differences between parents’ perceived ideal daily screen time and their children’s actual daily screen time (as reported in our previous work with the same sample; Alroqi et al., 2018a).
significance level used was \( \alpha = .05 \). \( p \)-values were calculated when analysing differences between groups. To calculate \( p \)-values, a chi-square test was used when all expected cell frequencies in the contingency table were \( \geq 5 \). However, when any of the expected cell frequencies in the contingency table was < 5, a two-sided Fisher’s exact test was used instead.

**Results**

The results are organised according to the research questions that were presented earlier.

**What Are Saudi Parents’ Beliefs Regarding the Ideal Age to Introduce Screens to Children? And How Do Parents’ Beliefs Compare to Their Children’s Actual Behaviours?**

The vast majority of caregivers in the sample (84\%) thought that the ideal age to introduce screens to children is 2 years or older, and over one quarter reported that children should not be introduced until they are at least 5 years or older (see Figure 3.1; Survey item No. 68).

![Figure 3.1. Caregivers’ beliefs about ideal age to introduce screens to children. yr = year; yrs = years.](image-url)
We compared parents’ beliefs regarding the perceived ideal age for screen exposure to the actual ages at which their own children were introduced to screens (as reported in our previous work with the same sample; Alroqi et al., 2018a; Survey items No. 63 and 64). We recoded all variables into two categories: younger than 2 years and 2 years or older. Using 2×2 contingency tables, we found that the vast majority of the parents believe that screens should be introduced to children when they are 2 years or older (television: 84%; mobile media devices: 84%; see Figure 3.2 and Figure 3.3). In addition, we found that nearly two thirds of parents (61%) believe that children should be introduced to screens when they are 2 years or older, yet they actually introduced their children to television at an age younger than 2 years (see Figure 3.2). On the other hand, only 22% of all parents believe that children should wait until they are 2 years or older to use screens and did actually refrain from exposing their children to television before they were 2 years or older. A two-sided Fisher’s exact test showed that these findings were marginally significant: television was introduced to children at a significantly younger age than the parental perceived ideal age to introduce screens, $p = .055$.

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1 In the survey, the question about parents’ beliefs regarding the ideal age to introduce screens asked respondents to choose from categorical answers (e.g., 1 to 2 years, 2 to 3 years), but the question about children’s actual onset age of screen media use asked respondents to provide numerical answers about the exact age in months when their children started to view television and when they started to use mobile media devices. Therefore, in order to make comparisons between parents’ beliefs and children’s actual behaviours, we had to convert the numerical data to categorical data to match those in the question about beliefs. We recoded all variables into two categories: younger than 2 years and 2 years or older. 2×2 contingency tables were used to determine whether parents’ beliefs were consistent with children’s behaviours or not. We used a chi-square test or Fisher’s exact test to calculate $p$-values depending on the number of counts in each cell (if less than 5 in any cell, we used Fisher’s exact test instead of chi-square).
Caregivers’ beliefs regarding the ideal age for screen exposure and children’s actual age of exposure to TV.

With regard to mobile media, parents’ beliefs and children’s age of exposure were slightly more aligned (see Figure 3.3). A notable number of parents (43%) believe that the ideal age to introduce screens to children is 2 years or older, but did actually introduce their children to mobile media devices at an age younger than 2 years. A similar number of parents (41%) had the same belief and did actually refrain from introducing their children to mobile media devices before they were 2 years or older. A chi-square test showed a significant difference between
parental beliefs regarding when to introduce screens and the actual age at which their children were introduced to mobile media devices, $X^2 (1, N = 220) = 74.34, p < .001$. 

![The ideal age to introduce MM as per caregivers' beliefs](image)

*Figure 3.3. Caregivers’ beliefs regarding the ideal age for screen exposure and children’s actual age of exposure to mobile media. MM = mobile media.*

**What Are Saudi Parents’ Beliefs Regarding the Ideal Amount of Daily Screen Time for Toddlers? And How Do Parents’ Beliefs Compare to Their Children’s Actual Behaviours?**

Parents in this study reported that their ideal daily screen time for toddlers aged 1 to 3 years was, on average, 92.27 minutes per day ($SD = 76.28$ minutes; Survey item No. 67). Parents of children under 2 years of age reported that, on average, children of their child’s age should have 82.65 minutes of screen time per day ($SD = 65.16$ minutes), whereas parents of children over 2 years of age reported that, on average, children of their child’s age should have 98.17 minutes of screen time per day ($SD = 82.46$ minutes).

A Welch’s two-sample t-test was used to identify potential differences between parents’ perceived ideal daily screen time and their children’s actual daily screen time (as reported in our previous work with the same sample; Alroqi et al., 2018a; Survey items No. 46 and 48). Results
indicate that the children’s actual screen time ($M = 194.11$ minutes, $SD = 154.70$ minutes) was significantly higher than parents’ perceived ideal screen time ($M = 92.27$ minutes, $SD = 76.28$ minutes), $t(317.77) = -8.74, p < .001$, 95% CIs [78.92, 124.76]. The boxplots in Figure 3.4 support this conclusion.

![Boxplot](image)

*Figure 3.4. Difference between ideal screen time as per parents' beliefs and children's actual screen time. The bold horizontal lines represent median values.*

How Do Saudi Parents Assess Their Children’s Actual Amount of Screen Time?

Caregivers were asked to assess their children’s TV time as well as their mobile media time (Survey items No. 47 and 49). For both television and mobile media, most caregivers believe that their children “moderately” or “rarely” watch television (81%) or use mobile media (72%; see Figure 3.5).
What Are Saudi Parents’ Views Regarding the Impact of Screen Media Use on Family Time?

Nearly two thirds of the respondents (61%) reported that screen media in their homes cause their family members to spend less time together. Only a few respondents (6%) believe that screen media cause them to spend more time together, and 33% noted that screen media do not influence the amount of family time that they experience.

What Are Saudi Parents’ Views Regarding the Impact of Screen Media Use on Their Children’s Language Development?

Caregivers were asked whether they thought TV viewing and mobile media use had a positive impact, a negative impact, or no impact on their children’s language development. Findings indicate that caregivers have different attitudes towards television and mobile media. Figure 3.6 shows that almost half of the caregivers believe that TV viewing has a positive impact on their children’s language development (48%), just over one quarter of the caregivers think that it has a negative impact (26%), and just over one quarter believe that TV viewing does not
have any impact on their children’s language development (26%). On the other hand, one quarter of the caregivers believe that using mobile media has a positive impact on their children’s language development (25%), almost half believe that it has a negative impact (48%), and just over one quarter (27%) believe that it has no impact. A two-sided Fisher’s exact test comparing the distribution of parental attitudes regarding the impact of television versus mobile media on children’s language development revealed a significant difference between the two, $p < .001$, with TV viewing significantly more likely to be associated with perceived positive impact on children’s language development than mobile media use.

![Impact of media use on language development](image)

*Figure 3.6. Caregivers’ views regarding impact of screen media use on children’s language development.*

An additional two-sided Fisher’s exact test was performed to determine whether there is a relationship between caregivers’ views regarding the impact of mobile media use on their children’s language development (Survey item No. 69) and the types of mobile media content their children most frequently viewed (as reported in Alroqi et al., 2018a; Survey item No. 51). Using a contingency table, the test showed a significant relationship between parental views regarding the impact of screens on language development and the children’s frequency of viewing educational materials, $p = .007$. In other words, children who view educational content
more frequently have parents who reported more positive attitudes regarding the impact of mobile media on their children’s language development. Similarly, children who view educational materials less frequently have parents who reported more negative attitudes regarding the impact of mobile media on their children’s language development.

**What Are Saudi Parents’ Motives for Allowing Their Children to Use Screens?**

Caregivers were asked about their motives for allowing their children to use screen media devices (see Table 3.3; Survey item No. 53). “Likely” and “very likely” responses were combined to measure the ranking of the motives. The top four motives were each espoused by over 70% of the sample and focused on distracting the child when needed (77%), teaching the child language basics (75%) and new vocabulary (71%), and providing the child with what they desire to have fun (74%). Ten additional motives were each reported as “likely” or “very likely” by over one third of the sample, indicating a broad range of reasons used for allowing children to view screen media. The least frequently reported motive (“Because the child needs to be skilled with computers and new mobile media devices to be successful in life”) was noted as “likely” or “very likely” by only 23% of the caregivers in this sample.
Table 3.3

Caregivers’ Motives for Allowing Screen Media Use

<table>
<thead>
<tr>
<th>Motive</th>
<th>Likelihood (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because they help distract the child when the caregiver has chores to attend to</td>
<td>76.82%</td>
</tr>
<tr>
<td>Because they help in teaching the child language basics such as alphabets and numbers</td>
<td>75.45%</td>
</tr>
<tr>
<td>Because the child wants to watch TV or use mobile media devices to have fun</td>
<td>73.64%</td>
</tr>
<tr>
<td>Because they help in teaching the child new vocabulary</td>
<td>71.36%</td>
</tr>
<tr>
<td>Because they help in teaching the child languages (e.g., Arabic, English, or French)</td>
<td>68.64%</td>
</tr>
<tr>
<td>Because they have educational materials that are good for the child’s brain development</td>
<td>65.46%</td>
</tr>
<tr>
<td>To get the child to remain quiet or not move when in public (restaurants, social gatherings, waiting areas, etc.)</td>
<td>55.00%</td>
</tr>
<tr>
<td>Because they help in teaching the child religious values and morals</td>
<td>53.63%</td>
</tr>
<tr>
<td>Because they help in teaching the child good manners and habits</td>
<td>53.63%</td>
</tr>
<tr>
<td>Because they make parenting easier</td>
<td>51.36%</td>
</tr>
<tr>
<td>As a reward for good behaviour</td>
<td>44.09%</td>
</tr>
<tr>
<td>To get the child to stop crying</td>
<td>43.63%</td>
</tr>
<tr>
<td>To distract the child so she/he can eat</td>
<td>41.36%</td>
</tr>
<tr>
<td>Because the caregiver finds it difficult to say ‘No’ to the child when she/he asks to use media</td>
<td>38.18%</td>
</tr>
<tr>
<td>Because the child needs to be skilled with computers and new mobile media devices to be successful in life</td>
<td>23.19%</td>
</tr>
</tbody>
</table>

Note. Likelihood = combined “Likely” and “Very Likely” responses.

What Are Saudi Parents’ Motives for Having a Screen Media Device in The Child’s Bedroom?

Caregivers who reported that their child has at least one non-mobile screen media device (i.e., TV, game console, DVD player, computer, etc.) in her/his bedroom (Survey item No. 37) were asked about their motives for allowing this (see Table 3.4; Survey item No. 38). The most frequently cited motive (reported as “likely” or “very likely” by 55% of the parents) was to keep the child occupied in her/his bedroom so the caregiver could do other things around the house. Two other motives were reported as “likely” or “very likely” by about one third of the sample:
“providing a reward for good behaviour” (34%) and “freeing up the other TVs so other family members can watch their own shows” (33%). The other six motives that parents were asked about were reported by only 20% or less of the sample.

Table 3.4
Caregivers’ Motives for Allowing a Media Device in the Child’s Bedroom

<table>
<thead>
<tr>
<th>Motive</th>
<th>Likelihood (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>To keep the child occupied in her/his room so the caregiver can do other things around the house</td>
<td>55.45%</td>
</tr>
<tr>
<td>Because it was a reward for good behaviour</td>
<td>34.09%</td>
</tr>
<tr>
<td>To free up the other TVs so other family members can watch their own shows</td>
<td>32.73%</td>
</tr>
<tr>
<td>Because the child shares a room with an older brother or sister</td>
<td>20.46%</td>
</tr>
<tr>
<td>To help the child fall asleep</td>
<td>19.55%</td>
</tr>
<tr>
<td>To get the child to sleep in her/his own room</td>
<td>13.63%</td>
</tr>
<tr>
<td>Because the child sleeps in a family room that has a TV in it</td>
<td>13.18%</td>
</tr>
<tr>
<td>Because the child shares a room with an adult</td>
<td>10.91%</td>
</tr>
<tr>
<td>Because the family bought a new TV and decided to give the child the old one</td>
<td>7.73%</td>
</tr>
</tbody>
</table>

*Note.* Likelihood = combined “likely” and “very likely” responses.

What Are Saudi Parents’ Screen Media Mediation Styles?

Parents were asked how often they used several screen media mediation practices with their children (see Table 3.5; Survey item No. 55). About half (48%) of the caregivers indicated that they “often” or “always” co-view television with their children. Similarly, half of the caregivers indicated that they “often” or “always” co-use mobile media with their children (50%). Nearly two fifths (44%) of the respondents indicated that caregivers engage in instructive media mediation practices as they “often” or “always” discuss and explain screen media content viewed to the child. Caregivers in the sample also tend to use restrictive media mediation styles – over half (59%) indicated that they “often” or “always” limit their children’s amount of screen time, nearly two thirds (65%) specify in advance the types of media content
that can be viewed or played, and almost three quarters (74%) ask their children to turn off the device when inappropriate content is being viewed.

Table 3.5

*Frequency of Screen Media Mediation Styles Used by Caregivers*

<table>
<thead>
<tr>
<th>Media Mediation Styles</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caregiver co-viewed TV with the child</td>
<td>5.45</td>
<td>14.09</td>
<td>29.55</td>
<td>33.64</td>
<td>14.55</td>
</tr>
<tr>
<td>Someone else co-viewed TV with the child</td>
<td>13.64</td>
<td>23.18</td>
<td>28.64</td>
<td>18.18</td>
<td>16.36</td>
</tr>
<tr>
<td>Caregiver co-used mobile media with the child</td>
<td>10.91</td>
<td>12.27</td>
<td>26.36</td>
<td>26.36</td>
<td>23.18</td>
</tr>
<tr>
<td>Someone else co-used mobile media with the child</td>
<td>18.64</td>
<td>25.91</td>
<td>27.73</td>
<td>18.18</td>
<td>9.55</td>
</tr>
<tr>
<td>Caregiver or someone else discussed/explained media content that was viewed to the child</td>
<td>19.09</td>
<td>15.45</td>
<td>18.64</td>
<td>23.64</td>
<td>20.00</td>
</tr>
<tr>
<td>Caregiver or someone else specified in advance the shows/apps that can be viewed/played</td>
<td>13.18</td>
<td>9.09</td>
<td>9.09</td>
<td>18.18</td>
<td>45.91</td>
</tr>
<tr>
<td>Caregiver or someone else made specific media viewing/playing hours for the child</td>
<td>16.36</td>
<td>6.82</td>
<td>13.64</td>
<td>20.91</td>
<td>37.73</td>
</tr>
<tr>
<td>Caregiver or someone else told the child to turn off the TV/mobile media device or switch the channel/quit an app when the child was viewing inappropriate content</td>
<td>8.64</td>
<td>1.82</td>
<td>4.55</td>
<td>10.00</td>
<td>64.09</td>
</tr>
</tbody>
</table>

**How Do Saudi Parents’ Screen Media Mediation Practices Differ by Demographic Variables?**

Table 3.6 shows some of the parental screen media mediation practices explored in the study by child age, child gender, parental education, and household income (using chi-square tests). Test results reveal that parents of older children (2 years and above) are significantly more likely than parents of younger children (under 2 years of age) to place restrictions on the amount of screen time for their children, $X^2 (1, N = 220) = 4.34, p = .037$. Parents of girls are
significantly more likely than parents of boys to use screen media to get their child to eat, $X^2 (1, N = 220) = 4.50, p = .034$. Parents with high incomes are the most likely group to use screen media to help their children learn language basics such as alphabets and numbers, $X^2 (2, N = 218) = 7.62, p = .022$, and to learn a second language, $X^2 (2, N = 218) = 7.93, p = .019$. In addition, parents with high incomes are most likely to discuss and explain screen media content viewed with their children, $X^2 (2, N = 218) = 6.28, p = .043$. 
Table 3.6

Parental Screen Media Mediation Practices by Demographic Variables

<table>
<thead>
<tr>
<th>% of caregivers who ‘likely’ or ‘very likely’ use screen media to …</th>
<th>Child Age</th>
<th>Child Gender</th>
<th>Parental Education</th>
<th>Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;2Y (n = 86)</td>
<td>≥2Y (n = 134)</td>
<td>M (n = 113)</td>
<td>F (n = 107)</td>
</tr>
<tr>
<td>keep child occupied while they attend to chores (Survey item No. 53 [sub-item No. 5])</td>
<td>75.29</td>
<td>77.61</td>
<td>75.22</td>
<td>78.50</td>
</tr>
<tr>
<td>reward good behaviour (Survey item No. 53 [sub-item No. 3])</td>
<td>36.05</td>
<td>49.25</td>
<td>46.90</td>
<td>41.12</td>
</tr>
<tr>
<td>keep child quiet in public areas (Survey item No. 53 [sub-item No. 6])</td>
<td>50.00</td>
<td>58.21</td>
<td>53.98</td>
<td>56.07</td>
</tr>
<tr>
<td>get child to eat (Survey item No. 53 [sub-item No. 7])</td>
<td>39.53</td>
<td>42.54</td>
<td><strong>34.51</strong></td>
<td><strong>48.60</strong></td>
</tr>
<tr>
<td>help child learn language basics (Survey item No. 53 [sub-item No. 11])</td>
<td>70.93</td>
<td>78.36</td>
<td>78.76</td>
<td>71.96</td>
</tr>
<tr>
<td>help child learn a second language (Survey item No. 53 [sub-item No. 15])</td>
<td>65.12</td>
<td>70.90</td>
<td>70.80</td>
<td>66.36</td>
</tr>
<tr>
<td>% of caregivers who ‘often’ or ‘always’ …</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>co-view TV with their child (Survey item No. 55 [sub-item No. 1])</td>
<td>44.18</td>
<td>50.75</td>
<td>47.79</td>
<td>48.60</td>
</tr>
<tr>
<td>co-use mobile media with their child (Survey item No. 55 [sub-item No. 2])</td>
<td>50.00</td>
<td>49.25</td>
<td>50.44</td>
<td>48.60</td>
</tr>
<tr>
<td>discuss screen media content with their child (Survey item No. 55 [sub-item No. 5])</td>
<td>36.47</td>
<td>47.76</td>
<td>48.67</td>
<td>38.32</td>
</tr>
<tr>
<td>select media content for their child (Survey item No. 55 [sub-item No. 6])</td>
<td>58.14</td>
<td>67.91</td>
<td>64.60</td>
<td>63.55</td>
</tr>
<tr>
<td>set specific media viewing hours (Survey item No. 55 [sub-item No. 7])</td>
<td><strong>50.00</strong></td>
<td><strong>64.18</strong></td>
<td>54.87</td>
<td>62.62</td>
</tr>
</tbody>
</table>

Note. <2Y = under 2 years; ≥2Y = 2 years or above; M = Male; F = Female; HS = High School; Mo = mothers; Fa = fathers. Numbers in bold show significant differences at the .05 level.
Discussion

The aim of the present study was to provide a comprehensive picture of Saudi parents’ attitudes towards their children’s screen media use, including the screen media mediation practices that these parents adopt, and also to ascertain the extent to which the parents’ perceptions matched with the families’ everyday media use. As parents play a critical role in shaping their young children’s screen media use practices, exploring these roles is important for child language researchers who are interested in looking at the relation between children’s media use and their language development.

This study shows that the majority of caregivers in the sample believe in waiting to introduce screens to children until they are 2 years or older. However, our previous work on the same sample indicates that they actually introduce their children to screens at a much younger age (Alroqi et al., 2018a).

The average amount of screen time perceived by Saudi caregivers as ideal for children under 2 years (83 minutes) and above 2 years (98 minutes) exceeds the AAP’s most recent recommendations (i.e., zero screen time for children aged 18 to 24 months and no more than 1 hour per day for children above 2 years; American Academy of Pediatrics, 2016). In addition, compared to findings from our previous study (i.e., Alroqi et al., 2018a), children spent significantly more time with screens than the amount of time believed to be ideal by their parents. The vast majority of the children in the sample were found in our previous study (i.e., Alroqi et al., 2018a) to use screens excessively as per the AAP’s definition of excessive use of screens, i.e., more than zero screen time for children aged 18 to 24 months and more than 1 hour per day for children above 2 years. Interestingly, despite the fact that the majority of children in the sample exceed the maximum amount of daily screen time as per the AAP’s standards, and
also exceed the amount of time believed by caregivers in the sample to be ideal, the majority of caregivers in the sample reported that they think their children only moderately or rarely watch television or mobile media. It is not clear, though, whether parents were not accurate in estimating the amount of time their children spent with screens or whether it is a matter of what parents regard as the right amount of screen time. Our findings regarding parental evaluation of their children’s screen time confirm previous research indicating that parents tend to underestimate their own children’s screen time (e.g., Livingstone, Marsh, Plowman, Ottovordemgentschenfelde, & Fletcher-Watson, 2015; Rideout, 2017; Ruangdaraganon et al., 2009; Vittrup, 2009; Vittrup et al., 2016).

Caregivers in our sample reported using screen media to play several roles in the lives of their children: as babysitter, entertainer, and educator. First, confirming previous research (e.g., Kabali et al., 2015; Livingstone et al., 2015; Nevski & Siibak, 2016; Rideout, 2013; Vittrup et al., 2016; Wartella et al., 2014; Zaman et al., 2016), caregivers’ most likely motive for using screen media with their children (and for allowing a screen media device in the child’s bedroom) was as a babysitter or as “digital pacifiers” (Kabali et al., 2015) to occupy them so they could attend to other chores. Screen media use was also reported by a majority of the caregivers to make sure their children remain quiet and do not move around in public places. Other studies confirm this motive specifically for mobile media devices, as their portable nature makes them an effective and convenient distracting tool for children, especially when they are in situations that require them to be quiet or patient outside of the home (e.g., waiting for an appointment or when traveling in the car; Bentley et al., 2016). Although it can be useful to use screens as a soothing strategy when needed (e.g., during aeroplane flights or medical procedures), there is concern that this will lead to problems in children’s ability to self-soothe and self-regulate their
emotions (American Academy of Pediatrics, 2016; Radesky, Silverstein, Zuckerman, & Christakis, 2014). In addition, keeping children occupied with screens during family and social gatherings may deprive them of valuable natural learning opportunities to interact with others, which may negatively affect their communicative and social skills. Interestingly, it is worth noting here that despite the fact that a lot of the caregivers reported using screen media to occupy children while caregivers attended to other chores, about half of the caregivers reported “always” or “often” co-viewing TV and co-using mobile media with their children.

Second, screen media use was also reported by parents in this sample as a source of entertainment. This study found that most caregivers were likely or very likely to let their children consume screen media just because it is fun. This is in line with previous research showing that entertainment is among the most common motives for allowing children to use screens (e.g., Cingel & Krcmar, 2013; Nevski & Siibak, 2016; Wartella et al., 2014;).

Third, in line with other studies (e.g., Baek et al., 2013; Bentley et al., 2016; Cingel & Krcmar, 2013; Li, Mendoza, & Milanaik, 2017; Marsh et al., 2015; Nevski & Siibak, 2016), parents also use screen media as a source of education. In fact, the vast majority of caregivers in the sample reported that they are likely or very likely using screen media because they offer educational materials that, in their opinion, are good for their children’s linguistic and cognitive development. More specifically, most caregivers let their children consume screen media because they believe that screen media can help their children learn language basics such as alphabets and numbers, acquire new vocabulary, and learn a second language. Research indicates that children aged 2 years and older can benefit from viewing high-quality and interactive child-directed educational content (e.g., Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Hirsh-Pasek et al., 2015; Huber, Yeates, Meyer, Fleckhammer, & Kaufman, 2018;
Linebarger & Walker, 2005; Rice, Huston, Truglio, & Wright, 1990; Russo-Johnson, Troseth, Duncan, & Mesghina, 2017; Wright, Huston, Scantlin, & Kotler, 2001; Zill, Davies, & Daly, 1994; Wright, Huston, Murphy, et al., 2001). However, watching educational child-directed content was not significantly associated with language gains in children under 2 years (DeLoache et al., 2010; Robb, Richert, & Wartella, 2009). This could be attributed to the video deficit effect, the phenomenon whereby children under 2 do not learn new information and behaviour as readily from video as from live situations (Anderson & Pempek, 2005). Children under 2 also show a deficit in transferring knowledge from two-dimensional (2D) contexts, such as screens, to the three-dimensional (3D) real-world context (Barr, 2010, 2013). In addition, as DeLoache et al. (2010) have suggested, parents may misattribute their children’s normal language development progress or the phenomenon of word spurt, a rapid development in the acquisition of vocabulary that typically occurs during the second year of life (e.g., Benedict, 1979; Goldfield & Reznick, 1990), to their children’s educational media exposure.

The majority of caregivers in the sample believe that TV viewing has a positive impact on their children’s language development, while mobile media have a negative impact on their children’s language development. This is in line with the findings of Wartella et al. (2014), who found that parents of young children in the U.S. are more concerned about the impact of mobile media devices on their children’s speaking skills than about the impact of television. A possible explanation for the conflicting opinions regarding the impact of television and mobile media on language development is the fact that mobile media offer a variety of materials that may not all be educational, unlike quality children’s TV channels and programmes that may carry some educational value when selected carefully. Moreover, most of the TV channels watched by Saudi children are in Arabic, which may enhance their mother tongue. On the other hand,
mobile media offers materials in different languages, though the most popular ones are in English (Alroqi, Serratrice, & Cameron-Faulkner, 2018b).

We speculated that parental opinions regarding the impact of screens on their children’s language development are related to the types of media content their children most often view. Our findings confirm that the types of content most frequently viewed on mobile media have a significant relation to parental attitudes. As would be expected, parents of children who more frequently view educational content have more positive opinions regarding the impact of mobile media on their children’s language development. This is similar to previous research by Lauricella et al. (2015) indicating that children tend to spend more time with specific types of screen media that are favoured by their parents (e.g., parents with positive views of TV had children who viewed more TV; parents with positive views of tablets had children who used tablets more often).

Findings from the current study indicate that most caregivers think that screens in general have led their family members to spend less time together. This is in contrast to Miliany (2014), who has suggested that television is regarded as a main source for Saudi family togetherness. It is also in contrast to Bentley et al. (2016), who described TV viewing as an opportunity for family time and closeness. For example, mothers in their study described cuddling with their children while viewing television or watching a movie together, although this was not the case with mobile media devices. It is worth noting here that we asked parents about their views regarding screens in general regardless of their platforms. Obviously, the whole family can share viewing one TV set together, whereas mobile media devices require more individual attention. Therefore, we speculate that caregivers may have been considering mobile media in particular
when they reported that screens led family members to be busy with their own devices and thus spend less time with each other.

Similar to findings from Asian cultures (e.g., Lee, 2013; Seo & Lee, 2017; Shin & Li, 2017), restrictive mediation was found to be the most frequently utilised media mediation style by Saudi parents in our sample. Saudi caregivers tend to restrict their children from viewing inappropriate content by turning off the device, switching the channel, or quitting the app. The majority of parents in the sample also indicated that they regularly limit their children’s screen time and specify which media content they can view or play on screens.

When investigating how parental screen media practices vary by demographic variables, two main findings were observed. First, parents with high incomes were found to use screen media for the purpose of helping their children learn language basics and learn a second language more than parents with low and mid-range incomes. Parents with mid-range incomes were found to be the least likely group to use screen media for these purposes, followed by parents with low incomes. It could be that parents with higher incomes are more occupied with their careers and thus spend less time teaching their children, which would make them use screen media as an educational tool to achieve this purpose and compensate for their absence. The use of English is often seen among Arabic speakers as a social status marker and an indication of modernity, social privilege, and prestige (Akeel, 2016; Elsayed, 2016; Jamjoom, 2012), so this could explain why parents with higher incomes use media for the purpose of teaching a second language more than parents with lower incomes.

Second, Saudi parents of children who are 2 years or older place more restrictions on their children’s screen time than parents of children under 2 years. This is in opposition to international screen time guidelines, which place more restrictions on screen time for children
under 2 years of age, as they are in a critical period of development and thus considered more vulnerable to the negative effects of screen media use. This confirms that Saudi parents need to be better informed about the critical importance of the first 3 years of life, the types of activities that are thought to promote or hinder children’s health and development, and screen media guidelines and resources that can help them make more informed decisions regarding their children’s media use habits.

**Limitations**

Although this study provides novel insights into Saudi parents’ beliefs and views regarding young children’s screen media use, how parents’ beliefs compare to children’s actual media use behaviours, and the media mediation practices parents adopt, there are limitations to our study. First, almost all participants in our sample were mothers of target children. In Arabic cultures, mothers are the primary caregivers of young children, and the ones that are most involved in child-rearing (Al-Maadadi & Ikhlef, 2015; Hossain & Juhari, 2015; Kurdahi Zahr & Hattar-Pollara, 1998). Therefore, their attitudes towards children’s media use and their media mediation practices are expected to have a more significant impact on their children’s media use habits than those of fathers. It is worth noting that the increase in national wealth in Gulf State countries has led more families to employ domestic workers to help with daily chores, which sometimes include child-rearing (Al-Matary & Ali, 2013; Alqahtani, Scott, Alshahrani, & Ullah, 2014). In the current study, about one third of the caregivers indicated having a domestic helper who regularly interacts with the target child at home. Therefore, it would be informative for future studies to examine the involvement of fathers as well as domestic helpers in shaping and mediating children’s screen media use practices.
Second, the current study’s findings are based on caregivers’ self-reported attitudes, views, and practices, which, as mentioned in Chapter 2, are subject to social desirability bias and thus may not necessarily reflect real-life practices (Byeon & Hong, 2015; Duch et al., 2013; Neumann, 2014; Sudman & Bradburn, 1973; Tourangeau, Rips, & Rasinski, 2000). Bearing this in mind, the survey questions were carefully worded so respondents could provide answers about their own attitudes, perceptions, and practices without the fear of being judged. We made sure to remain neutral in all questions and not represent any of the parental attitudes or mediation practices as favourable or unfavourable.

Third, the majority of the mothers in the current study were well-educated. The study findings, therefore, may not generalise to the larger population. However, this skew reflects the increasing levels of education among Saudi Arabian women. Official national statistics indicate that there are now more female college students and graduates than male students and graduates (Saudi General Authority of Statistics, 2016). Nevertheless, future studies should attempt to examine whether the same attitudes and mediation practices are present among mothers with different education levels.

Finally, two additional questions should have been included in the survey. It would have been useful to know whether or not Saudi parents are aware of, or familiar with, the AAP, or any other official, screen time guidelines. We speculate, from caregivers’ responses to other questions, that Saudi parents are not aware of, or familiar with, screen time guidelines. However, including a direct question would have provided us with a stronger indication of Saudi parents’ knowledge of children’s media use recommendations. We should have also asked about parents’ general attitudes towards children’s screen media use. We asked caregivers about their thoughts regarding the impact of screens on family time and on children’s language
development, but a more general question would have been helpful with regard to investigating the association between parents’ general attitudes towards children’s media use and parents’ as well as children’s media-related practices.

**Conclusions**

The current study sought to explore Saudi parents’ beliefs, views, and attitudes regarding young children’s media use, how parents’ beliefs compare to children’s actual media-related behaviours, and Saudi parents’ media mediation styles and practices. Similar to parents in other cultures, Saudi caregivers seem to underestimate the amount of time their children spend with screens. The majority of the caregivers in the current study believe that screen media use leads family members to spend less time together, and that television viewing has a positive impact on their children’s language development, while mobile media use has a negative impact. Saudi caregivers tend to use restrictive media mediation practices more frequently than other mediation practices. Caregivers’ beliefs about the appropriate age to introduce screens and the appropriate amount of screen time do not align with their children’s actual screen media use practices. Such discrepancies pose the questions of who should decide the right age to introduce screen media to children and the right amount of screen time for children of specific ages. Globally, many international guidelines recommend parents to wait until their child is 2 years old before introducing screens and recommend a maximum of 2 hours a day of screen time for children aged 2 to 5 years. Although children’s screen media use is a hot topic among social media users in Saudi Arabia, access to evidence-based information on the topic or helpful screen time guidelines or recommendations is limited, and most of what circulates on social media in Arabic is inaccurate. The growing interest among caregivers to learn more about healthy family media use practices and the lack of access to credible information on this topic make it necessary that
more awareness efforts and evidence-based research take place in the country. The results of this study have the potential to inform efforts of parents, educators, and policymakers and to help parents make mindful choices regarding their role in actively and positively mediating their children’s screen media use.
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Thank you for agreeing to take part in this survey which is conducted as part of a research project aiming to explore the literacy and media environment of young Saudi children.

All of your answers and comments will remain confidential and anonymous. If you have any questions about the survey, please contact the Principal Investigator, Haifa Alroqi (Mobile: +966- 531666108/ Email: haifa.alroqi@postgrad.manchester.ac.uk).

1. Child’s Gender: □ Female □ Male
2. Child’s Date of Birth? .......... / ........ / .........
   (Day) (Month) (Year)
3. Child’s Place of Birth ……………………………………………………………………….. (City/ Country)
4. Your Name/ pseudonym (Optional) ……………………………………………………………
5. Your email address (Optional) ……………………………………………………………
6. Your phone number (Optional) ……………………………………………………………
7. Your relationship to the child: □ Mother □ Father □ Other, please specify …………………
8. What is your age?
   □ 17 or younger
   □ 18-20
   □ 21-24
   □ 25-29
   □ 30-34
   □ 35-39
9. Which of the following best describes your current marital status?

☐ Single
☐ Married
☐ Widowed
☐ Divorced
☐ Separated

10. What is the highest level of school you have completed or the highest degree you have received?

☐ No schooling completed
☐ Elementary School Certificate
☐ Intermediate School Certificate
☐ High School Certificate
☐ Post HSC Diploma
☐ Bachelor degree
☐ Master degree
☐ Doctoral Degree
☐ Other, please specify …………………………………………………………………………………………………………………

11. Which of the following categories best describes your employment status?

☐ Employed, working full-time
☐ Employed, working part-time
☐ Not employed, currently looking for work
☐ Not employed, NOT currently looking for work
☐ Businesswoman
☐ Student
☐ Retired
☐ Disabled, not able to work
☐ Other, please specify …………………………………………………………………………………………………………………

12. What is the age of the child’s father?

☐ 17 or younger
☐ 18-20
13. What is the highest level of school the father has completed or the highest degree he has received?

- No schooling completed
- Elementary School Certificate
- Intermediate School Certificate
- High School Certificate
- Post HSC Diploma
- Bachelor degree
- Master degree
- Doctoral Degree
- Other, please specify

14. Which of the following categories best describes the father’s employment status?

- Employed, working full-time
- Employed, working part-time
- Not employed, currently looking for work
- Not employed, NOT currently looking for work
- Businessman
- Student
- Retired
- Disabled, not able to work
- Other, please specify

15. How many children age 12 or younger live in your household (including the child)?

16. What is the birth order of the child?

- Oldest
- Middle
- Youngest
17. How much total combined money do all members of your household earn every month?

- SR 0 to SR1,999
- SR 2,000 to SR4,999
- SR 5,000 to SR9,999
- SR 10,000 to SR14,999
- SR 15,000 to SR19,999
- SR 20,000 to SR24,999
- SR 25,000 to SR29,999
- SR 30,000 to SR34,999
- SR 35,000 to SR39,999
- SR 40,000 and up

18. Which of the following best describes the type of tenure of your housing?

- Rented
- Owned
- Provided by employer
- Other, please specify: ………………………………

19. What is the name of the district where you currently live?  ……………………………… (District/ City)

20. Were there any problems during pregnancy, birth, or right after the child was born? (premature, low birth weight, maternal infections, low Apgar, transfusion)

- No
- Yes

   If yes, please explain: …………………………………………………………………………………………………………………

21. Was the child delayed in any of the following?

- Babbling
- Talking
- Sitting
- Walking
- child was not delayed in any of the above
22. Do you have any concerns about your child’s hearing?

☐ No
☐ Yes

If yes, please explain: ...........................................................................................................................................

23. Do you have any concerns about your child’s speech/language development?

☐ No
☐ Yes

If yes, please explain: ...........................................................................................................................................

24. What language do you use when speaking to the child?

☐ Arabic
☐ English
☐ Mixture of Arabic and English
☐ Other, please specify: ...........................................................................................................................................

25. What language does the father use when speaking to the child?

☐ Arabic
☐ English
☐ Mixture of Arabic and English
☐ Other, please specify: ...........................................................................................................................................

26. Are there other people (other than parents) living at the same place where the child lives?

☐ No
☐ Yes

If yes, please specify how many and their relationship to the child

........................................................................................................................................................................

........................................................................................................................................................................

........................................................................................................................................................................

27. Is there a domestic helper/ au pair who regularly interacts with the child at home?

☐ Yes
☐ No → (Skip to 29)

28. For each domestic helper, please identify the following:

☐ The domestic helper’s nationality.
☐ The language she uses when interacting with the child (e.g., Arabic, English, Mixture of Arabic & English, etc.)
□ Her proficiency level in that/those language(s) (i.e., High, Medium, or Low)

DH1: Nationality: ……………………. Language: ……………………. Proficiency:……………………
DH2: Nationality: ……………………. Language: ……………………. Proficiency:……………………
DH 3: Nationality: ……………………. Language: ……………………. Proficiency:……………………
Other, please specify: ……………………………………………………………………………

29. How often do you read to your child?

□ Never   □ rarely   □ Once a week   □ 2-3 times a week   □ Everyday

30. How often do you read bedtime stories to your child?

□ Never   □ Rarely   □ Sometimes   □ Often   □ Always

31. Approximately, how many books does your child have (including books shared with siblings, & excluding school textbooks)?

□ No books   □ 1-2 books   □ 3-9 books
□ 10-19 books   □ 20-49 books   □ 50 plus

32. What is the language of the books you often read to your child? (Please mark all that apply)

□ Arabic only
□ English only
□ Arabic and English books equally
□ Arabic books more than English books
□ English books more than Arabic books
□ Wordless picture books
□ Other, please specify: ……………………………………………………………………………

33. Is there a TV set in your household?

□ Yes
□ No → (Skip to 35)

34. How many TV sets do you have in your household? ……………………………………………

35. How many of the following do you have in your household? (If any is not available, please put 0)

TV (Local or Satellite) ………………………
Desk computer or laptop ………………………
DVD player or VCR ………………………
Games console e.g., PlayStation, Xbox, or Wii ………………………
An iPod Touch or other type of video iPod ………………………
A smartphone such as iPhone, Galaxy, or BlackBerry
A tablet device, such as iPad, Galaxy Tab, or Galaxy Note
A handheld video game player e.g., Gameboy or PSP

36. Do you have an internet connection at home?

☐ Yes
☐ No

37. Which of the following items, if any, does your child have in her/his bedroom? (Please mark all the apply)

☐ TV (Local or Satellite)
☐ Desk computer or laptop
☐ DVD player or VCR
☐ Games console e.g., PlayStation, Xbox, or Wii
☐ A music CD player or audiocassette
☐ High speed Internet access
☐ None of the above

38. How likely is it that your child has a media device (e.g., TV, Games console, DVD player, Computer, etc.) in her/his bedroom because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>I let my child watch TV and/or use electronic devices ...</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Because it helps her/him fall asleep</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Because it keeps her/him occupied in their room so I can do other things around the house</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Because it frees up the other TVs so other family members can watch their own shows</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Because it was a reward for good behaviour</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Because she/he shares a room with an older brother or sister</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Because she/he shares a room with an adult</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. Because she/he sleeps in a family room that has a TV in it</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. Because we bought a new TV and decided to give her/him the old one</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9. To get her/him to sleep in her/his own room</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
39. Which of the following items do you have, if any?

☐ Your own smartphone
☐ Your own tablet or iPad
☐ Your own iTouch or other video iPod
☐ None of these → (Skip to 44)

40. What type of cell phone, if any, do you have?

☐ I have a smartphone (you can send email, watch videos, or access the Internet on it)
☐ I have a regular cell phone (just for talking or texting)
☐ I don’t have a cell phone

41. Approximately, how many apps, if any, have you downloaded onto your own:
   a. Smartphone: ..............................................
   b. Tablet (e.g., iPad) ..............................................
   c. iPod Touch ..............................................

42. Approximately, how many of the apps that you’ve downloaded were for your child/children to use on your:
   a. Smartphone: ..............................................
   b. Tablet (e.g., iPad) ..............................................
   c. iPod Touch ..............................................

43. Approximately, how many of the apps you’ve downloaded for your child/children are educational apps (i.e., apps that are designed to teach kids something)?
   a. Smartphone: ..............................................
   b. Tablet (e.g., iPad) ..............................................
   c. iPod Touch ..............................................

44. Which of the following items does your child have, if any?

☐ her/his own smartphone
☐ her/his own iPad or tablet
☐ her/his own iTouch or other video iPod
☐ her/his own handheld video game player like a Gameboy or PSP
☐ None of the above

45. Which of the following items does your child share with someone else (e.g., parent, siblings, etc.)?

☐ A smartphone
☐ A tablet or an iPad
□ An iTouch or other video iPod
□ A handheld video game player like a Gameboy or PSP
□ None of the above

46. How many hours per day does your child spend on watching TV? .........................................................

47. How do you evaluate your child’s TV watching time?
□ She/he never watches TV
□ She/he rarely watches TV
□ She/he moderately watches TV
□ She/he frequently watches TV
□ She/he excessively watches TV

48. How many hours per day does your child spend on using electronic media? .................................

49. How do you evaluate your child’s electronic media use?
□ She/he never uses electronic media → (Skip to 52)
□ She/he rarely uses electronic media
□ She/he moderately uses electronic media
□ She/he frequently uses electronic media
□ She/he excessively uses electronic media

50. How often is internet connection available for the devices your child regularly uses?
□ Never    □ Rarely    □ Sometimes    □ Often    □ Always

51. How often, if ever, does your child use the following kinds of apps on a cell phone, iPod, iPad, or other tablet device? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Educational games, like puzzles, memory games, math, or reading</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. Games that are just for fun</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. Creative apps and programmes for things like drawing, making music, or creating videos</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. Apps and programmes based on a character my child knows from a TV show</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5. Apps and programmes that have audio songs</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
6. Apps and programmes that have video songs

7. Apps and programmes with religious content like teaching Quran, prayers, and Islamic rituals.

8. Apps and programmes that have photo and video albums

9. Other types of apps and programmes

52. How often does your child do each of the following activities? (Please mark ONE answer for each statement below. Answer options are: Never, Once a week, Several times a week, Once a day, Several times a day)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Once a week</th>
<th>Several times a week</th>
<th>Once a day</th>
<th>Several times a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read or be read to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Watch DVDs or videotapes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Watch TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Use the computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Play video games on a console player like an Xbox, PlayStation, or Wii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Play games on a handheld player like a Gameboy or PSP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Use a mobile device (like a smartphone, tablet, iPad, iPod Touch, or similar device) to play games, use apps, or watch videos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

53. How likely is it that you let your child watch TV and/or use electronic devices because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. because my child wants to watch TV or use electronic devices to have fun</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. because I find it difficult to say 'No' to my child when she/he asks to watch TV or use electronic devices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. as a reward for good behaviour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. because they make parenting easier
5. because they help distract my child when I have some chores to attend to
6. to get my child to remain quiet or not move when in public (restaurants, social gatherings, waiting areas, etc.)
7. to distract my child so she/he can eat
8. to get my child to stop crying
9. because my child needs to be skilled with computers and new tablet devices to be successful in life
10. because they have educational materials that are good for my child’s brain development
11. because they help in teaching my child language basics such as alphabets and numbers
12. because they help in teaching my child new vocabulary
13. because they help in teaching my child religious values and morals
14. because they help in teaching my child good manners and habits
15. because they help in teaching my child languages (e.g., Arabic, English or French)

54. If there are other reasons, other than the ones mentioned above, please explain below. Otherwise, leave blank.

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55. How often does each of the following happen? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always, I don't know.)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you watch TV together with your child?</td>
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<tr>
<td>2. How often do you use electronic devices together with your child?</td>
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<tr>
<td>3. When the child is watching TV, how often does someone else watch with her/him?</td>
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<tr>
<td>4. When the child is using electronic devices, how often does someone else use/ play with her/him?</td>
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</tr>
</tbody>
</table>
5. How often do you or someone else discuss/explain the content of the programme viewed on TV or electronic devices to your child?

☐ ☐ ☐ ☐ ☐ ☐ ☐

6. How often do you or someone else specify in advance the programmes/applications that may be viewed/played?

☐ ☐ ☐ ☐ ☐ ☐ ☐

7. How often do you or someone else set specific media viewing/playing hours for your child?

☐ ☐ ☐ ☐ ☐ ☐ ☐

8. How often do you or someone else tell your child to turn off the TV/electronic device or switch the channel/quit an application when she/he is viewing an unsuitable content?

☐ ☐ ☐ ☐ ☐ ☐ ☐

9. How often does your child eat her/his main meals while watching TV or using electronic devices?

☐ ☐ ☐ ☐ ☐ ☐ ☐

10. On a typical day, how often do you leave the TV on, even if no one is actually watching it?

☐ ☐ ☐ ☐ ☐ ☐ ☐

56. Do you or someone else forbid your child to watch/play certain programmes/channels/applications?

☐ Yes
☐ No → (Skip to 58)

57. Please specify the channels, programme types, or programme titles that you or someone else forbid your child to view/play

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58. In general, do the media in your home—TVs, computers, video games, and mobile devices—cause your family to spend more time together with other family members, less time together with other family members, or don’t they make much difference one way or the other?

☐ Media cause us to spend more time with other family members
☐ Media cause us to spend less time with other family members
☐ Media don’t make much difference in how much time we spend with other family members

59. What is your child’s favourite activity? If more than one, list all.

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60. What is your child’s favourite TV channel? If more than one, list all.

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61. What is your child’s favourite TV programme? If more than one, list all.

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62. What is your child's favourite tablet/ smartphone application? If more than one, list all.
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63. At what age did your child start watching TV? .........................................................

64. At what age did your child start using electronic devices (e.g., smartphone, tablets, computers, etc.)?
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65. From your point of view, which channel(s) or programme(s) do you think is beneficial for your child? 
Please provide details.
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66. From your point of view, which channel(s) or programme(s) do you think is harmful for your child? 
Please provide details.
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67. From your point of view, what is the ideal amount of screen time (TV & mobile devices) for children in your child's age?
........................................................................................................................................................................

68. From your point of view, when is the ideal age to introduce children to screens?

☐ Younger than 1 year
☐ 1 to 2 years
☐ 2 to 3 years
☐ 3 to 4 years
☐ 4 to 5 years
☐ Older than 5 years

69. From your point of view, does TV viewing impact your child's language development negatively or positively?

☐ TV viewing negatively impacts my child's language development
☐ TV viewing positively impacts my child's language development
☐ TV viewing does not have any impact (positive or negative) on my child's language development

70. From your point of view, does using mobile devices impact your child's language development negatively or positively?

☐ Using mobile devices negatively impacts my child's language development
☐ Using mobile devices positively impacts my child's language development
☐ Using mobile devices does not have any impact (positive or negative) on my child's language development
71. Does your child attend day care?

☐ Yes
☐ No

72. If you have anything to add in regard to your child’s media use and its relation to your child’s language development, please use the space provided below to write your input.

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The Association Between Screen Media Quantity, Content, and Context and the Language Development of Young Children

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Paper prepared for publication (not yet submitted)
Abstract

The rising prevalence of media and touchscreens in young children’s lives has led to a heated debate over their potential benefits and hazards. Although screen media can be utilised as an effective educational tool, excessive use of screens by young children during this crucial developmental period can be detrimental (American Academy of Pediatrics, 2016). In today’s rapidly changing media landscape, understanding young children’s screen media use patterns and examining their association with language development are critical in guiding the development of up-to-date, research-driven recommendations for all stakeholders. The present study investigates the impact of the quantity, content, and social context of screen media exposure on the language development of 85 Saudi children aged 1 to 3 years. Weekly event-based diaries and surveys were employed to track children’s screen media use patterns and the social contexts of their screen media use. The diaries were completed over the course of 7 weeks, reporting on a different day of the week each week. The survey was completed after returning all the diaries. Children’s language development was assessed using the JISH Arabic Communicative Development Inventory (JACDI; Dashash & Safi, 2014), the official Arabic adaptation of the MacArthur–Bates Communicative Development Inventories (CDI; Fenson et al., 1993). The language inventory was completed after returning the fifth diary. Our findings indicate that out of the three screen media viewing parameters (quantity, content, and context), the most significant predictor of language development in 12- to 16-month-olds was screen media context (as measured by the frequency of children’s interactive joint media engagements). The more that caregivers engaged with their young children in viewing screen media and the more they verbally interacted with them while co-viewing, the higher the children’s expressive and receptive vocabulary scores. In older children (17- to 36-month-olds), higher levels of screen
media quantity (as measured by the amount of time spent viewing screens daily, the prevalence of background TV in the children’s environment, and the onset age of screen media viewing) had the highest negative impact on children’s expressive vocabulary and grammatical complexity scores.

**Keywords**: co-viewing, expressive vocabulary, language development, media use, receptive vocabulary, technology, toddlers, touchscreens
Introduction

While any theory of cognitive and language development needs to take into account the child’s environment, some theoretical approaches have placed greater emphasis on the role of the environment in children’s linguistic and cognitive development than others (e.g., Bronfenbrenner’s ecological systems theory, Tomasello’s usage-based theory, and Vygotsky’s social interactionist theory). In fact, the early childhood home environment has been found to have greater influence on children’s language development than genetic factors (Hayiou-Thomas, Dale, & Plomin, 2012; Kavé, Shalmon, & Knafo, 2013). Research has consistently shown that the Home Literacy Environment (HLE), in particular, plays a significant role in the development of early language (e.g., Deckner, Adamson, & Bakeman, 2006; Griffin & Morrison, 1997; Liebeskind, Piotrowski, Lapierre, & Linebarger, 2014; Payne, Whitehurst, & Angell, 1994; Rodriguez et al., 2009; Roberts, Jurgens, & Burchinal, 2005; Schmitt, Simpson, & Friend, 2011; Wood, 2002).

Views of what constitute the HLE are varied. The HLE has been broadly defined as exposure to, and frequency of, activities, opportunities, and resources related to language and literacy at home. The HLE has been predominantly characterised in the literature by children’s and parents’ reading behaviours (e.g., number of books, exposure to print on various media, frequency of caregiver–child shared reading, and onset age of reading; Bus, van IJzendoorn, & Pellegrini, 1995; de Jong & Leseman, 2001; Deckner et al., 2006; DeTemple, 2001; Elley, 1989; Frijters, Barron, & Brunello, 2000; Payne et al., 1994; Purcell-Gates, 1996; Sénéchal, LeFevre, Hudson, & Lawson, 1996; Tabors, Roach, & Snow, 2001; Weinberger, 1996). However, many researchers have argued that the HLE should not be viewed as a unity construct, but as a construct that is made up of a variety of interrelated experiences that collectively influence
children’s literacy and language development (Britto & Brooks-Gunn, 2001; Burgess, 1999; Burgess, Hecht, & Lonigan, 2002; Leseman & de Jong, 1998; Schmitt et al., 2011; Wood, 2002). Several other conceptualisations of the HLE have included other facets, such as parent–child interactions, parental modelling of literacy behaviours, and parents’ beliefs about, and attitudes towards, literacy- and language-fostering activities (Burgess, 2002; Burgess, 2011; DeBaryshe, Binder, & Buell, 2000; Park, 2002; Rodriguez & Tamis-LeMonda, 2011; Rodriguez et al., 2009; Schmitt et al., 2011; Weigel, Martin, & Bennett, 2006). In addition, a number of studies have included the frequency of television viewing by children and their parents as one of the components of the HLE (e.g., Burgess et al., 2002; Foy & Mann, 2003; Griffin & Morrison, 1997; Purcell-Gates, 1996).

These conceptualisations of the HLE mostly predate the advent of mobile media and touchscreen technologies. In today’s digital world, screen media have become an inseparable part of our lives both at home and outside of the home, and have dramatically changed our environments and the ways in which we interact, communicate, and learn. Traditional media (e.g., television) and new media (e.g., smartphones and tablets) are now seen as a source of linguistic input in children’s and adults’ environments (Dixon, Zhao, Quiroz, & Shin, 2012; Hoff, 2006; Linebarger & Vaala, 2010). Therefore, more recent descriptions of the HLE have included traditional and new media as integral components of children’s home literacy environments in the digital age (e.g., Kumpulainen & Gillen, 2017; Liebeskind et al., 2014; Mascarenhas et al., 2017; Trainin, Wessels, Nelson, & Vadasy, 2017).

Despite the increasing popularity and prevalence of digital media, scientific research and policy statements on the use of digital media by children and on the rapidly-changing media contents and contexts lag behind their adoption and the pace of digital innovation (American
One area that requires attention is the hypothesis that screen media may displace other activities that can contribute to children’s language development, such as parent–child interactions, reading, and play (Anderson & Subrahmanyam, 2017; Hofferth, 2010; Holloway, Green, & Livingstone, 2013; Hudon et al., 2013; Johnson, 2015; Schmidt, Pempek, Kirkorian, Lund, & Anderson, 2008; Seo & Lee, 2017; Taylor, Monaghan, & Westermann, 2018; Zimmerman & Christakis, 2007). Patterns of displacement can also be revealed by examining the motives parents cite for allowing their children to use screen media. Numerous studies have shown that occupying children while caregivers attend to other chores or while they are in public are among the most common motives for allowing children to use screens (e.g., Chaudron, 2015; Cingel & Krcmar, 2013; Kabali et al., 2015; Nevski & Siibak, 2016; Rideout, 2013; Seo & Lee, 2017; Vittrup et al., 2016; Wartella, Rideout, Lauricella, & Connell, 2014). Screen media can have an indirect impact on children’s language development by influencing the quantity and quality of parents’ linguistic input and the amount of quality time that family members spend together, especially when many hours of daily life are spent while both parents and children are engaged with, or distracted by, screen media (Hudon et al., 2013; Jago et al., 2013; Lee & Chae, 2007; Tanimura, Okuma, & Kyoshima, 2007; Vandewater, Bickham, & Lee, 2006).

Several international health bodies recommend no screen time for children under 2 years and 1 to 2 hours of screen time for children 2 to 5 years old (e.g., American Academy of Pediatrics, 2016; Australian Department of Health, 2017; Canadian Paediatric Society, 2017; German Federal Ministry of Health, 2016; New Zealand Ministry of Health, 2017). Despite these recommendations, young children around the world are exposed to screen media at early
ages and for longer than recommended (Alroqi, Serratrice, & Cameron-Faulkner, 2018a; Choles & Mindell, 2013; Colley et al., 2013; Hinkley, Salmon, Okely, Crawford, & Hesketh, 2012; Kabali et al., 2015; Rideout, 2017; Samaha & Hawi, 2017; Sweetser, Johnson, Ozdowska, & Wyeth, 2012). Much of the guidance and rhetoric around the subject of children’s digital media use have been focused on the amount of daily screen time (Billington, 2016). However, there has recently been a shift towards focusing on other aspects of screen media use such as the social context of media consumption and the content of media consumed (e.g., American Academy of Pediatrics, 2016; Barr & Linebarger, 2017; Blum-Ross & Livingstone, 2016; Huber, Yeates, Meyer, Fleckhammer, & Kaufman, 2018; Livingstone, Blum-Ross, Pavlick, & Ólafsson, 2018; Pempek & Lauricella, 2017; Uhls & Robb, 2017; Vaala & Jordan, 2017). Thus, a comprehensive investigation of screen media exposure and its association with developmental outcomes must include the three main parameters of screen media use: quantity, content, and context. Each of these parameters and its association with language development is discussed in the following sections.

**Quantity of Screen Media Exposure**

The association between children’s amount of screen time and their language development has been examined in several studies. Most studies have measured the quantity of foreground screen media exposure by looking at the number of minutes or hours that children actively spend daily or weekly viewing or using screens (i.e., TV and/or mobile media). A minority of studies have also included the amount of background TV exposure (i.e., the TV is on in the background, but the child is not actively watching it) when calculating the quantity of screen media exposure (e.g., Lapierre, Piotrowski, & Linebarger, 2012; Lavigne, Hanson, &
Anderson, 2015). It is worth clarifying that background screen media exposure mostly describes background TV exposure, as opposed to mobile media exposure, given that mobile media devices often require more individual use. Furthermore, unlike TV, mobile media devices may run out of power or auto-lock when not in use, and therefore they are less likely to be available in the background. In our brief review of the literature on the association between the quantity of young children’s screen media exposure and their language development, we cover three dimensions that together make up the quantity parameter: (a) the amount of foreground screen media exposure; (b) the amount of background screen media exposure; and (c) the onset age at which children were first introduced to screens, which contributes to the total cumulative amount of time that children are exposed to screen media.

**Amount of foreground screen media exposure.** Previous research on the link between screen time and early language development has produced mixed findings. Several studies have found a negative association between the amount of screen time and language development in children under 3 years of age. For example, Tomopoulos et al. (2010) found that longer daily duration of screen media exposure at age 6 months predicted lower language and cognitive development at age 14 months even after adjusting for potential confounding variables, including family sociodemographic characteristics and home environment factors. Similarly, Duch et al. (2013) found a significant correlation, in both cross-sectional and longitudinal analyses, between spending over 2 hours of screen time (i.e., time spent viewing media through television, cell phones, DVDs, or computers) per day and low expressive and receptive language scores in Hispanic toddlers. These results remained significant even after controlling for gender and maternal education. In a prospective longitudinal study in Canada, Pagani, Fitzpatrick, and Barnett (2013) found that the amount of TV-watching time at 29 months was associated with
subsequent decreases in French receptive vocabulary at 65 months, while controlling for potentially confounding variables including maternal education, family functioning, early stimulation of literacy, and early child temperament. In Thailand, Chonchaiya and Pruksananonda (2008) reported that after adjusting for several variables that could predict language delay (e.g., child’s gender, family history of neglectful parenting, parental education), 15- to 48-month-old Thai children who started watching TV at an age younger than 12 months and who watched TV for more than 2 hours per day were about six times more likely to experience language delays.

Other studies have reported both positive and negative associations between amount of screen time and vocabulary development in young children, with varying findings depending on several factors, including the child’s age and language outcomes measured. For instance, Becker (2013) found no correlation between the quantity of screen time and 30- to 36-month-old children’s performance on a novel word-learning task. However, she did find a significant negative correlation between the quantity of screen time and expressive vocabulary size. As Becker (2013) has explained, it is possible that parents of children with smaller vocabulary size turn to screen media more often in an effort to enhance their children’s language and/or that these parents are more distant from their children. The latter association may represent a confounding variable that may actually be causing the decrease in a child’s vocabulary score and the increase in the amount of time spent viewing screen media. Using the MacArthur–Bates Communicative Development Inventories (CDI; Fenson et al., 1993) and controlling for potential covariates (i.e., race, age, household income, maternal and paternal education, whether both parents were living in the household, the child’s hours in day care), Zimmerman, Christakis, and Meltzoff (2007) found a negative relationship between the amount of time spent watching
television or DVDs/videos and the CDI receptive vocabulary scores of infants aged 8 to 16 months. However, they found no significant associations with the CDI expressive vocabulary scores in toddlers aged 17 to 24 months. The differences in the age groups studied and the language outcomes measured in Zimmerman et al.’s (2007) study should be noted, as they did not measure the expressive vocabulary of the children aged 8 to 16 months nor the receptive vocabulary of children aged 17 to 24 months (as receptive vocabulary is not a component of the CDI: Words and Sentences, which is designed for children above the age of 16 months). In addition, as Zimmerman et al. (2007) explain, the programmes watched by infants and toddlers in their younger group had short scenes, little dialogue, and a variety of visually salient events. On the other hand, older toddlers watched more educational shows which they may understand portions of their linguistic and cognitive content even though the shows are not specifically designed for children under the age of 2 years. Thus, the types of content watched by each age group may have impacted Zimmerman et al.’s (2007) results. Types of content viewed by children and their associations to language gains are discussed later in this chapter.

Some studies report no association between screen time and language development in young children. For example, Alloway, Williams, Jones, and Cochrane (2014) found no effect, positive or negative, for the amount of time spent watching different types of TV programming (e.g., educational, cartoons, movies, adult entertainment, and baby DVDs) on the receptive vocabulary of 2- to 3-year-old toddlers. Similarly, Schmidt, Rich, Rifas-Shiman, Oken, and Taveras (2009) found that time spent viewing TV at ages 6, 12, and 24 months was not associated with receptive vocabulary development at age 36 months after adjusting for maternal, child, and household characteristics, although they found a negative association in unadjusted models. As Schmidt et al. (2009) explained, the effects of screen media use during infancy on
cognitive skills at age 36 months seem to be confounded by sociodemographic and environmental determinants of both screen media use and lower cognitive development scores. Additionally, in a recent study, Taylor et al. (2018) found no evidence that time spent engaging with television or touchscreen devices has either a positive or a detrimental effect on the vocabulary development of 6- to 36-month-old British children who were from highly educated families with moderate screen media use and high reading engagement. It seems that children from disadvantaged, less stimulating environments are more vulnerable than those from more advantaged backgrounds to the potential negative developmental outcomes associated with screen time. Several previous studies have shown that children from lower income families and less educated parents spend more time watching screens and less time in enriching activities such as reading (e.g., Certain & Kahn, 2002; Rideout & Hamel, 2006). In addition, interactive co-viewing and verbal interactions around media content tend to be lower in families with low socioeconomic status (SES; Barkin et al., 2006; Warren, 2005). Children from low-SES families have also been found to view more non-child-directed content than child-directed educational content (Tomopoulos et al., 2010). These variables that are observed in low-SES families (the increase in screen media viewing time, the decrease in other stimulating activities, the lower interaction around media, and the increased exposure to age-inappropriate, non-educational content) are thus possible predictors of adverse effects associated with media use (Tomopoulos et al., 2010; Warren, 2005).

**Amount of background screen media exposure.** As noted above, studies on children’s screen media use have often been exclusively focused on the amount of foreground screen media exposure (Lapierre et al., 2012). The need for examining the relations between background TV and developmental outcomes in children is emphasised by parents’ common belief that
background TV has no effect on their children as they do not seem to pay attention to it (Pempek, Kirkorian, & Anderson, 2014). Contrary to this belief, background TV exposure has been linked to lower cognitive skills and poorer expressive and receptive language outcomes (e.g., Barr, Lauricella, Zack, & Calvert, 2010; Hudon et al., 2013; Masur, Flynn, & Olson, 2016; Tomopoulos et al., 2010). Moreover, it has been associated with a reduction in the quantity and quality of parent–child verbal interactions (e.g., Christakis et al., 2009; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Masur et al., 2016; Pempek et al., 2014; Tanimura et al., 2007) and a decrease in sustained attention during toy play (e.g., Courage, Murphy, Goulding, & Setliff, 2010; Schmidt et al., 2008; Setliff & Courage, 2011), both of which are predictive of early language development.

**Onset age of screen media exposure.** A growing body of literature suggests that age appears to be a significant factor in determining the potential positive or negative effects that screen media may have on children’s language development. While numerous investigations point to positive language developmental outcomes for screen media use in children above the age of 2 years (e.g., Krcmar, 2014; Krcmar, Grela, & Lin, 2007; Linebarger & Walker, 2005; Nussenbaum & Amso, 2016; O’Doherty et al., 2011; Wright et al., 2001), other studies have found either no relation or a negative relation between screen media use and language outcomes in children under 2 years (e.g., DeLoache et al., 2010; Krcmar, 2014; Krcmar et al., 2007; Richert, Robb, Fender, & Wartella, 2010; Robb, Richert, & Wartella, 2009; Tomopoulos et al., 2010; Zimmerman et al., 2007).

Despite the findings noted above, very few investigations have specifically examined the age at which screen media viewing starts and its relation to developmental outcomes. One of the few studies that examined this factor found that 15- to 48-month-old Thai children who started
viewing television at an age younger than 1 year and who watched television for more than 2 hours a day were about six times more likely than a comparison group to experience language delays as assessed by the Denver Developmental Screening Test (Chonchaiya & Pruksananonda, 2008). In another study, Hudon et al. (2013) examined the onset age of television viewing within a number of other variables that comprised what they described as the quality of screen media use. They found that toddlers with poorer-quality viewing experiences (which included a younger onset age of television viewing) had lower CDI productive vocabulary scores (Hudon et al., 2013). We do not agree, however, with how Hudon et al. (2013) classified the onset age of screen media viewing as a variable within the quality of screen media viewing construct. Instead, we view onset age as a variable contributing to the quantity parameter of screen media viewing. We argue that the younger age at which children are introduced to screens, the more cumulative total time they spend with screens.

Content of Screen Media

Concerns regarding the relationship between early screen media exposure and developmental outcomes have been recently shifting from a focus on the quantity of screen media use to the quality of the media content viewed and the context of the media viewing experience. Most of the investigations examining the content features and characteristics of screen media programming have mainly focused on TV and DVD exposure. However, findings from these studies can be extended to some of the content types available on mobile media devices (e.g., YouTube videos), as these devices are often used on an on-demand basis to view what was originally TV or DVD content.
Screen media content types available to children are not all the same. They differ in the audience that they target (i.e., infant/toddler-directed, older children-directed, adult-directed), in their educational value (i.e., educational vs. non-educational), in the languages that they use (e.g., American English, Spanish, Modern Standard Arabic, Egyptian Arabic), in the language- and literacy-related properties that they utilise (e.g., eliciting participation, talking directly to viewers, limited-language shows), in the formal features that they employ (e.g., pace, camera cuts, scene lengths, special effects), and in their interactivity and contingency (i.e., active vs. non-interactive; contingent vs. non-contingent). Variations in these variables have been found to be related to variations in language and learning outcomes. In order to limit the scope of our literature review in this section, we only focus on the screen media content variables that are relevant to the present study. Namely, we briefly review prior research on three screen media content variables: (a) target audience, (b) educational value, and (c) language of the screen media content.

**Target audience.** Several investigations have looked at the quality of media content in terms of its target audience and how this variable is linked to language outcomes in young children. Children are usually exposed to adult-directed TV programmes when their parents watch them (i.e., foreground TV for the parents, but background TV for the children). A number of longitudinal studies have shown that young children’s viewing of programmes that are not age-appropriate is negatively associated with language and cognitive outcomes. For instance, in a 3-year longitudinal study, Wright et al. (2001) followed children from ages 2 to 5 and 4 to 7 years and assessed their performance on four measures of academic skills: reading, maths, receptive vocabulary, and school readiness. They found that watching child-directed, informative programmes between ages 2 and 3 predicted high subsequent performance on the
four measures. In contrast, they found that children who frequently viewed general-audience programmes performed worse on the tests than did children who were infrequent viewers of such programmes.

This finding was confirmed in another study that was conducted on a younger population (Tomopoulos et al., 2010). Tomopoulos and colleagues examined the associations between 6-month-old children’s exposure to three media content types (i.e., child-oriented educational content, child-oriented non-educational content, and older child/adult–oriented content) and the children’s cognitive and linguistic development at age 14 months (Tomopoulos et al., 2010). Of the three media types, the older child/adult-oriented content was associated with lower cognitive and linguistic outcomes. Their study, however, did not find significant associations between exposure to young child–oriented educational or non-educational content and cognitive and linguistic development. Additional research has indicated that frequent exposure to adult-directed TV programmes at ages 1 and 4 was associated with poorer cognitive skills (vocabulary, spatial skills, pre-numeracy skills, and pre-literacy skills) at age 4 (Barr et al., 2010).

In addition to the negative association reported between viewing adult-directed content and young children’s language development, other studies found that adult-directed programmes and background TV reduce the quality and quantity of parent–child interactions, which are significant predictors of child language development (e.g., Christakis et al., 2009; Kirkorian, Pempek, Murphy, Schmidt, & Anderson, 2009; Mendelsohn et al., 2008; Pempek et al., 2014; Tanimura et al., 2007). Taken together, most studies indicate that non-child-directed screen media are associated with negative outcomes in young children.

**Educational value.** The educational value of screen media content is an important element that contributes to screen media quality. Educational benefits are among the most
frequent motives that parents report for allowing or encouraging children to use screens (Alroqi et al., 2018b; Baek, Lee, & Kim, 2013; Bentley, Turner, & Jago, 2016; Cingel & Krcmar, 2013; Li, Mendoza, & Milanaik, 2017; Marsh et al., 2015; Nevski & Siibak, 2016). These beliefs may result from the fact that some children’s programmes and apps do present educational and literacy concepts such as sounds, letters, numbers, and new words, which may lead parents to assume that such programmes are effective at teaching these concepts. These beliefs may also stem from screen media producers’ and app developers’ educational and developmental claims specifically targeted at infants, toddlers, and pre-schoolers (Garrison & Christakis, 2005; Hirsh-Pasek et al., 2015; Linebarger & Vaala, 2010). Vaala, Ly, and Levine (2015) reviewed 183 apps from lists of Top 50 educational apps on various popular app stores (e.g., Google Play and the Apple App Store) and found that when the target age group was specified, 90% of the apps specified preschool-age children as, at least, part of their target audience.

In response to developers’ and producers’ educational and developmental claims, numerous studies have been carried out to assess the effectiveness of specific content types and programmes on learning. Several studies have found positive associations between viewing children’s educational programming and language outcomes in children above the age of 2 years. For example, viewing educational shows such as Sesame Street has been found to be positively associated with vocabulary size, receptive vocabulary, and school readiness (e.g., Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Rice, Huston, Truglio, & Wright, 1990; Wright, Huston, Scantlin, & Kotler, 2001; Zill, Davies, & Daly, 1994). Similar results were reported by Wright et al. (2001), who found that viewing educational programming at ages 2 and 3 years was positively associated with receptive vocabulary and school readiness at age 3. Linebarger and Walker (2005) carried out a 2-year longitudinal study to examine the relation between 6-month-
olds’ viewing of specific programmes and their subsequent language outcomes. These researchers discovered positive findings for viewers of shows that had specific educational aims and that used language-promoting properties such as offering viewers several opportunities to hear vocabulary items and their definitions, to see visual representations of words, and to see and hear interactions between characters (e.g., Arthur, Clifford, and Dragon Tales). They also discovered positive outcomes for viewers of shows that had on-screen characters that speak directly to the child, elicit participation, provide the child with opportunities to respond, label objects, and engage in real-life-like interactions (e.g., Dora the Explorer and Blue’s Clues). Viewers of these types of programmes had higher expressive vocabulary scores at age 30 months than non-viewers.

Despite the positive associations that have been found between viewing educational programming and language outcomes in children aged 2 years and older, research indicates that children younger than 2 years of age do not seem to gain similar benefits from watching educational shows (even from programmes that are claimed to be designed for infants and toddlers). For example, Robb et al. (2009) found that 12- to 15-month-old children who viewed Baby Wordsworth, an infant-directed DVD designed to introduce children to words around the house, did not show increases in their expressive or receptive knowledge of the words featured in the DVD. Similar findings were reported by DeLoache et al. (2010), who found that children aged 12 to 18 months who viewed a best-selling educational DVD promoted for infants who are 1 year or older did not learn any more words after 1 month of exposure to the DVD than did a control group who did not view the DVD. Finally, another study discovered that although toddlers (17 months and older) were able to learn novel words after repeated exposure to an educational infant-directed DVD, those younger than 17 months did not seem to benefit from
repeated exposure to the same DVD (which they viewed six times or more over a 2-week period; Krcmar, 2014).

Taken together, these findings add to accumulating evidence that although children over 2 years of age can learn from screens, children under 2 years of age do not learn as effectively from screen media as they do from live presentations (e.g., Barr & Hayne, 1999; Barr, Zack, Garcia, & Muentener, 2008; DeLoache et al., 2010; Hayne, Herbert, & Simcock, 2003; Krcmar, 2011; Krcmar et al., 2007; Neuman, Kaefer, Pinkham, & Strouse, 2014; Robb et al., 2009; Roseberry, Hirsh-Pasek, Parish-Morris, & Golinkoff, 2009; Schmitt & Anderson, 2002). Anderson and Pempek (2005) named this phenomenon the *video deficit effect*. Infants and toddlers seem to also have a deficit in transferring knowledge from two-dimensional (2D) contexts, such as screens, to the three-dimensional (3D) real world context (Barr, 2010, 2013). In summary, age seems to be an important factor in determining the language-development benefits that children can gain from watching educational content.

**Language of the screen media content.** The language input received from screen media is an important media content aspect to consider, especially in communities where the language variety (i.e., dialect or language) used in screen media is different from the variety that children hear in daily conversations around them. Screen media are often used by parents as an educational source for second/foreign language learning. In a previous study, we found that one of the motives that Saudi caregivers cite for letting their children use screen media was to help them learn a foreign language that is not spoken at home or in the local community (e.g., English; Alroqi et al., 2018b). This is the same motive suggested by Duch et al. (2013), who found that Hispanic parents in their study selected English child-directed programming for their children to help them learn English.
Most studies that have dealt with language choice in children’s screen media have focused on bilingual/multilingual communities and code-switching in children’s shows such as *Dora the Explorer* and *Handy Manny* (e.g., De Casanova, 2007; Gregori-Signes & Alcantud-Díaz, 2012). Few studies were conducted on children in bilingual or multilingual contexts who were mainly exposed to screen media in one language (e.g., English), but were spoken to at home in their parents’ mother language (e.g., Spanish) (e.g., Duch et al., 2013). With the introduction of touchscreens and Internet-connected devices, children around the world are now exposed to screen media content in languages and language varieties other than their first language. An example of this is represented by one episode of the Russian children’s cartoon *Masha and the Bear*, which received more than 3 billion views to become the fourth most viewed *YouTube* video of all time (YouTube, 2018). Therefore, it is important to identify the range of language(s) or language varieties that young children are exposed to, both on TV and mobile media, and to investigate the impact of these language varieties on children’s first and second language development.

Studies examining the relationship between screen media in bilingual/multilingual communities and first and second language development have presented conflicting findings. Patterson (2002), for example, carried out a study on Spanish–English bilingual toddlers from homes in which both languages were spoken. These researchers examined the relation between the amount of television viewing in each language (English and Spanish) and language development. They found no significant associations between the frequency of TV watching in each language and the children’s Spanish or English vocabulary size. Other studies, however, have reported a positive link between TV viewing in a specific language and the development of that language. For instance, Uchikoshi (2006) found that watching educational English TV
shows (e.g., *Arthur* and *Between the Lions*) was significantly positively associated with higher expressive and receptive English vocabulary scores among Spanish–English bilingual kindergarteners. Similarly, Dixon (2011) found that Singaporean bilingual/multilingual kindergarteners who only watched English TV programmes scored 10 points higher on English vocabulary measures than those who only watched TV programmes in languages other than English. Moreover, this same study found that bilingual/multilingual children who viewed TV programmes in English at the same frequency that they watched programmes in another language scored 4 points higher on English vocabulary than those who only watched TV programmes in languages other than English (Dixon, 2011).

On the other hand, some studies have found negative associations between children viewing screen media in a language other than the language spoken at home and their first language development. For example, Duch et al. (2013) discovered a negative association between Hispanic infants’ and toddlers’ watching child-directed media in English more than 2 hours a day and their Spanish language scores. This same study found no association between watching adult-directed media in Spanish more than 2 hours a day and children’s Spanish language scores. It is important to note here that in their sample, almost all households were Spanish speaking, all child-directed media was in English, and all adult-directed media was in Spanish.

In another study, Hudon et al. (2013) looked at both the quantity and quality of TV viewing by monolingual English, monolingual French, and English-French bilingual infants and toddlers and its association with their English and French vocabulary scores. These researchers found that the quantity of TV viewing was not related to language outcomes in monolingual or bilingual children. However, what they described as poor quality screen media viewing (i.e.,
early onset age of viewing, adult-directed TV programmes, background TV, and solitary viewing) was related to lower English and French vocabulary scores in both monolinguals and bilinguals. Moreover, they discovered a greater negative effect on the English vocabulary of bilinguals who were English-dominant and who were watching more English TV than French TV.

Interestingly, both Duch et al. (2013) and Hudon et al. (2013) have attributed the lower language outcomes in their studies to reductions in parent–child interactions during co-viewing. However, they explained the effects differently. Duch et al. (2013) speculated that it was unlikely for Hispanic parents to have verbal interactions with their children around the English media content they viewed due to language barriers. Hudon et al. (2013), on the other hand, suggested that adult-directed English programming and background TV draw the attention of English-speaking caregivers and results in decreased caregiver–child interactions, which mediate the relation between poor-quality screen media viewing and lower vocabulary scores.

A review of the literature yielded no studies on the association between the language of screen media content and the acquisition of first language in diglossic communities. **Diglossia** is defined as “a situation in which two languages (or two varieties of the same language) are used under different conditions within a community, often by the same speakers” (Diglossia, n.d.). In Arabic-speaking countries, there is a diglossic situation where Modern Standard Arabic (MSA) is the high variety (H) that is usually used in textbooks, formal education, news broadcasts, official speeches, and religious sermons (Ferguson, 1959). The low varieties (L) of Arabic are the colloquial regional vernaculars that vary across countries and regions and are usually used for speaking and in informal daily conversations. Although H and L can share similar lexicons and linguistic features and can have some degree of mutual intelligibility, there are many
grammatical, phonological, lexical, and semantic differences between them. Children in Arab countries are born in this linguistic context, where they grow up speaking a colloquial variety of Arabic, which they start acquiring before school. They are also exposed to MSA before school through TV programmes such as cartoons and children’s educational programmes (Alshamrani, 2012). Later, through formal education, children learn to read and speak another linguistically-related form, namely MSA (Saiegh-Haddad, 2005).

Alfailakawi (2013) analysed the content of twelve Gulf State TV stations, excluding channels targeting a specific age group (e.g., children or teenagers) or a specific genre (e.g., news or sports channels). He found that 62% of the child-directed programmes in the sample used MSA, 23% used regional colloquial Arabic, and 15% used English. The study also revealed that among the child-directed content, imported animated cartoons were mostly dubbed in MSA, while game and talk shows were mostly delivered in colloquial Arabic. English was used in child-directed shows that were broadcast on English-language TV channels (e.g., Saudi 2 and KTV 2). No prior studies have looked at the language(s) used in children’s channels in the Middle East and North Africa (MENA) region and especially in Gulf State countries.

In summary, research so far has not provided conclusive findings on the association between media content language and children’s language development. Investigating this connection is particularly important given that many parents use screens as a source of language learning and that many children are exposed, through screen media, to a variety of languages that have the potential to support or hinder their learning of other languages as well as the development of their mother language.
Social Context of Screen Media Exposure

In recent years, there has been a growing interest in investigating the social context of screen media use and its impact on children’s learning (Lauricella et al., 2017). The social context of screen media use refers to whether screen media is viewed with other people or individually. Two or more people watching television together has been described for many years as co-viewing (Austin, 1993; Dorr, Kvaric, & Doubleday, 1989; Valkenburg, Krcmar, Peeters, & Marseille, 1999). Joint Media Engagement (JME), a more recent term, is now used to refer to both TV co-viewing and mobile media co-using (Takeuchi & Stevens, 2011).

Without parental scaffolding, children’s ability to learn from 2D experiences (e.g., TV, book-reading, or playing games on touchscreens) is limited (Lerner, 2017). Numerous studies have been conducted to compare children’s learning from screens viewed on a solitary basis versus screens that have been co-viewed. Compared to solitary viewing, co-viewing educational programmes with contingently responsive adults has been found to have better outcomes (Anderson & Pempek, 2005; Krcmar et al., 2007; Myers, Crawford, Murphy, Aka-Ezoua, & Felix, 2018; Rasmussen, Keene, Berke, Densley, & Loof, 2017; Roseberry et al., 2009; Strouse, O’Doherty, & Troseth, 2013). A contingently responsive caregiver is one who is sensitive to the child’s cues and attempts to interact, who responds to these cues and attempts appropriately and promptly, and who talks to the child about what is in the child’s current focus of attention (Dunst, Raab, & Trivette, 2012; Helmerhorst, Riksen-Walraven, Fuka, Tavecchio, & Gevers Deynoot-Schaub, 2017; Matthews, McGillion, & Pine, 2016; McGillion et al., 2013; McGillion, Pine, Herbert, & Matthews, 2017; World Health Organization, 2004). According to the latest screen time recommendations from the American Academy of Pediatrics (2016), interactive co-viewing starting at 15 months of age is the primary factor in facilitating young children’s
learning from screens. One study found that pre-schoolers who watched *Barney & Friends* without a co-viewer learned fewer words than those who watched the programme with an adult (Singer & Singer, 1998). Another study by DeLoache et al. (2010) showed that 12- to 18-month-old children who viewed a bestselling baby DVD with their parents who were interacting with them during the viewing learned more words than those who watched the DVD alone and those who did not watch the DVD.

JME has been found to be particularly beneficial for younger children. One study found that children above the age of 3 years were able to learn novel verbs from solitary exposure to video, but children below 3 years were only able to learn the verbs when video was supplemented by live social interaction from an adult in the same room (Roseberry et al., 2009). In a recent study, Strouse, Troseth, O’Doherty, and Saylor (2018) examined word learning in toddlers in four conditions: a contingent video chat with parent modelling, a contingent video chat with no parent modelling, a non-contingent pre-recorded video with parent modelling, and a non-contingent pre-recorded video with no-parent modelling. In the modelling conditions, parents faced the screen and modelled behaviours requested by an on-screen actress. This study found that the children in the two parent modelling groups had significantly higher scores on a word learning test than those in the two no-parent modelling groups. This finding highlights the significance of co-viewing in helping young children interpret communicative cues from contingent and non-contingent media.

Indeed, the level of interactivity associated with screen media co-viewing plays an important role in children’s learning outcomes, with a clear distinction between passive co-viewing and interactive co-viewing. As Richert, Robb, and Smith (2011) have noted, being with the children in the same room while the television is on does not equate with high-quality co-
viewing. A recent investigation examined the impact of three *Skype* video chat variables (co-viewer’s responsiveness, video chat partner’s eye gaze, and object similarity) on toddlers’ responsiveness to, and short-term learning from, video chats (Myers et al., 2018). The study found that co-viewer’s responsiveness was the most significant factor in facilitating children’s responsiveness and learning. Children with a responsive co-viewer remained attentive to the on-screen partner significantly longer and learned significantly more novel words than children with an unresponsive co-viewer (Myers et al., 2018). The findings highlight the important role that caregivers play in making co-viewing a language-rich, interactive social experience, just as they would when actively engaged in 3D play with their children (Lerner, 2017). Screens, in that sense, can be utilised as tools for learning and engagement (Learner, 2017; Takeuchi & Stevens, 2011).

JME can facilitate children’s learning from screens through several mechanisms. It creates an opportunity for joint attention, which is a fundamental process needed for early social, cognitive, and language development (Ahktar, Dunham, & Dunham, 1991; Bakeman & Adamson, 1984; Bates, 1979; Bruner, 1983; Scott et al., 2013; Tomasello, 1988, 1995). Joint attention can be defined as the state of shared focus among two individuals (e.g., a caregiver and a child) towards an object of mutual interest (Bakeman & Adamson, 1984; Bruner, 1975, 1983; Tomasello & Farrar, 1986) and is typically exhibited in early infancy through eye gaze shifting (Bakeman & Adamson, 1984). One study found that during co-viewing of child-oriented programmes, very young children followed their parents’ gaze to the screen (Demers, Hanson, Kirkorian, Pempek, & Anderson, 2013).

JME also influences children’s language outcomes indirectly through parent–child interactions, which are also critical for language development (e.g., Bornstein, Haynes, &
Co-viewing provides an opportunity for additional parental input with regard to verbal growth and language development (Richert et al., 2011). During co-viewing, caregivers often engage in interactive practices that foster children’s language and cognitive development, such as labelling new objects, engaging in back-and-forth interactions about the content being watched, requesting children to repeat words heard on the screen, explaining complex words and concepts, and relating media content to child’s prior knowledge and experience (Anderson & Hanson, 2017; Troseth, Russo, & Strouse, 2016). In addition, the new concepts, ideas, and vocabulary introduced by screen media are frequently picked up by caregivers, who incorporate them into their speech during and after the co-viewing (Anderson & Hanson, 2017).

Interestingly, a number of studies have found similarities between features of co-viewing and joint book reading, which is another significant predictor of language outcomes. Lemish and Rice (1986) reported that, similar to book-reading, co-viewing is an experience that provides opportunities for joint attention, elicits questions and verbal labelling, and prompts repetitions of adult utterances. Lemish and Rice (1986) identified four main themes that are found in both book-reading and co-viewing: designating, questioning, repetitions, and descriptions. Similarly, Barr et al. (2008) found that during co-viewing of baby DVDs, parents of children aged 12 to 18 months used the same types of speech that are usually used in shared book-reading (e.g., wh-questions, yes/no questions, direct requests, tag questions, and labels or descriptions).

Although the literature has provided some findings about the impact of TV and DVD co-viewing, very few studies have looked at the influence of mobile media co-engagement on children’s learning and development. In addition, previous work has mainly focused on
children’s co-viewing or co-using with adults rather than with peers. As Piotrowski (2017) has noted, understanding how children use screen media through the contextual contours of their daily routine can provide us with valuable information not only on the quantity or content of the screen media they view or use, but also on the subsequent effects screen media can have on them.

One study did examine the use of iPads by kindergarteners and its association with their academic performance (Blackwell, 2015 as cited in Lauricella et al., 2017, p. 30). In this study, subjects were divided into three groups (of six classrooms each). In Group 1, students shared iPads (2:1 ratio). In Group 2, each student had an iPad (1:1 ratio). In Group 3, no iPads were available. The study found that the students in the 1:1 classrooms did not differ from those with no iPads with regard to their Spring assessment test scores. However, the children in the shared condition performed significantly better compared to the other two groups (Blackwell, 2015 as cited in Lauricella et al., 2017, p. 30). Blackwell suggested that sharing the iPads with peers may have increased opportunities for scaffolding and peer-to-peer interactions, which may have helped learners better construct knowledge (Blackwell, 2015 as cited in Lauricella et al., 2017, p. 30).

Our review of the literature on the association between each of the three screen media use parameters (quantity, content, and context) and language development in young children has revealed a set of conditions that may be associated with more positive outcomes from screen media use by young children, particularly in relation to language learning outcomes: (a) a moderate amount of screen media exposure (specific to certain age groups); (b) an older onset age of screen media use (preferably after 2 years of age); (c) age-appropriate, educational, child-
directed content; (d) media content in the language spoken in the child’s community; and (e) co-viewing with a contingently responsive adult.

**Current Study**

The current study aims to fill some of the gaps in the literature on children’s screen media use. First, previous studies on young children’s exposure to screen media have mainly focused on television exposure, as mobile media use among children is a relatively recent phenomenon. Now that mobile media have become a major source of entertainment and learning for children, however, more recent studies that examine screen media exposure tend to focus only on mobile media, at the expense of TV exposure, despite the fact that children consume both mobile media and TV. Traditional forms of screen media (e.g., TV) are still an important component of the family media diet and should thus not be neglected when comprehensively investigating screen media exposure or its relation to developmental outcomes. Therefore in our study we attempted to account for a wide variety of screen media sources available in children’s households.

Second, most of the research efforts and public debates around the subject of children’s screen media use have primarily focused on quantity of screen media use. To better understand screen media use in children and its implications for their development, a more comprehensive approach is necessary, involving what Guernsey and Levine (2015) named the *three Cs* of media use – *content, context, and the child*.

Third, most of what we know about children’s screen media use and its relation to language development comes from Western cultures. Non-Western cultures are under-represented in the literature. The available data on screen media use in the Middle East and North Africa (MENA) region comes mostly from marketing and business reports that provide data on adult media users only. Saudi Arabia, a historically and demographically young country
with a population of 32 million, 40% of which are under the age of 20 (Saudi General Authority for Statistics, 2016), provides a good setting for studying media use in young children, as it is the largest media market in the MENA region. The country contributes to over one third of the MENA region’s media revenues (Dubai Press Club & Dubai Media City, 2016) and is the largest per capita consumer of YouTube videos, with more than 90 million views per day (Dubai Press Club & Dubai Media City, 2016; Smith, 2013). Despite the growing prevalence of, and access to, new media platforms in Saudi Arabia (Dubai Press Club & Dubai Media City, 2016; Northwestern University in Qatar, 2017), the increasing interest in adopting technology in education, and the country’s ambitious 2030 Vision, which aspires to invest in early childhood care and education (Saudi Council of Economic and Development Affairs, 2016), no previous studies have been conducted to examine the screen media use practices of young children in Saudi Arabia or the impact of these practices on children’s development.

This study seeks to address some of the limitations of previous literature and to contribute to this interdisciplinary line of research by investigating the association between screen media exposure (both TV and mobile media) and language development in Saudi toddlers. The study explores three parameters of screen media exposure: (1) quantity, (2) content, and (3) context, in order to ascertain the contribution of each to language outcomes in children aged 1 to 3 years.

Methods

Participants

The final sample in the present study consisted of 85 mothers of 1- to 3-year-old Saudi children residing in Saudi Arabia. The study started with an initial sample of 139 participants. Nearly 75% (n = 104) of the potential participants were eligible to participate in the study. Only
stay-at-home children (those who do not attend day care) were eligible to enter the study, as including children who attend day care would require us to collect information about their screen media use in day care in addition to their screen media use at home (which was beyond the aims and scope of the current study). A total of 35 potential participants were excluded for one or more of the following reasons: (a) the child was younger than 1 year or older than 3 years \((n = 9)\), (b) the child was not a Saudi citizen or was not a resident of Saudi Arabia \((n = 6)\), (c) the child was attending day care at the time of data collection \((n = 14)\), or (d) the child had health or developmental issues that may interfere with her/his media or linguistic environment (e.g., autism, hearing impairment, neurological disorder; \(n = 6)\).

Attrition rate was 18%. A total of 19 participants withdrew from the study. Six of these stopped responding to the Principal Investigator’s (PI) contacts, five completed one diary, but then asked to withdraw from the study, and nine withdrew from the study before completing any instruments, mostly due to lack of time. No demographic information was collected for the drop-out respondents prior to their withdrawal. The only information we had about the drop-out respondents and their children are the information provided in the Consent Forms (i.e., they were all mothers of the target children, and the children were all typically-developing, stay-at-home, 1- to 3-year-old Saudi citizens living in Saudi Arabia). Therefore, it was not possible to compare the drop-out respondents to the respondents in the final sample based on demographic variables.

The mean age of the children in the final sample was 24.92 months \((N = 85, SD = 7.67\) months). Twenty-one percent of the children were aged 12 to 16 months \((n = 18, M = 14.39\) months, \(SD = 1.33\) months), and 79% were aged 17 to 36 months \((n = 67, M = 27.75\) months, \(SD = 6.01\) months). Tables 4.1 and 4.2 provide details of the socioeconomic characteristics of the target children and their parents. The children in the sample were roughly evenly split between
males (54%) and females (46%). The majority of parents, especially mothers, had a college degree or above (mothers: 82%; fathers: 53%). Mothers were more highly educated than fathers, but their employment rate was lower. Almost all fathers in the sample were either full-time or part-time employed (99%), while about three quarters (74%) of the mothers were not. All the participants were native speakers of Arabic. The majority of the children were spoken to by their parents solely in Arabic (fathers: 94%; mothers: 74%). However, about one quarter (26%) of mothers spoke English in addition to Arabic to their children, compared to only 5% of the fathers. Almost half (47%) of the children in the sample were from lower-income families, more than a third (37%) were from middle-income families, and 17% were from higher-income families.
Table 4.1
Socioeconomic Characteristics of the Parents

<table>
<thead>
<tr>
<th>Parental SES variable</th>
<th>Mothers</th>
<th></th>
<th>Fathers</th>
<th></th>
</tr>
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<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td></td>
<td>n</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–29 years</td>
<td>53</td>
<td>62.35</td>
<td>19</td>
<td>22.35</td>
</tr>
<tr>
<td>30–39 years</td>
<td>31</td>
<td>36.47</td>
<td>50</td>
<td>58.82</td>
</tr>
<tr>
<td>40–49 years</td>
<td>1</td>
<td>1.18</td>
<td>15</td>
<td>17.65</td>
</tr>
<tr>
<td>Older than 50 years</td>
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<td>0.00</td>
<td>1</td>
<td>1.18</td>
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<tr>
<td><strong>Education</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>10</td>
<td>11.76</td>
<td>7</td>
<td>8.24</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>60</td>
<td>70.59</td>
<td>38</td>
<td>44.71</td>
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<tr>
<td>Some education after high school</td>
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<td>1.18</td>
<td>15</td>
<td>17.65</td>
</tr>
<tr>
<td>High school certificate (12 years of education)</td>
<td>13</td>
<td>15.29</td>
<td>20</td>
<td>23.53</td>
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<tr>
<td>Intermediate school certificate (9 years of education)</td>
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<td>Primary school certificate (6 years of education)</td>
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<tr>
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<tr>
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<td>11</td>
<td>12.94</td>
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<tr>
<td>Unemployed, looking for work</td>
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<tr>
<td>Unemployed, not looking for work</td>
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<td>24.71</td>
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<td>1.18</td>
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<tr>
<td>Student</td>
<td>12</td>
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<tr>
<td>Retired</td>
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<td>0.00</td>
</tr>
<tr>
<td>Disabled, not able to work</td>
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<td>0.00</td>
</tr>
<tr>
<td>Others</td>
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<td>0.00</td>
</tr>
<tr>
<td><strong>Language spoken with child</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic</td>
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<td>74.12</td>
<td>80</td>
<td>94.12</td>
</tr>
<tr>
<td>English</td>
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<td>0.00</td>
<td>1</td>
<td>1.18</td>
</tr>
<tr>
<td>Mixture of Arabic and English</td>
<td>22</td>
<td>25.88</td>
<td>4</td>
<td>4.71</td>
</tr>
</tbody>
</table>
Table 4.2

Socioeconomic Characteristics of the Households/Children

<table>
<thead>
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</tr>
</thead>
<tbody>
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<td></td>
</tr>
<tr>
<td>Riyadh, Saudi Arabia</td>
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<td>23.53</td>
</tr>
<tr>
<td>Jeddah, Saudi Arabia</td>
<td>43</td>
<td>50.59</td>
</tr>
<tr>
<td>Other, Saudi Arabia</td>
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<td>25.88</td>
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**Monthly household income**

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<td>Lower-income</td>
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<td>Middle-income</td>
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<tr>
<td>Higher-income</td>
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<td>16.47</td>
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**Availability of domestic helper nanny**

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<table>
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<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>24.71</td>
</tr>
<tr>
<td>No</td>
<td>64</td>
<td>75.29</td>
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**Child characteristics**

<p>| | | |</p>
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<thead>
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<tr>
<td><strong>Child’s age</strong></td>
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<td></td>
</tr>
<tr>
<td>12–16 months</td>
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<td>21.18</td>
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<tr>
<td>17–36 months</td>
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<td><strong>Child’s gender</strong></td>
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<td>Female</td>
<td>39</td>
<td>45.88</td>
</tr>
<tr>
<td>Male</td>
<td>46</td>
<td>54.12</td>
</tr>
</tbody>
</table>

*For the purpose of this study, lower-income was defined as families earning less than SAR 10,000 a month; middle-income was families earning between SAR 10,000 and SAR 19,999 a month, and higher-income was families earning over SAR 20,000 a month (SAR 1 = £0.185 as of June 1, 2016; SAR = Saudi Arabian Riyal). According to the Saudi General Authority for Statistics, the median monthly household income in 2013 was SAR 10,723 (The Saudi General Authority for Statistics, 2013).*

**Procedures**

All participation in this study was voluntary. Ethical approval for the study was received from the University of Manchester’s Ethics Review Board. Participants were recruited via several social media platforms, including WhatsApp, Twitter, Instagram, and Snapchat, as well as via word of mouth and paper flyers placed in public locations such as malls, schools, and hospitals. The posts shared on social media directed potential participants to a URL address that
presented the Participant Information Sheet (PIS) and the Consent Form (CF). The electronic flyers (images) that were posted on Instagram and Snapchat included the contact details of the PI and directed potential participants to contact the PI in order to learn more about and potentially join the study. The PI used the help of several social media influencers (CMIs) with interests in childhood issues, who believed in the aims of the study, to help promote the electronic flyers and the PIS/CF link. The social media platforms that were found to attract more participants in this study were Twitter and WhatsApp. The least effective recruitment method in this study was paper flyers placed in public locations. Incentives (book tokens) were offered to motivate participation in the study.

Prior to starting the study, the purpose of the research was clarified, and informed consent was obtained from all respondents. Primary caregivers who were interested in participating and who gave consent were asked to provide their contact information and invited to complete a weekly diary, a parent-reported language measure, and an online survey. All materials used in this study were administered in Arabic.

Each participant was sent (via email) a Home Literacy and Media Diary (described below), with detailed instructions on how to complete it as well as an example of a completed 1-day diary. Each participant was asked to complete seven daily diaries over a period of 7 weeks. Completed diaries were collected (via email or WhatsApp) from participants on a weekly basis. Completed diaries were regularly checked to address any immediate problems or incorrect entries. After completing the fourth diary, each participant was sent and asked to complete a hard copy of the language assessment tool discussed below – the JISH Arabic Communicative Development Inventory (JACDI; Dashash & Safi, 2014). The JACDI version sent to each participant depended on the age of their target child. JACDI – Words and Gestures (JACDI-
WG) forms were sent to caregivers of children aged 12 to 16 months, and JACDI – Words and Sentences (JACDI-WS) forms were sent to caregivers of children aged 17 to 36 months. Prior to completing the JACDI, participants were contacted by phone and were given instructions on how to complete it. After submitting the last diary, each participant was sent a link to complete the Home Literacy and Media Survey (described below) via the online data collection engine Survey Monkey. After completing the survey, participants were thanked for their participation.

The final sample was restricted to those participants who submitted at least two diaries representing at least one weekday and one weekend day, completed the language assessment tool, and completed the online survey. Out of the 85 participants in the final sample, 52 submitted seven diaries, 24 submitted two diaries, and nine submitted more than two but fewer than seven diaries.

Materials and Measures

In the present study, 85 participants completed three measures: (1) a diary, (2) a language assessment tool, and (3) a survey. Details of each measure are described below.

The Home Literacy and Media Diary (HLM Diary). The Home Literacy and Media (HLM) Diary (see Appendix C) is a 24-hour, event-based, parent-report diary that was adapted from the Child Development Supplement to the Panel Study of Income Dynamics (PSID-CDS; University of Michigan Institute for Social Research, 2014). The diary collects data on target children’s media use, reading, and play activities. The PSID-CDS time diary, as well as versions adapted from it, were used in several studies to track children’s daily activities and practices such as screen time, time with parents, reading time, and playing time (e.g., Hofferth, 2010; Hsin & Felfe, 2014; Vandewater, Bickham, & Lee, 2006; Vandewater, Shim, & Caplovitz, 2004; Zimmerman & Christakis, 2007). Time diaries have been shown to have greater validity and
reliability than other types of parents’ retrospective reports (Garrison, Liekweg, & Christakis, 2011; Vandewater, Bickham, & Lee, 2006; Vandewater, Shim, & Caplovitz, 2004; Vrotsou, Ellegård, & Cooper, 2009).

There are differences and similarities between the PSID-CDS time diary and the diary designed for the current study (HLM Diary). The PSID-CDS has a column with the question “What did your child do?”, which asks parents to identify the activity that the child was engaged in (e.g., TV watching, reading, playing). In the HLM Diary, there are three separate tables appearing on three separate pages: the first one was designed to collect TV viewing details, the second table assesses digital media details, and the third collects details about other activities children engaged in (e.g., reading, playing). Both the PSID-CDS diary and the HLM Diary ask questions about:

- the onset and offset times of each activity,
- where the child was when doing the activity,
- name of TV programme being viewed,
- people sharing the activity with the child, and
- people who were present but were not directly sharing the activity with the child.

In addition, the HLM Diary asks for details about TV viewing that are not included in the PSID-CDS:

- the name of the TV channel being watched,
- the language or language variety of the media content being viewed, and
- whether the person co-viewing media with the child was interacting with the child during co-viewing, and if yes, about what.
Another important distinction in the HLM Diary is a set of items that asks caregivers to provide specific details about their children’s digital media use. For example, caregivers were asked to specify:

- the types of devices used in each digital media use activity (e.g., tablets, smartphones, game consoles),
- the name of the application, software, or programme used,
- the use type (e.g., playing games, watching videos, browsing photos), and
- other questions similar to the questions asked for TV viewing (e.g., the language of the content being viewed, people sharing the activity with the child).

In the table that was designed to collect information about other activities children engaged in, caregivers were asked specific questions to identify the type of activity. For example, if the activity was reading, caregivers were asked to provide the title of the book that was read, who read to the child, in which language or language variety the book was written, and in which language or language variety the book was read.

The HLM Diary captures details associated with children’s media exposure by asking participants to report on several aspects, including: (1) the screen type used to view the media (e.g., TV, tablet, or smartphone); (2) the title of the media content viewed or used (e.g., *Barney & Friends*, *Iftah Ya Simsim*); (3) the name of the mobile media application used (e.g., *Lamsa*, *YouTube*); and (4) the language or language variety of the content viewed (e.g., Modern Standard Arabic, Saudi/Gulf Colloquial Arabic, English). Details of other home environment activities, specifically reading activities, that are captured by the diary include: (1) the title of the book read to the child, (2) the language of the book, and (3) the language or language variety that was used.
to read the book. The diary also captures details about the children’s play activities, including the type of play and whether it occurred indoors or outdoors. The diary also elicits contextual information such as: (1) *Where?* (i.e., where each activity took place); (2) *When?* (i.e., the starting and ending time of each activity); (3) *With whom?* (i.e., people sharing the activity with the child); and (4) *Who else was there?* (i.e., people who were there, but not directly sharing the activity with the child).

Our choice of the event-based diary method and data collection procedures was guided by the work of Ellis-Davies, Sakkalou, Fowler, Hilbrink, and Gattis (2012). Observational event-based diaries have been shown to be reliable and practical methodological tools that allow real-time recording of young children’s behaviour in their natural environments (Ellis-Davies et al., 2012). As Ellis-Davies et al. (2012) suggest, it is important to ensure the reliability of reporters when using diary methods. Low reliability could result from insufficient training of participants, from the onerous task of paper-and-pencil diaries, and from not entering reports at the requested times (Ellis-Davies et al., 2012). In the current study, we addressed these methodological challenges by providing caregivers with detailed instructions on how to complete the diaries, providing an example of a completed 1-day diary, and offering support online or via phone when needed by asking participants to contact the Principal Investigator at any time if they had any questions regarding the diary or any other part of the study. We also made sure to collect diaries each week and to monitor and assess diary entries as soon as they were received for compliance with instructions and for detecting and addressing any problems. Due to cost restrictions, we were unable to use electronic diaries similar to the ones used in Ellis-Davies et al. (2012). However, to reduce the onerous nature of completing paper-and-pencil diaries, the event-based questions used in the diaries were direct, clear, and accompanied by examples.
They also only required very short responses and were designed to help caregivers easily identify target activities and record them in real time.

Most of the studies that have used time-use or event-based diaries in examining children’s screen media exposure have required participants to complete their diaries for a single day or for one randomly chosen weekday and one randomly chosen weekend day (e.g., Barr, Danziger, Hilliard, Andolina, & Ruskis, 2010; Brown, Nicholson, Broom, & Bittman, 2011; Lapierre et al., 2012; Lauricella, Barr, & Calvert, 2014; Lillard, Drell, Richey, Boguszewski, & Smith, 2015; Linebarger, Barr, Lapierre, & Piotrowski, 2014; Mendelsohn et al. 2008; Tomopoulos et al., 2007; Vandewater, Shim, & Caplovitz, 2004). However, to ensure that our diaries accurately reflect children’s typical routines, we followed the Language Diary Model developed by De Houwer and Bornstein (2003) by having each participant complete one diary per week for a period of 7 weeks.

Each participant was asked to log their target child’s media use, reading, and play activities/behaviours as they occurred over the course of one chosen day each week for a period of 7 weeks. Participants were asked to choose a different day each week. For example, if a participant completed an HLM Diary on Monday of Week 1, she should complete an HLM Diary in Week 2 for a different day (e.g., Tuesday or Wednesday). Each participant’s completed weekly diaries should ideally have a total of 5 different weekdays and 2 different weekend days.

**The JISH Arabic Communicative Development Inventory (JACDI).** The JISH Arabic Communicative Development Inventory (JACDI; Dashash & Safi, 2014) is a standardised, norm-referenced measure designed to assess Saudi Arabic language development in infants and toddlers aged 8 to 36 months. It is the official Arabic adaptation of the MacArthur–Bates Communicative Development Inventories (CDI; Fenson et al., 1993; Fenson et al., 2007) – a

There are two separate forms of the JACDI that were designed for different age ranges. The JACDI – Words and Gestures (JACDI-WG) form is appropriate for use with 8- to 16-month-old children, while the JACDI – Words and Sentences (JACDI-WS) form is appropriate for use with 16- to 36-month-old children. For the purpose of this study, we used the JACDI-WG to assess the expressive and receptive vocabulary development of children aged 12 to 16 months ($n = 18$, $M = 14.39$ months, $SD = 1.33$ months), and we used the JACDI-WS to assess expressive vocabulary development and length of utterances produced among 17- to 36-month-olds ($n = 67$, $M = 27.75$ months, $SD = 6.01$ months).

The Home Literacy and Media Survey (HLM Survey). The Home Literacy and Media (HLM) Survey (see Appendix D) was used to collect demographic information about the target children and their parents, as well as information about the target children’s screen media and literacy environment (e.g., onset age of TV viewing and mobile media use, frequency of background TV in the household, number of children’s books at home). The HLM Survey consists of 84 questions. Nine survey items (i.e., Items No. 43, 47, 50, 51, 52, 53, 54, 61, and 62) were adapted from the Zero to Eight survey (Rideout, 2013). Four of the items regarding parents’ attitudes toward children’s media use and parental media mediation practices were adapted from the Common Sense Media Zero to Eight Survey (Rideout, 2013) and the Parenting in the Age of Digital Technology Survey (Wartella, Rideout, Lauricella, & Connell, 2014; i.e., Items No. 48, 63, 65, and 68). The remainder of the survey items were developed by the Principal Investigator. Items were presented in various formats including yes/no questions, checklists, open-ended questions, and Likert scales. Participants were asked to complete the
HLM Survey after submitting their diaries in an effort to ensure that the survey questions would not influence their diary entries.

Both data collection tools (the diary and the survey) were utilised to collect a wide range of information from the respondents. However, each one of the tools was used to address different specific questions. For example, the amount of foreground screen media exposure, the types of contents viewed on screens, details of the social context of screen media use, and the frequency of reading and play activities were all captured using the diary. However, some information was not possible to collect using the diary tool such as demographic information of children and their parents, the age at which children started using screens, and the number of books available at home. Therefore, the survey tool was used to collect these specific data.

To ensure content validity when designing the data collection tools for this study (the diary and the survey), previous research was reviewed, and instruments designed to assess similar topics were consulted. Following that, a list of survey and diary items that aimed to tap into the constructs of interest was generated. Three experts were sent copies of the survey and the diary and were asked to comment on inaccurate or ambiguous items, or items that they thought did not seem to measure the constructs of interest. Based on feedback received, modifications were made, and the final versions of the survey and the diary were developed. To ensure face validity, the survey and the diary were pilot-tested on a small group of Saudi mothers of 1- to 3-year-olds (n = 5) for clarity, readability, errors, and completion time, and changes were made accordingly.

**Analysis**

Statistical analysis was performed using the R statistical package (version 3.4.2). Descriptive statistics were used to assess measures of central tendency and variability.
examining the amount of time children spend using screens, we divided the children into two age groups based on international guidelines on screen time that make a distinction between screen time recommendations for children above and below 2 years. Thus, we divided the children here into a younger group aged 1 to 2 years \( n = 42, M = 18.17 \text{ months}, SD = 3.87 \text{ months} \) and an older group aged 2 to 3 years \( n = 43, M = 31.51 \text{ months}, SD = 3.61 \text{ months} \). Student’s t-test for independent samples was used to determine the significance of differences between these two age groups with regard to the amount of screen time. The significance level used was \( \alpha = .05 \). \( p \)-values were calculated when analysing differences between groups.

Regression analyses were utilised to answer our primary research question: which of the three parameters of screen media exposure (quantity, content, or context) is most predictive of language outcomes in children aged 1 to 3 years. For the regression analyses, we had to divide the sample differently, as explained earlier, based on the two JACDI versions used to assess the language outcomes. The sample was divided here into two age groups: younger children aged 12–16 months \( n = 18, M = 14.39 \text{ months}, SD = 1.33 \text{ months} \) and older children aged 17–36 months \( n = 67, M = 27.75 \text{ months}, SD = 6.01 \text{ months} \). In order to select the best regression model, we used stepwise model selection, which utilises the Akaike Information Criterion (AIC) to eliminate the non-significant predictors. In addition, we used the F-ratio test to help us decide whether to use the full or reduced model. The predictor and outcome variables are described below.

**Predictor variables.** Our main predictor variable was screen media exposure as measured by its quantity, its content, and its context. We were also interested in comparing the prevalence of screen media in children’s home environments with the prevalence of reading, which has been long regarded as the most substantial component of the HLE. This interest was motivated by the
displacement hypothesis (Mutz, Roberts, & van Vuuren, 1993; Neuman, 1988), which suggests that screen time displaces time spent in other language- and literacy-promoting activities, such as reading and play. Therefore, we included reading prevalence (as measured by the frequency of reading books to the target child and the number of books available for the child at home) as an additional variable to examine its relation to the main predictor variable and its impact on the outcome variables. In addition, family demographics and child gender were included in the model as predictors to explore their effects on the outcome variables.

The predictor variables were grouped into five broad composite categories: (1) screen media quantity, (2) screen media content, (3) screen media viewing context, (4) reading prevalence, and (5) family demographics. Gender was later added to the regression model as a factor. Table 4.3 provides more details on the variables included within each category and the scores that were assigned to each variable. Each composite category was given a composite global score. For the screen media categories, higher scores were given to conditions that have been described in the literature as “more positive” screen media viewing experiences. For example, a higher score was given to a child who views screens for less than 2 hours a day, who rarely has TV on at home when no one is watching, who started viewing screens after the age of 2, who watches child-directed educational content more than other content types, who mostly watches screen media content in her/his mother tongue, and who is mostly accompanied by an interacting adult while watching. With regard to the reading prevalence category, higher scores were given to conditions where reading was more frequent and children had access to more books at home. As for the family demographics category, higher scores were given to conditions where parents were more highly educated, were employed, and had higher monthly income.
**Screen media quantity.** In order to determine quantity of screen media exposure, we looked at three variables: (1) the average amount of time a child spends daily viewing screens (TV and mobile media devices), (2) the prevalence of background TV (which adds to the total screen media exposure time), and (3) the onset age of screen media viewing (TV and mobile media devices).

**Screen media content.** To determine quality of screen media content, we used three variables: (1) target audience (i.e., child-directed content vs. adult-directed content); (2) content genre (i.e., child-directed educational content, child-directed non-educational content, child-directed songs and rhymes); and (3) language/language variety of the content viewed (i.e., MSA, Saudi/Gulf Colloquial Arabic, Non-Saudi/Gulf Colloquial Arabic, English, no speech [silent, noise or music only]). For each child, we identified the most viewed/used screen media content type (i.e., the content type viewed/used for periods longer than the other types).

To decide whether a certain show was educational or non-educational, we used the Common Sense Media (CSM) evaluation of educational value for each show (Common Sense Media, 2017). CSM is a United States based organisation that aims at promoting safe technology use for children and empowering parents, teachers, and policymakers by providing them with information, advice, and tools (including reviews and ratings) to help them in making informed decisions regarding children’s media use (Common Sense Media, 2018). If a show was rated by CSM at least 3 out of 5 for educational value, it was considered educational. It is worth noting that most of the shows that Saudi children watch on TV and mobile media devices are international shows that are also aired on American and British channels, but are dubbed in Arabic. For the shows that could not be found on CSM (e.g., local shows and shows produced specifically for an Arabic-speaking audience), we viewed five different episodes or video clips of
each show and determined its educational value. We followed Zimmerman and Christakis’ (2007) method of content classification. Any show that was designed to have primarily educational value for children was considered educational. Any show that was designed to be primarily entertaining for children was considered non-educational (Zimmerman and Christakis (2007) used the term “other children’s shows”). Any show that was designed primarily for adults was considered adult-directed (called “grown-up programs” by Zimmerman and Christakis (2007)). Child-directed songs and rhymes included songs aired on Arabic children’s song TV channels (e.g., Toyor Al-Jannah, Karameesh, Noon, Canari), which can also be viewed on mobile media devices. They also included English nursery rhymes and children songs (e.g., songs on popular children YouTube channels such as Super Simple Songs, ChuChuTV, Little Baby Bum, Mother Goose Club, and Hoopla Kids).

**Screen media viewing context.** To determine the social context of viewing, we looked at two variables: (1) solitary viewing vs. co-viewing; and (2) interactive co-viewing (verbal interaction while co-viewing) vs. passive or silent co-viewing (no verbal interaction while co-viewing). Similar to how we calculated the most frequently viewed content types, for each child, we identified the most frequent type of viewing context based on the number of minutes that they engaged in each type. For example, if a child spent more time viewing media alone than co-viewing media with another person, their most frequent type of social context would be solitary viewing.

**Reading prevalence.** To determine the prevalence of reading in the child’s environment, we looked at two variables: (1) how often the child is read to at home; and (2) the number of books available to the child at home.
**Family demographics.** To assess family demographics, we looked at five variables: (1) mother’s educational attainment, (2) father’s educational attainment, (3) mother’s employment, (4) father’s employment, and (5) monthly household’s income.

The variables that were selected to make up the composite scores in each category were selected based on theoretical and empirical grounds. For example, based on the literature reviewed earlier, a later onset age of screen media exposure is associated with better language development and, therefore, was assigned a higher score in the measure. Similarly, increased amounts of foreground and background screen media exposure are associated with lower language outcomes and, thus, they were both assigned lower scores than decreased amounts of exposure. Watching content in a language that is the same as, or close to, the language of the viewer (e.g., Saudi or Gulf Arabic dialects for Saudi viewers) is expected to be more comprehensible and, as a result, has higher potential of positively affecting children’s first language development than a language that is not comprehensible or not often spoken in the child’s immediate environment (e.g., English for Arabic-monolingual Saudi viewers). Therefore, languages and language varieties that are similar or close to the language of Saudi children were given higher scores than language varieties that are likely to be less comprehensible. Similarly, having more books at the child’s home and reading more frequently to the child have also been found to be positive predictors of children’s early language development and, thus, were assigned higher scores than having fewer books or being read to less frequently.
Table 4.3

Broad Composite Categories of the Predictor Variables

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<th>Source</th>
<th>Score</th>
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<th>3</th>
<th>4</th>
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<tr>
<td>Overall screen time</td>
<td>Diary</td>
<td>-</td>
<td>&gt; 2 hours</td>
<td>≤ 2 hours</td>
<td>0 hours (no use)</td>
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<td>Frequency of background TV</td>
<td>Survey (Item 65-10)</td>
<td>IDK</td>
<td>Often/Always</td>
<td>Rarely/Sometimes</td>
<td>Never</td>
<td>-</td>
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<tr>
<td>Onset age of TV viewing</td>
<td>Survey (Item 75)</td>
<td>-</td>
<td>≤ 12 months</td>
<td>13–24 months</td>
<td>≥ 25 months/Not yet</td>
<td>-</td>
</tr>
<tr>
<td>Onset age of mobile media use</td>
<td>Survey (Item 76)</td>
<td>-</td>
<td>≤ 12 months</td>
<td>13–24 months</td>
<td>≥ 25 months/Not yet</td>
<td>-</td>
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<td><strong>2. Media Content</strong></td>
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<tr>
<td>Most viewed content target audience</td>
<td>Diary</td>
<td>No use</td>
<td>Adult-directed</td>
<td>Child-directed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Most viewed content genre</td>
<td>Diary</td>
<td>No use</td>
<td>Child-directed non-educational/Child-directed songs</td>
<td>Child-directed educational</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Most viewed content language</td>
<td>Diary</td>
<td>No use</td>
<td>English/No speech</td>
<td>Colloquial non-Gulf Arabic</td>
<td>MSA</td>
<td>Colloquial Saudi or Gulf Arabic</td>
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<td><strong>3. Media Context</strong></td>
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<tr>
<td>Frequency of co-viewing TV</td>
<td>Diary</td>
<td>No use</td>
<td>Solitary viewing</td>
<td>With children</td>
<td>With adults</td>
<td>-</td>
</tr>
<tr>
<td>Frequency of co-using mobile media</td>
<td>Diary</td>
<td>No use</td>
<td>Solitary use</td>
<td>With children</td>
<td>With adults</td>
<td>-</td>
</tr>
<tr>
<td>Frequency of interaction while co-viewing</td>
<td>Diary</td>
<td>No use</td>
<td>No interaction</td>
<td>Interaction</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>4. Reading Prevalence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of books available to child</td>
<td>Survey (Item 41)</td>
<td>0 books</td>
<td>1-9 books</td>
<td>10-19 books</td>
<td>≥ 20 books</td>
<td>-</td>
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<td>Frequency of reading to child</td>
<td>Diary</td>
<td>Never</td>
<td>Once a week</td>
<td>Twice a week</td>
<td>3-5 times a week</td>
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<td><strong>5. Family Demographics</strong></td>
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<td>Mother’s education</td>
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<td>No schooling</td>
<td>Elementary, Intermediate</td>
<td>High school</td>
<td>Post HSC, Bachelor</td>
<td>Postgraduate degree</td>
</tr>
<tr>
<td>Father’s education</td>
<td>Survey (Item 19)</td>
<td>No schooling</td>
<td>Elementary, Intermediate</td>
<td>High school</td>
<td>Post HSC, Bachelor</td>
<td>Postgraduate degree</td>
</tr>
<tr>
<td>Mother’s employment</td>
<td>Survey (Item 14)</td>
<td>Not employed</td>
<td>Student</td>
<td>Employed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Father’s employment</td>
<td>Survey (Item 20)</td>
<td>Not employed</td>
<td>Student</td>
<td>Employed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Monthly household income</td>
<td>Survey (Item 26)</td>
<td>&lt;SR 10,000</td>
<td>SR 10,000 to 19,999</td>
<td>≥ SR 20,000</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note. NA = Not applicable; IDK = I don’t know; MSA = Modern Standard Arabic; HSC = High School Certificate.*
**Outcome variables.** The outcome variables for this study were derived from the JACDI. For the children aged 12 to 16 months ($n = 18$, $M = 14.39$ months, $SD = 1.33$ months), the outcome variables were expressive and receptive vocabulary size as measured by the JACDI-WG. For the children aged 17 to 36 months ($n = 67$, $M = 27.75$ months, $SD = 6.01$ months), we used the JACDI-WS to assess language outcomes. The first language outcome we looked at for this age group was expressive vocabulary size (i.e., the number of words produced). Because the JACDI-WS does not assess receptive vocabulary for children above 16 months, we decided to use the mean length of the three longest utterances (M3L) as the second language outcome measure for this age group. In this part of the tool, the mean length of the three longest utterances children produced (based on examples provided by their parents) is calculated. The rules we followed for utterance segmentation and for determining the number of morphemes per utterance were based on previous work on computing the Mean Length of Utterance (MLU; e.g., Brown, 1973; Miller, 1981; Khater & Shaalan, 2007; Shaalan, 2009), as well as the JACDI User Manual (Dashash & Safi, 2014). The mean length of utterance (MLU) is a measure of expressive language skills that is used frequently within both clinical and research settings (Kaiser & Roberts, 2011) and is considered a useful index of grammatical and morpho-syntactic development (Dethorne, Johnson, & Loeb, 2005; Hoff, 2009).
Results

Descriptive Statistics

Quantity of screen media exposure.

Quantity of foreground screen media exposure. Based on the diary data, compared to time spent in shared-book reading and indoor play and/or outdoor play, screen media viewing/using was the most prevalent activity among Saudi young children (Figure 4.1). Children in the sample (including those who had never engaged in one or more of the activities) spent an average of 149.26 minutes (SD = 108.32 minutes) daily exposed to screens (TV: M = 84.11 minutes, SD = 63.24 minutes; mobile media: M = 65.12 minutes, SD = 78.96 minutes). They only spent an average of 7.77 minutes (SD = 16.01 minutes) a day in shared-book reading, and an average of 134.79 minutes (SD = 79.39 minutes) a day in play (indoor play: M = 118.44 minutes, SD = 74.35 minutes; outdoor play: M = 16.35 minutes, SD = 26.13 minutes).

![Figure 4.1. Children's time spent on daily activities.](image)

The boxplots in Figure 4.2 show the distribution of time spent in different activities (including children who were never engaged in any of the activities). It should be noted that 7%
of the children in the sample had never watched TV, 14% had never viewed mobile media, 2% were never exposed to screen media (TV and mobile media), 60% were never read to, and 47% had never played outdoors. When mothers were asked in the survey about their evaluation of their children’s screen time (Survey items No. 57 and 59), the majority indicated that their children watch TV and use mobile media “moderately” or “rarely” (TV: 79%; mobile media: 72%).

![Distribution of time children spent in activities](image)

*Figure 4.2. Distribution of time children spent in activities. Includes children who had never engaged in one or more of these activities. The bold horizontal lines represent median values. MM = Mobile media.*

Given that many international bodies distinguish in their guidelines between children above and below the age of 2 years, we compared the two age groups with regard to their screen media viewing times. Ninety-five percent of all children below 2 in the sample and 91% of all children above 2 in the sample exceeded the American Academy of Pediatrics’ screen time recommendations for their age. Student’s t-test for independent samples was conducted to compare screen time in younger children aged 1 to 2 years (n = 42, M = 18.17 months, SD = 3.87 months) and in older children aged 2 to 3 years (n = 43, M = 31.51 months, SD = 3.61 months). The test showed that older children viewed TV and used mobile media devices significantly more frequently than younger children (see Table 4.4). The test was performed on all children.
including those who never used screens. Seven percent of the children aged 1–2 years in the sample never watched TV, 19% never used mobile media, and 5% never used screens of either type. On the other hand, 7% of the children aged 2–3 years in the sample never watched TV, 10% never used mobile media, and 0% never used screens of either type.

Table 4.4

*Time Spent Viewing/Using Screens Across Age Groups*

<table>
<thead>
<tr>
<th></th>
<th>1–2 Year Olds</th>
<th>2–3 Year Olds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( n = 43 )</td>
<td>( n = 42 )</td>
</tr>
<tr>
<td>TV time</td>
<td>69.19 54.18</td>
<td>98.67 68.51</td>
</tr>
<tr>
<td>Mobile media time</td>
<td>48.10 60.30</td>
<td>81.74 91.36</td>
</tr>
<tr>
<td>Overall screen time</td>
<td>117.24 86.43</td>
<td>180.53 118.95</td>
</tr>
</tbody>
</table>

*Note. Includes children who never used screens.*

*\( p < .05 \) **\( p < .01 \)

_Prevalence of background screen media exposure._ Over half of the mothers (59%) indicated that TV was “often” (32%) or “always” (27%) left on in the background at their homes even if no one was actually watching it (see Figure 4.3; Survey item No. 65 [sub-item No. 10]).

*Figure 4.3. Background TV screen exposure.*
Onset age of screen media exposure. The average age of starting to watch TV among 1- to 3-year-old children was about 13 months ($M = 12.76; SD = 7.38$), while the average age of starting to view or use mobile media was about 18 months ($M = 17.82; SD = 7.43$). Fifty-six percent of the children in the sample started watching TV at the age of 2 years or earlier, and 78% started using mobile media at the age of 2 years or earlier (Survey item No. 75 and 76).

Content of screen media exposure.

Quality of screen media content based on target audience. Based on the diary data, children in the sample watched child-directed media more than adult-directed media on both screen types (TV: 83%; mobile media: 87%; see Figure 4.4).

![Figure 4.4. Use of screen media content based on target audience.](image)

Quality of screen media content based on content genre. Figure 4.5 shows that the most viewed media content genre on all screens, as per the diary data, was child-directed non-educational content (viewed the most by 56% of the sample), followed by children’s songs and rhymes (Arabic songs on TV and Arabic and English songs on mobile media, viewed the most
by 35% of the sample). The most frequently viewed content genre on TV alone was child-directed non-educational content (55%), which was the most frequently viewed content type among only 24% of mobile media users. Child-directed educational programming was more often viewed on mobile media screens (13%) than on TV screens (5%). The most frequently viewed content type on mobile media devices was children’s songs and rhymes (44%), viewed the most on TV by 40% of the sample. Two additional content genres were included when exploring the types of content young children viewed on mobile media devices: unboxing videos and browsing photos and videos, as we found that these are additional genres children frequently view on mobile media devices. Browsing photos and videos on mobile media devices was the most frequently viewed content on mobile media devices in 13% of the sample, while watching unboxing videos was the most frequently viewed content in 7% of the sample.

![Figure 4.5. Use of screen media content based on screen media content genre.](image)

**Quality of screen media content based on its language variety.** As shown in Figure 4.6, the diary data showed that the most viewed language variety on TV was MSA (58% vs. 32% among mobile media users), followed by Non-Saudi/Gulf Colloquial Arabic (22% vs. 5% among
mobile media users). The most viewed language variety on mobile media devices was English (37%), while only 6% of TV was viewed in this language.

Figure 4.6 shows that co-viewing/co-using screens with mothers was the most frequent type of viewing among both TV viewers (55%) and mobile media users (43%) as per the diary data. On all screen types, co-viewing media with fathers was not the most frequent type of viewing for any of the children in the sample. Co-viewing/co-using media with both parents was the most frequent form of viewing in 12% of TV viewers, while no mobile media users were found to have co-viewing with both parents as being the most frequent type of viewing. Co-viewing was more frequent on all screen types than solitary media use. Solitary viewing/using was far more common in mobile media use (36%) than in TV viewing (3%).
Interactive co-viewing vs. passive co-viewing. Passive co-viewing of TV was more common than interactive co-viewing, as the diary data revealed that it was the most frequent type of co-viewing in 73% of the sample. No comparable data was available for mobile media co-use.

Prevalence of shared-book reading. Reading to young children in our sample was very infrequent as per the diary data. Nearly two thirds (60%) of the mothers in this study “never” read to their children, and only 9% read to their children every day (see Figure 4.8). In addition, over one third (34%) of the children in the sample had no books at home (see Figure 4.9; Survey item No. 41).
Figure 4.8. Frequency of reading to young children.

Figure 4.9. Number of books available to the children at home.
Regression Analyses

Table 4.5 and Table 4.6 show the descriptive statistics for the composite measures and outcome variables that were included in the regression models for each age group.

Table 4.5

Descriptive Statistics for the Composite Measures and Outcome Variables Included in the Regression Models for Children Aged 12 to 16 Months

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Min</th>
<th>Q1</th>
<th>Mdn</th>
<th>M</th>
<th>Q3</th>
<th>Max</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of words produced</td>
<td>4.00</td>
<td>8.25</td>
<td>15.00</td>
<td>23.33</td>
<td>40.50</td>
<td>55.00</td>
<td>18.37</td>
</tr>
<tr>
<td>No. of words understood</td>
<td>15.00</td>
<td>57.50</td>
<td>113.00</td>
<td>133.67</td>
<td>169.75</td>
<td>360.00</td>
<td>104.40</td>
</tr>
<tr>
<td>Composite Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite score of media quantity</td>
<td>5.00</td>
<td>7.00</td>
<td>8.00</td>
<td>8.17</td>
<td>9.00</td>
<td>12.00</td>
<td>1.65</td>
</tr>
<tr>
<td>Composite score of media content</td>
<td>4.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.21</td>
<td>6.00</td>
<td>7.00</td>
<td>0.89</td>
</tr>
<tr>
<td>Composite score of media context</td>
<td>5.00</td>
<td>6.00</td>
<td>7.00</td>
<td>6.82</td>
<td>8.00</td>
<td>8.00</td>
<td>1.25</td>
</tr>
<tr>
<td>Composite score of reading prevalence</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>2.00</td>
<td>4.00</td>
<td>7.00</td>
<td>2.14</td>
</tr>
<tr>
<td>Composite score of family demographics</td>
<td>6.00</td>
<td>8.25</td>
<td>10.00</td>
<td>9.61</td>
<td>11.00</td>
<td>13.00</td>
<td>1.79</td>
</tr>
</tbody>
</table>

Note. Min = Minimum; Q1 = 1st Quartile; Mdn = Median; M = Mean; Q3 = 3rd Quartile; Max = Maximum; SD = standard deviation.

Table 4.6

Descriptive Statistics for the Composite Measures and Outcome Variables Included in the Regression Models for Children Aged 17 to 36 Months

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Min</th>
<th>Q1</th>
<th>Mdn</th>
<th>M</th>
<th>Q3</th>
<th>Max</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of words produced</td>
<td>21.00</td>
<td>98.50</td>
<td>272.00</td>
<td>322.24</td>
<td>503.00</td>
<td>837.00</td>
<td>243.92</td>
</tr>
<tr>
<td>M3L</td>
<td>1.00</td>
<td>2.00</td>
<td>3.00</td>
<td>3.43</td>
<td>4.00</td>
<td>11.00</td>
<td>2.15</td>
</tr>
<tr>
<td>Composite Measure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite score of media quantity</td>
<td>4.00</td>
<td>6.00</td>
<td>7.00</td>
<td>6.73</td>
<td>8.00</td>
<td>12.00</td>
<td>1.47</td>
</tr>
<tr>
<td>Composite score of media content</td>
<td>3.00</td>
<td>5.00</td>
<td>6.00</td>
<td>5.39</td>
<td>6.00</td>
<td>7.00</td>
<td>1.02</td>
</tr>
<tr>
<td>Composite score of media context</td>
<td>3.00</td>
<td>5.00</td>
<td>6.00</td>
<td>5.88</td>
<td>7.00</td>
<td>8.00</td>
<td>1.36</td>
</tr>
<tr>
<td>Composite score of reading prevalence</td>
<td>0.00</td>
<td>0.00</td>
<td>1.00</td>
<td>1.96</td>
<td>3.00</td>
<td>7.00</td>
<td>2.14</td>
</tr>
<tr>
<td>Composite score of family demographics</td>
<td>5.00</td>
<td>8.00</td>
<td>9.00</td>
<td>8.82</td>
<td>10.00</td>
<td>14.00</td>
<td>1.93</td>
</tr>
</tbody>
</table>

Note. Min = Minimum; Q1 = 1st Quartile; Mdn = Median; M = Mean; Q3 = 3rd Quartile; Max = Maximum; SD = standard deviation; M3L = The mean length of the three longest utterances
Younger children: 12 to 16 months. As described above, we conducted a multiple linear regression examining the association between the predictors and the number of words produced by children aged 12 to 16 months. The multiple linear regression was fitted to estimate the degree of influence of each predictor on the number of words produced by the children who were 16 months or younger. Table 4.7 shows the parameter estimates of the fitted model.

Table 4.7
Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 12 to 16 Months: Full Model

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-86.207</td>
<td>50.321</td>
<td>-1.713</td>
<td>0.162</td>
</tr>
<tr>
<td>Media quantity</td>
<td>2.335</td>
<td>5.310</td>
<td>0.439</td>
<td>0.683</td>
</tr>
<tr>
<td>Media content</td>
<td>2.629</td>
<td>8.921</td>
<td>0.295</td>
<td>0.783</td>
</tr>
<tr>
<td>Media context</td>
<td>9.348</td>
<td>7.399</td>
<td>1.263</td>
<td>0.275</td>
</tr>
<tr>
<td>Reading prevalence</td>
<td>-0.413</td>
<td>4.318</td>
<td>-0.096</td>
<td>0.928</td>
</tr>
<tr>
<td>Family demographics</td>
<td>2.277</td>
<td>3.799</td>
<td>0.599</td>
<td>0.581</td>
</tr>
<tr>
<td>Gender</td>
<td>-5.626</td>
<td>12.565</td>
<td>-0.448</td>
<td>0.678</td>
</tr>
</tbody>
</table>

*Note. B = unstandardised coefficient; SE = standard error.*

The F-ratio test indicated no significant difference between the full model including the predictors in Table 4.5 and the null model, $F(6, 4) = 1.35, p = .401$. The stepwise regression retained screen media context only in the regression model. This simple linear model gave the lowest AIC of 57.59. The adjusted $R^2$ values for the full regression model ($R^2_{\text{Adjusted}} = 0.175$) and the reduced regression model ($R^2_{\text{Adjusted}} = 0.488$) indicated that no additional information was explained by adding other variables to the reduced model, $F(6, 10) = 0.32, p = .880$. Hence, the reduced regression model was a better fit than the full model.

Table 4.8 shows the parameter estimates of the reduced model. Screen media context contributed significantly to explaining the variation in the number of words produced by the
younger children group. The number of words produced is expected to increase by 10.37 words with a one-unit increase in the composite score of screen media context. This effect is significant at $\alpha = .05$. In other words, the more that caregivers co-engaged with their children in viewing/using screen media and the more they interacted with them while co-viewing, the higher the expressive vocabulary scores their children got on the JACDI-WG.

Table 4.8

*Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 12 to 16 Months: Reduced Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$B$</th>
<th>$SE$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-45.134</td>
<td>22.114</td>
<td>-2.041</td>
<td>0.072</td>
</tr>
<tr>
<td>Media context</td>
<td>10.366</td>
<td>3.195</td>
<td>3.245</td>
<td>0.010**</td>
</tr>
</tbody>
</table>

*Note. $B =$ unstandardised coefficient; $SE =$ standard error.*

*p $\leq .05$. **$p \leq .01$.

Next, we ran a multiple linear regression to examine the association between the predictors and the number of words understood by children aged 12 to 16 months. The multiple linear regression was fitted to the data of the younger children to estimate the degree of influence of each predictor on the number of words that these children understood. The parameter estimates of the model are shown in Table 4.9. $p$-values for all predictions showed non-significant effects.
Table 4.9

Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Understood by Children Aged 12 to 16 Months: Full Model

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-86.404</td>
<td>320.447</td>
<td>-0.270</td>
<td>0.801</td>
</tr>
<tr>
<td>Media quantity</td>
<td>-10.432</td>
<td>33.816</td>
<td>-0.308</td>
<td>0.773</td>
</tr>
<tr>
<td>Media content</td>
<td>-29.708</td>
<td>56.811</td>
<td>-0.523</td>
<td>0.629</td>
</tr>
<tr>
<td>Media context</td>
<td>85.671</td>
<td>47.116</td>
<td>1.818</td>
<td>0.143</td>
</tr>
<tr>
<td>Reading prevalence</td>
<td>-3.597</td>
<td>27.495</td>
<td>-0.131</td>
<td>0.902</td>
</tr>
<tr>
<td>Family demographics</td>
<td>-8.725</td>
<td>24.192</td>
<td>-0.361</td>
<td>0.737</td>
</tr>
<tr>
<td>Gender</td>
<td>-23.390</td>
<td>80.013</td>
<td>-0.292</td>
<td>0.785</td>
</tr>
</tbody>
</table>

Note. $B = \text{unstandardised coefficient}; SE = \text{standard error}.$

The F-ratio test indicated no significant difference between the fitted regression model and the null model, $F(6, 4) = 1.58, p = .344$. As was the case for the regression model with the number of words produced, we found, using stepwise selection, that the best model was the model which only had screen media context as a predictor ($AIC = 97.77$). The adjusted $R^2$ values for the full model ($R^2_{\text{Adjusted}} = 0.257$) and the reduced model ($R^2_{\text{Adjusted}} = 0.56$) indicated that the reduced model was a better fit in describing the variation in the number of words understood by the younger children group. There was no significant difference between the full model and the reduced model, which indicates that the additional variables in the full model did not contribute to explaining the variation in the response, $F(6, 10) = 0.26, p = .912$. In addition, the F-ratio test for the reduced model indicated a significant difference against the null model at significance level $\alpha = .05$, $F(1, 9) = 13.79, p = .005$.

Table 4.10 shows the parameter estimates of the reduced model. Screen media context contributed significantly to explaining the variation in the number of words understood by the younger children group. A one-unit increase in the composite score of screen media context is expected to increase the number of words understood by 73.67 words.
Table 4.10

*Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Understood by Children Aged 12 to 16 Months: Reduced Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-341.831</td>
<td>137.329</td>
<td>-2.489</td>
<td>0.035*</td>
</tr>
<tr>
<td>Media context</td>
<td>73.669</td>
<td>19.841</td>
<td>3.713</td>
<td>0.005**</td>
</tr>
</tbody>
</table>

*Note. B = unstandardised coefficient; SE = standard error.*

*p ≤ .05. **p ≤ .01.

**Older children: 17 to 36 months.** As described above, we conducted a multiple linear regression examining the association between the predictors and the number of words produced by children aged 17 to 36 months. A multiple linear regression was fitted to estimate the degree of influence of each predictor on the raw number of words produced by these children. Table 4.11 presents the effect of each predictor on the number of words produced, as described by the full multiple regression model.

Table 4.11

*Multiple Linear Regression Coefficients for the Association Between the Predictors and the Number of Words Produced by Children Aged 17 to 36 Months: Full Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>-345.094</td>
<td>240.491</td>
<td>-1.435</td>
<td>0.158</td>
</tr>
<tr>
<td>Media context</td>
<td>73.669</td>
<td>19.841</td>
<td>3.713</td>
<td>0.005**</td>
</tr>
</tbody>
</table>

*Note. B = unstandardised coefficient; SE = standard error.*

*p ≤ .05. **p ≤ .01.
The F-ratio test was used to compare the contribution of the full regression model in describing the relationship between the response and the independent variables against the null model. A significant difference was found, $F(6, 49) = 6.43, p < .001$. A stepwise regression was carried out to select variables that decreased the AIC value. The lowest AIC value (594.84) was obtained when child gender was removed from the model. To compare regression models with different numbers of predictors, the adjusted $R^2$ was obtained. The adjusted $R^2$ values suggest that the reduced model ($R^2_{\text{Adjusted}} = 0.382$) describes the variation in the raw number of words produced slightly better than the full model ($R^2_{\text{Adjusted}} = 0.372$). There was no significant difference between the full model and the reduced model, $F(1, 59) = 0.21, p = .646$.

Table 4.12 presents the effects of each predictor on the number of words produced, as described by the reduced multiple regression model. Screen media quantity, screen media viewing context, and reading prevalence contributed significantly to explaining the variation in the number of words produced by the older children group. The screen media quantity score had the largest positive impact on the number of words produced. More specifically, the number of words produced is expected to increase by 68.63 words with a one-unit increase in the screen media quantity composite score. In other words, the less that children aged 17 to 36 months were exposed to foreground and background screen media and the older they were when they started viewing screens, the higher expressive vocabulary scores they achieved. Reading prevalence also showed a significant positive association with the number of words produced. A one-unit increase in the reading composite score is expected to increase the number of words produced by 40.70 words. In addition, and unexpectedly, screen media viewing context showed a significant negative association with the number of words produced by children aged 17 to 36 months.
Finally, we conducted a multiple linear regression for the association between the predictors and the M3L produced by children aged 17 to 36 months. The regression was fitted to estimate the degree of influence of each predictor on the mean length of the three longest utterances (M3L) produced by children aged 17 to 36 months. Table 4.13 presents the effect of each predictor on the M3L produced, as described by the full multiple regression model.

Table 4.13

Multiple Linear Regression Coefficients for the Association Between the Predictors and M3L Produced by Children Aged 17 to 36 Months: Full Model

<table>
<thead>
<tr>
<th>Predictor</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>1.695</td>
<td>2.249</td>
<td>0.753</td>
<td>0.455</td>
</tr>
<tr>
<td>Media quantity</td>
<td>0.416</td>
<td>0.197</td>
<td>2.109</td>
<td>0.040*</td>
</tr>
<tr>
<td>Media content</td>
<td>0.269</td>
<td>0.236</td>
<td>1.141</td>
<td>0.259</td>
</tr>
<tr>
<td>Media context</td>
<td>-0.622</td>
<td>0.184</td>
<td>-3.382</td>
<td>0.001**</td>
</tr>
<tr>
<td>Reading prevalence</td>
<td>0.356</td>
<td>0.114</td>
<td>3.126</td>
<td>0.003**</td>
</tr>
<tr>
<td>Family demographics</td>
<td>0.054</td>
<td>0.123</td>
<td>0.439</td>
<td>0.663</td>
</tr>
<tr>
<td>Gender</td>
<td>0.116</td>
<td>0.498</td>
<td>0.235</td>
<td>0.815</td>
</tr>
</tbody>
</table>

Note. B = unstandardised coefficient; SE = standard error.

*p ≤ .05. **p ≤ .01. ***p ≤ .001
The F-ratio test indicated a significant improvement in the prediction of the fitted regression model against the null model, \( F(6, 49) = 4.97, \ p < .001 \). Using stepwise selection, we found that dropping screen media content, child gender, and demographics gave the best model (the lowest AIC value of 69.09). The adjusted \( R^2 \) values suggest that the reduced model (\( R^2_{\text{Adjusted}} = 0.32 \)) was slightly better than the full model (\( R^2_{\text{Adjusted}} = 0.30 \)) in describing the variation of the M3L. There was no significant difference between the full model and the reduced model, \( F(3, 59) = 0.51, \ p = .676 \).

Table 4.14 shows the parameter estimates of the reduced model. As shown in the table, the parameter estimates of all variables in the reduced model are significant at \( \alpha = .05 \). The screen media quantity score and the reading prevalence score both had positive effects on the M3L outcomes, while the screen media context score had a negative effect. A one-unit increase in the composite score of screen media quantity and reading prevalence is expected to increase the M3L by 0.4 words and 0.38 words, respectively. A one-unit increase in the screen media context composite score is expected to decrease the M3L by 0.61.

Table 4.14

*Multiple Linear Regression Coefficients for the Association between the Predictors and M3L Produced by Children Aged 17 to 36 Months: Reduced Model*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>( B )</th>
<th>( SE )</th>
<th>( t )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Intercept)</td>
<td>3.642</td>
<td>1.501</td>
<td>2.426</td>
<td>0.019*</td>
</tr>
<tr>
<td>Media quantity</td>
<td>0.402</td>
<td>0.194</td>
<td>2.073</td>
<td>0.043*</td>
</tr>
<tr>
<td>Media context</td>
<td>-0.606</td>
<td>0.180</td>
<td>-3.373</td>
<td>0.001***</td>
</tr>
<tr>
<td>Reading prevalence</td>
<td>0.379</td>
<td>0.110</td>
<td>3.453</td>
<td>0.001***</td>
</tr>
</tbody>
</table>

*Note. \( B \) = unstandardised coefficient; \( SE \) = standard error.*

\*\( p \leq .05 \). **\( p \leq .01 \). ***\( p \leq .001 \)
Discussion

The primary research question of the current study focused on ascertaining the contribution of each of the three screen media use parameters (quantity, content, and context) in predicting language outcomes among children under 3. Our analysis showed that screen media context was the most significant predictor of language development in 12- to 16-month-olds. Screen media context, as measured by the frequency of interactive joint media engagements with children, correlated positively with the number of words these children produced and understood. The more caregivers engaged with their young children in viewing or using screen media and the more they verbally interacted with them while co-viewing, the higher the expressive and receptive vocabulary scores on the JACDI-WG. Interestingly, we found that the context of screen media viewing was even more predictive of expressive and receptive vocabulary development than reading to children within the 12 to 16-month age group.

Our findings regarding the significant role of the social context of screen media viewing adds to emerging evidence suggesting a positive association between interactive Joint Media Engagement (JME) and early language development (e.g., American Academy of Pediatrics, 2016; Anderson & Hanson, 2017; Courage, 2017; Myers et al., 2018; Nikken & Schols, 2015; Piotrowski, 2017; Strouse et al., 2013). It is well known that parent–child interactions are exceptionally important for early language development (e.g., Bornstein et al., 1998; Hart & Risley, 1975, 1995; Huttenlocher et al., 1991; McGee, Krantz, & McClannahan, 1985; Rodriguez & Tamis-LeMonda, 2011). Therefore, maintaining positive caregiver–child interactions through verbally interacting during and/or after co-viewing can mitigate adverse effects of screen media use on early language development. Screens, in that sense, can be utilised as prompts for additional, more diverse parent–child interactions. This reasoning helps
explain why we see some negative effects of screen media exposure on young children’s language development. Such effects are likely due, at least in part, to situations where screen time distracts both children and caregivers and decreases caregiver–child interactions (e.g., Christakis et al., 2009; Hudon et al., 2013; Kirkorian et al., 2009; Pempek et al., 2014; Radesky et al., 2014; Vandewater et al., 2006).

The observed positive relationship between interactive joint media engagements and language outcomes in younger children could be caused by other variables that were not measured or controlled for in this study. For example, the quantity and quality of parent-child interactions in general which may transfer to screen-oriented interactions is one possible explanation. It could be the case that parents who interact with their children during joint media engagements are actually the parents who are generally more talkative and who direct more language to their children whether during joint media engagements or at other times.

Among the older children within our sample (17- to 36-month-olds), screen media quantity had the highest impact on expressive vocabulary scores and the mean length of the three longest utterances they produced (M3L), as assessed by the JACDI-WS. Screen media quantity, as measured by the amount of time a child spends daily viewing screens, the prevalence of background TV in the child’s environment, and the onset age of screen media viewing, correlated negatively with the number of words older children produced and the M3L as measured by the JACDI-WS. This finding supports previous research indicating a negative association between amount of screen time and language outcomes (e.g., Becker, 2013; Chonchaiya & Pruksananonda, 2008; Duch et al., 2013; Tomopoulou, et al., 2010).

One unanticipated finding of this study was that, unlike its positive relation to language outcomes in younger children, screen media context was negatively correlated with the number
of words produced by children older than 16 months. Our study did not review details of the interactional features of parental talk while co-viewing. It may be that parents interact differently with older children than they do with younger children. This variation may help explain the different results for children older than 16 months compared to those who are younger. In fact, previous research has indicated that features of parent–child interactions while co-viewing vary depending on several factors, including the types of screen media content and the child’s age, and that this variation in parental speech has been linked to differences in outcome measures (Barr et al., 2008; Demers et al., 2013; Fender, Richert, Robb, & Wartella, 2010; Fidler, Zack, & Barr, 2010; Mendelsohn et al., 2008; Mendelsohn et al., 2010; Reiser, Tessmer, & Phelps, 1984; Reiser, Williamson, & Suzuki, 1988; Strouse et al., 2013). For example, Sims and Colunga (2013) found that parents of 30- to 36-month-old children used four types of speech when talking to their children during co-viewing: tag questions, label elicitation and feedback, narrating, and wh-questions and explicit labelling. These researchers found that co-viewing was associated with children’s negative word learning outcomes only when parents used more narrating during the co-viewing (Sims & Colunga, 2013). Similarly, it is possible that certain interactional features that caregivers in our sample used when co-viewing with their older children might have contributed to the more negative language outcomes.

When co-engaging with screens, the children in our sample usually co-viewed TV or co-used mobile media with their mothers or siblings. Interestingly, fathers’ engagement with their children in co-viewing screens was almost non-existent. This confirms cultural norms in Saudi Arabia, where mothers are often most involved in child rearing, while fathers are the primary breadwinners (Al-Maadadi & Ilkhlef, 2015; Hossain & Juhari, 2015; Kurdahi Zahr & Hattar-Pollara, 1998). The present study also found that solitary screen media viewing/using is more
common for mobile media than it is for TV. This could be attributed to the nature of portable handheld devices, which are specifically designed for individual use.

The type of screen media content (the screen media’s target audience, educational value, and content language) was not significantly correlated to any of the language outcomes in our sample. Of course, there are other variables that could have been included within the content parameter and could have shown different results. For instance, we did not examine the formal features of the content viewed (e.g., fast motion, rapid pacing, visual special effects, frequent camera cuts, loud music, non-speech vocalisations), the interactivity and contingency features of the content viewed, or the language- and literacy-promoting strategies employed in the content viewed. To examine these variables, a more detailed qualitative mult-imodal content analysis needs to be undertaken.

This study provides new information on the quantity, content, and context of screen media use by Saudi young children that is specifically relevant to Saudi parents and policymakers. Our findings confirm those of Alroqi et al. (2018a), showing that Saudi children spend more time viewing and using screens than is recommended by international bodies (e.g., American Academy of Pediatrics, 2016). Children aged 1 to 3 years in our sample spent an average of 2 hours and 29 minutes viewing screens per day. Children below 2 years in the sample exceeded the American Academy of Pediatrics screen time recommendations as they viewed screens for an average of 1 hour and 57 minutes more than the recommended time (i.e., zero hours). Children aged 2 to 3 years in the sample viewed screens for an average of 3 hours a day, which is 2 hours more than the recommended time for their age (i.e., 1 hour a day). These results are consistent with those of Al-Agha, Nizar, and Nahhas (2016), who found that the majority of Saudi children aged 2 to 18 years in their study spent more than 2 hours per day
watching TV and using electronic devices. In addition to the amount of time children spent in foreground screen media use, background TV exposure was also high in our sample as the majority of caregivers indicated that television was left on in their homes all or most of the time even if no one was watching it. However, this is in contrast with the results on the onset age of TV viewing that were reported by caregivers in another question (the onset age of TV viewing was 13 months). It seems that what parents reported when they were asked about the onset age was when their children started paying attention to TV and actively watching it, not merely being exposed to it at home.

There are concerns that the increasing use of technology is leading to a notable decline in reading and play among children (American Academy of Pediatrics, 2016; Anderson & Subrahmanyam, 2017; Chaudron, 2015; Clements, 2004; Frost, 2012; Hofferth, 2010; Holloway, Green, & Livingstone, 2013; Marsh et al., 2015; Seo & Lee, 2017). In the current study, we found that screen time was the most prevalent activity among Saudi children under 3 years of age when compared to time spent in reading or playing outdoors which are two activities that have been found in the literature to support language development. It has been well established that reading is one of the HLE components that is most significantly positively linked with concurrent and long-term literacy and language outcomes (e.g., Bus et al., 1995; Evans, Shaw, & Bell, 2000; Farrant & Zubrick, 2012; Foy & Mann, 2003; Frijters et al., 2000; Lonigan & Whitehurst, 1998; Ninio, 1983; Payne et al., 1994; Scarborough & Dobrich, 1994; Snow, 1983; Whitehurst & Lonigan, 1998). In addition, research has shown that outdoor play and direct experiences in outdoor settings foster opportunities for child-directed speech, verbal communications, and language development (e.g., Cameron-Faulkner, MacDonald, Serratrice, Melville, & Gattis, 2017; Cameron-Faulkner, Melville, & Gattis, 2018; Davis & Waite, 2005;
Unfortunately, confirming our findings in Alroqi et al. (2018a), we found that reading to young children was very infrequent within the current sample. We also discovered that playing outdoors was low among the children in our sample, which could be attributed to the hot weather in the country and the lack of green space, parks, and outdoor play areas. Although our findings are not able to shed light on whether the increased screen media use directly displaces time spent reading and playing outdoors, our results regarding the discrepancies between time spent on these activities warrant further investigation.

With regard to the quality of screen media content viewed, we found that the Saudi children in our sample watched child-directed media more than adult-directed media and were exposed to non-educational material, both on TV and mobile media screens, more than educational material. According to the daily programme schedules published on the websites of Arabic child-directed TV channels (e.g., MBC3, Spacetoon, Ajyal), the majority of these channels show non-educational child-directed programmes more than educational ones. So, it may not be the case that children or their caregivers necessarily prefer to view non-educational content; rather, this type of content represents what is easily accessible and commonly available.

There are a number of key strengths associated with the current study. First, most previous studies on children’s screen media use and its impact on language development have used either expressive or receptive vocabulary scores as a measure of language development. The current study used both expressive and receptive vocabulary measures in addition to a third language assessment measure: the mean length of the three longest utterances (M3L). To the best of our knowledge, no prior studies on children’s screen media use and language
development have used M3L or the mean length of utterance (MLU) as a measure of language development.

Second, this is one of few studies that have attempted to provide a comprehensive understanding of children’s screen media exposure by taking into account the three parameters of quantity, content, and context. Third, this study used an extended version of detailed weekly diaries over a period of 7 weeks to track children’s screen media use. Most event-based and time-use diary studies have utilised only 1 to 2 days of data and assumed they were representative of other weekdays. Finally, the current study is the first to examine the impact of screen media use on young children’s language development in Saudi Arabia.

There are several limitations to this study. First, parent-report measures, in general, are susceptible to socially desirable answers, recall bias, and memory lapses (Byeon & Hong, 2015; Duch et al., 2013; Neumann, 2014; Sudman & Bradburn, 1973; Tourangeau, Rips, & Rasinski, 2000). However, event-based and time-use diaries have been found to be less subject than retrospective interviews or surveys to these drawbacks (Anderson, Field, Collins, Lorch, & Nathan, 1985; Burton & Nesbit, 2015; Ellis-Davies et al., 2012; Huston, Wright, Rice, Kerkman, & St. Peters, 1990). In addition, we instructed parents to make sure they record their children’s activities in the diaries as they happen, which further prevents potential inaccuracies associated with this method of data collection. By virtue of the study design, associations that were found do not confirm the existence of causal relationships between the screen media parameters examined and language outcomes. In addition, the contradictory results found between the two age groups with regard to the association between the social context of media use and language outcomes call for further research on this topic. Sample size was another limitation in this study that could have impacted the results, especially within the under 16-month-old age group.
Finally, we did not ask parents to report in the diaries whether they verbally interacted with their children during co-viewing of mobile media. This data point would have been valuable for the study and should be included in any future research on this topic.

Conclusion

The main goal of the current study was to determine which of the three parameters of screen media exposure (quantity, content, and context) is more significant in predicting language development in children under 3 years of age. Two key findings were obtained. First, we discovered that the context of the screen media viewing experience, as measured by the frequency of interactive joint media engagements with the child, plays a larger role than the quantity of media exposure or the quality of the media content viewed in the language development of children under 16 months. Second, we found a negative association between quantity of screen time and language outcomes in children above 16 months of age. This finding highlights the influence of the sheer volume of screen media time over and above the other variables studied.

In today’s rapidly changing media landscape, understanding children’s media use patterns (especially in the early critical developmental years) and examining their association with children’s health and development are of extreme importance. This study aimed to provide a more comprehensive picture of the screen media environment of young children by considering the quantity of the time spent with traditional and new media, a number of content features of the screen media available to children, and the social context of screen media engagements among Saudi children. While the American Academy of Pediatrics and other similar international bodies provide clear guidelines and recommendations on screen media use by children, no such
recommendations are offered in Saudi Arabia. Therefore, the findings from this study present important implications for developing up-to-date, research-driven recommendations for this population. Given the high frequency of non-educational screen media use among young children in the country, app and media producers should be encouraged to provide Saudi and Arabic-speaking children with age-appropriate digital books and high-quality educational screen media materials that can support their development.
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associated with less parent–child shared reading aloud and teaching activities?

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Appendices

APPENDIX A. Paper 3 - Participant Information Sheet

APPENDIX B. Paper 3 - Consent form

APPENDIX C. Paper 3 - Weekly Diary

APPENDIX D. Paper 3 - Study Survey

APPENDIX E. Paper 3 - Study Recruitment Flyer

APPENDIX F. Paper 3 - Letter to gatekeeper
Appendix A. Paper 3 - Participant Information Sheet

Title of the research: The Impact of Media Viewing on the Language Development of Young Saudi Children

Introduction

You are being invited to take part in a research study as part of a doctoral thesis in the School of Arts, Languages and Cultures at the University of Manchester.

The researcher is interested in exploring the impact of Saudi children’s literacy environment and media viewing habits on the children’s language development. Studies suggest that the children’s literacy environment as well as media exposure play a significant role in the language development of the children and so it is essential to understand this role. Studies on the association between media exposure and language development in specific are scarce generally and in Saudi Arabia in particular.

Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for your time.

What will my child and I be asked to do?

The study has two parts.

Part 1: Investigating media use in the home

If you and your child take part, you will be asked to complete:

1. A Home Literacy and Media Diary which is a diary that is filled out once a week for a period of seven weeks. It should take approximately thirty minutes every week to complete. The diary aims at gathering information about the amount of time the child usually spends in different activities including playing, reading, watching TV, and using electronic media such as smartphones, tablets and computers.
2. A Home Literacy and Media Survey which is completed once at the end of the study and should take fifteen minutes to complete. In the questionnaire, parents will be asked questions related to demographic data, languages used in the home, media devices available to the target child, and your attitude toward media viewing.
Part 2: Child language development measure

The second part of the study involves assessing your child’s language and communication skills. Once the diary and the survey are completed, you will be asked to complete a parent-report instrument that is designed to assess young children’s language skills.

Where will the study take place?
The diary and the survey should be completed by the parent at the child’s home. The language assessment tool will also be given to the parents to complete at home.

Will my data and my child’s data be confidential?
Yes, only the researcher and the supervisors will have access to the data. All data will be kept strictly confidential and stored securely on password protected computers and lockable cabinets. Any identifying information will be removed from the data if they are used in research publications. Consent forms and data will be held, under the responsibility of the principal investigator for 10 years following completion of the study for publishing purposes and will be stored in lockable file and then destroyed by a shredder.

Do my child and I have to take part?
It is up to you and your child to decide whether or not to take part. If you and your child decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you and your child decide to take part you are still free to withdraw at any time and without giving a reason, and, if you wish, your data will be destroyed. If your child does not want to participate, s/he will not be included, even though you have given your consent for you and your child to participate.

Benefits and risks
There are no direct benefits to you and your child participating in this study. However, both children and parents generally indicate their enjoyment for taking part in such studies, and are generally enthusiastic about taking part in research on child development. The results of the research are expected to give parents information on language development and on its relationship to media viewing that they may find relevant.

Similarly, there are no direct risks to taking part in the study either. Your child will not be required to do any tasks and will not be approached or observed by the researcher. If your child demonstrates any form of reluctance, s/he will not be required to take part.

In order to compensate you for your and your child’s time and inconvenience, if you participate in this research, you will receive a SR 30 book token (£ 5) that can be used at a local bookstore.

Insurance and compliance
If you have a concern about any aspect of this study, you should ask to speak to the principal investigator, Haifa Alroqi, via Mobile Number +966-531666108 or email: haifa.alroqi@postgrad.manchester.ac.uk, who will do her best to answer your questions. If you have questions at any time about the study or the procedures, you may also contact the research main supervisor, Dr Thea Cameron-Faulkner via phone at +44 (0)161 275-3192 or via email at t.cameron@manchester.ac.uk. If the principal investigator and the main supervisor are unable to resolve your concern or you wish to make a complaint regarding the study, please contact a University of Manchester Research Practice and Governance Co-ordinator on +44 (0)161 275 7583 or +44 (0)161 275 8093 or by email to research-governance@manchester.ac.uk. Finally, if your child is harmed in any way by taking part in this study the University of Manchester has an insurance policy for both negligent and non-negligent harm. Insurance enquiries should be addressed to the Insurance Office, Room MLG.006, John Owens Building, The University of Manchester, Oxford Road, Manchester, M13 9PL, +44 (0)161 275 2243.
Where can I obtain further information if I need it?
If you require any further details, please contact the principal investigators, Haifa Alroqi, via Mobile Number +966-531666108 or email: haifa.alroqi@postgrad.manchester.ac.uk

This project has been approved by

the University of Manchester’s Ethics Review Board
Appendix B. Paper 3 - Consent Form

SCHOOL OF ARTS, LANGUAGES AND CULTURES

CONSENT FORM

Title of Project: The Impact of Media Viewing on the Language Development of Young Saudi Children

The parent should complete the following part of this sheet him/herself

please delete as necessary and initial

1. Have you read the Participant Information Sheet? YES/NO
   Initials:……

2. Have you received enough information about the study? YES/NO
   Initials:……

3. Do you consent to completing a weekly diary as detailed in the Participant Information Sheet? YES/NO
   Initials:……

4. Do you consent to completing a questionnaire as detailed in the Participant Information Sheet? YES/NO
   Initials:……

5. Do you consent to completing a child language assessment tool as detailed in the Participant Information Sheet? YES/NO
   Initials:……

6. Do you understand that you and your child do not need to take part in the study and if either of you do not want to you are both free to withdraw:
   • at any time,
   • without having to give a reason for withdrawing
   • and without detriment to you and your child? YES/NO
   Initials:……

7. I agree to take part in the above project. YES/NO
   Initials:……

Name of child: ........................................... Child’s DOB ............................................................
Name of parent: ........................................... Date: ............................ Signature:.................................
Parent’s Mobile Number: .............................. Parent’s Email Address: ...............................
Name of researcher: ................................. Date: ............................ Signature:.................................

This project has been approved by
the University of Manchester’s Ethics Review Board

335
Appendix C. Paper 3 - Weekly Diary

HOME LITERACY AND MEDIA DIARY

<table>
<thead>
<tr>
<th>Child’s Name:</th>
<th>Diary ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETED BY:</td>
<td>COLLECTED BY:</td>
</tr>
<tr>
<td>Day:</td>
<td>Date:</td>
</tr>
<tr>
<td>Date:</td>
<td></td>
</tr>
</tbody>
</table>
Introduction

An important part of our research, as detailed in the Parent Information Sheet, is to find out how children aged 1 to 3 years old spend time during the week and on the weekends. The Home Literacy and Media Diary will help us collect the most accurate information possible. The diary is a tool that is meant to give a fairly comprehensive picture of the home environment of the child listed on the front cover. The aim is to measure the amount of time the child usually spends in different activities including playing, reading, watching TV, and using electronic devices such as smartphones, tablets and computers.

Please read the instructions below for guidance on how to complete the diary.

Instructions

☞ Please fill out the diary once a week: first on a Sunday, then on a Monday (8 days later), then on a Tuesday (again 8 days later), and so on until a 'week' has been filled (in real time, a language and media diary covers 7 weeks).
☞ Please fill out the diary for the day of the week specified on the front cover.
☞ Please fill out the diary for the child listed on the front cover.
☞ The diary is divided into three parts (Part 1: TV Viewing, Part 2: Electronic Media Use, and Part 3: Other Activities). For each day, please fill out the three parts together.
☞ Please indicate who was doing the activity with the child and who else was in the same location (but not doing the activity with the child).
☞ Please indicate if the child was doing any other activity at the same time.
☞ Please fill out the diary for the entire day, starting from the time the child wakes up until the time the child goes to bed.
☞ For examples of possible answers, please read the blue text in the box under each column title.
☞ The researcher will be glad to help you with any questions or problems you may have in completing the diary. Please send the diary back to your researcher every Saturday (via email, WhatsApp, or any other communication method agreed with the researcher).
☞ On the following two pages, you will find some examples of daily activities and how they would be filled out for this diary. Please note that the following scenario is only an example of how to fill out a diary. It may not be at all reflective of a day in the life of your child.

For further help or explanation, please do not hesitate to contact the researcher, Haifa Alroqi, at haifa.alroqi@postgrad.manchester.ac.uk or Mobile Number +966 531666108.
<table>
<thead>
<tr>
<th>Where was the child?</th>
<th>Name of TV Channel</th>
<th>Title of Programme/ Movie/ Cartoon</th>
<th>Language/ Dialect of the Material Viewed</th>
<th>Time Began</th>
<th>Time Ended</th>
<th>With whom was the child watching TV?</th>
<th>Was the co-viewer(s) talking to the child while watching? If yes, about what?</th>
<th>Who else was there but not directly involved in TV viewing?</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the living room</td>
<td>Baraem</td>
<td>Teela wa Toola</td>
<td>Modern Standard Arabic</td>
<td>10:25AM</td>
<td>10:45AM</td>
<td>sister and brother</td>
<td>Yes, about the show</td>
<td>Domestic helper</td>
<td></td>
</tr>
<tr>
<td>In the living room</td>
<td>Toyor Aljannah</td>
<td>Baba Jbli Ballon</td>
<td>Jordanian Arabic</td>
<td>10:45AM</td>
<td>10:48AM</td>
<td>X</td>
<td>X</td>
<td>Domestic helper</td>
<td></td>
</tr>
<tr>
<td>In the living room</td>
<td>Toyor Aljannah</td>
<td>Ya baba asnani wawa</td>
<td>Jordanian Arabic</td>
<td>10:48AM</td>
<td>10:51AM</td>
<td>X</td>
<td>X</td>
<td>Domestic helper</td>
<td></td>
</tr>
<tr>
<td>In the living room</td>
<td>MBC 1</td>
<td>Sabah Alkhair Ya Arab</td>
<td>Saudi Arabic &amp; Gulf Arabic</td>
<td>11:06AM</td>
<td>12:00PM</td>
<td>mother</td>
<td>No, they were watching silently</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### Part 2: Electronic Media Use

<table>
<thead>
<tr>
<th>Where was the child?</th>
<th>Device Type Used</th>
<th>Name of the Application Viewed</th>
<th>Name of the Content Viewed</th>
<th>Using Type</th>
<th>Language/ Dialect of the Material Viewed/Used</th>
<th>Time Began</th>
<th>Time Ended</th>
<th>With whom was the child viewing/ playing?</th>
<th>Who else was there but not directly involved in viewing/ playing?</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the child’s room</td>
<td>iPhone</td>
<td>YouTube</td>
<td>Hameedo</td>
<td>Watching a video</td>
<td>Jordanian Arabic</td>
<td>9:30AM</td>
<td>9:45AM</td>
<td>X</td>
<td>The domestic helper was dressing the child</td>
<td>The domestic helper was feeding the child his breakfast</td>
</tr>
<tr>
<td>In the bedroom</td>
<td>iPad</td>
<td>Angry Birds</td>
<td>X</td>
<td>Playing games</td>
<td>X</td>
<td>9:45AM</td>
<td>10:15AM</td>
<td>X</td>
<td>The domestic helper was feeding the child his breakfast</td>
<td>The domestic helper was feeding the child his breakfast</td>
</tr>
<tr>
<td>In the car</td>
<td>iPhone</td>
<td>Photo library</td>
<td>Phone pictures</td>
<td>Viewing photos</td>
<td>X</td>
<td>12:00PM</td>
<td>12:05PM</td>
<td>Sister</td>
<td>Driver, Mother</td>
<td></td>
</tr>
<tr>
<td>In his aunt’s bedroom</td>
<td>Laptop</td>
<td>YouTube</td>
<td>Hippy Happy – Haifa Al Turk</td>
<td>Watching a video</td>
<td>Gulf Arabic</td>
<td>12:30PM</td>
<td>12:35PM</td>
<td>X</td>
<td>Driver, Mother</td>
<td></td>
</tr>
</tbody>
</table>
### Part 3: Other Activities

<table>
<thead>
<tr>
<th>Where was the child?</th>
<th>What other activities did the child engage in?</th>
<th>Title of the book/story</th>
<th>Language/Dialect used in the activity</th>
<th>Time Began</th>
<th>Time Ended</th>
<th>With whom was the child doing the activity?</th>
<th>Who else was there but not directly involved in activity?</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>e.g., In the living room, in her/his bedroom, in the parents’ bedroom, in the car, at the mall.</td>
<td>e.g., Playing with blocks, playing with dolls, reading a story, playing football outdoor, going to a theme park.</td>
<td>If the activity was reading, give the title of the book (e.g., Natharat Jaddati, Barney Goes to the Dentist, Alarnab Wa Assulhafoh). If the activity was not reading, put X.</td>
<td>e.g., Modern Standard Arabic, English, Hijazi Arabic, Najdi Arabic. If there were no sounds during the activity, put X.</td>
<td>e.g., 5PM</td>
<td>e.g., 6:30PM</td>
<td>Role of the person(s) involved (e.g., Mother, Nanny, Sister, Friends, Brothers). If no one was sharing the activity with the child, put X</td>
<td>e.g., Father, Grandmother, Sister, Father &amp; Brother.</td>
<td>Add any additional notes</td>
</tr>
<tr>
<td>In the grandparent’s living room</td>
<td>Playing with blocks</td>
<td>X</td>
<td>X</td>
<td>12:13pm</td>
<td>12:20pm</td>
<td>X</td>
<td>Grandmother, Grandfather, Mother, Sister</td>
<td></td>
</tr>
<tr>
<td>In the grandparent’s living room</td>
<td>Reading a story</td>
<td>Chooobi Mareeth</td>
<td>Hijazi Arabic</td>
<td>12:20pm</td>
<td>12:25pm</td>
<td>Aunt</td>
<td>mother</td>
<td>The aunt was reading the story. The story is written in Modern Standard Arabic but was read by the aunt in Hijazi Arabic.</td>
</tr>
<tr>
<td>At the playground</td>
<td>Playing football</td>
<td>X</td>
<td>Hijazi Arabic</td>
<td>5:00 pm</td>
<td>5:15 pm</td>
<td>Father and brother</td>
<td>mother</td>
<td></td>
</tr>
<tr>
<td>At the mall</td>
<td>Playing at the kids zone</td>
<td>X</td>
<td>Hijazi Arabic &amp; English</td>
<td>6:00pm</td>
<td>7:00pm</td>
<td>sister</td>
<td>The domestic helper</td>
<td>The workers at the kids zone were mainly Indians speaking English with the kids</td>
</tr>
</tbody>
</table>
# Part 1: TV Viewing

<table>
<thead>
<tr>
<th>A1</th>
<th>B1</th>
<th>C1</th>
<th>D1</th>
<th>E1</th>
<th>F1</th>
<th>G1</th>
<th>H1</th>
<th>I1</th>
<th>J1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where was the child?</td>
<td>Name of TV Channel</td>
<td>Title of Programme/Movie/Cartoon</td>
<td>Language/Dialect of the Material Viewed</td>
<td>Time Began</td>
<td>Time Ended</td>
<td>With whom was the child watching TV?</td>
<td>Was the co-viewer talking to the child while watching? If yes, about what?</td>
<td>Who else was there but not directly involved in TV viewing?</td>
<td>Additional Notes</td>
</tr>
<tr>
<td>e.g., In the living room, in her/his bedroom, in the parents’ bedroom, in the car, at the mall.</td>
<td>e.g., Baraem, MBC3, Toyor Al-Jannah, Al Arabiya, Dubai TV.</td>
<td>e.g., Dora the Explorer, Tom &amp; Jerry, Mama Jabt Baby, 8 O’clock with Dawood, Arabs Got Talent.</td>
<td>e.g., Modern Standard Arabic, English, Hijazi Arabic, Najdi Arabic. If there was no language (only music, no sound, mute), put X</td>
<td>e.g., SPM</td>
<td>e.g., 6:30 PM</td>
<td>Role of the person(s) involved (e.g., Mother, Nanny, Sister.). If no one was watching with the child, put X.</td>
<td>e.g., Yes, about the programme/ Yes, about other topics/ No, watching silently. If no one was watching with the child, put X.</td>
<td>e.g., Father, Grandmother, Sister, Father &amp; Brother. If no one was there, put x.</td>
<td>Add any additional notes</td>
</tr>
<tr>
<td>A2</td>
<td>B2</td>
<td>C2</td>
<td>D2</td>
<td>E2</td>
<td>F2</td>
<td>G2</td>
<td>H2</td>
<td>I2</td>
<td>J2</td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Where was the child?</td>
<td>Device Type Used</td>
<td>Name of the Application Viewed</td>
<td>Name of the Content Viewed</td>
<td>Using Type</td>
<td>Language/Dialect of the Material Viewed/Used</td>
<td>Time Began</td>
<td>Time Ended</td>
<td>With whom was the child viewing/playing?</td>
<td>Who else was there but not directly involved in viewing/playing?</td>
</tr>
<tr>
<td>e.g., In the living room, in her/his bedroom, in the parents’ bedroom, in the car, at the mall.</td>
<td>e.g., Tablet, Smartphone, iPhone, iPad, Galaxy Note, Laptop, Desktop.</td>
<td>e.g., YouTube, Minecraft, Subway Surfers, Photo Library.</td>
<td>e.g., A song from Karameesh, An Episode of Barney &amp; Friends, A football match, phone pictures, phone videos. If it is clear from the name of the application, put X.</td>
<td>e.g., Watching videos, playing games, viewing pictures, surfing internet.</td>
<td>e.g., Modern Standard Arabic, English, Hijazi Arabic, Najdi Arabic. If there is no language (e.g., only music, no sound, mute), put X.</td>
<td>e.g., 5PM</td>
<td>e.g., 6:30PM</td>
<td>e.g., Father, Grandmother, Sister, Father &amp; Brother. If no one was there, put X.</td>
<td>Add any additional notes</td>
</tr>
<tr>
<td>A3</td>
<td>B3</td>
<td>C3</td>
<td>D3</td>
<td>E3</td>
<td>F3</td>
<td>G3</td>
<td>H3</td>
<td>I3</td>
<td></td>
</tr>
<tr>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td><strong>Where was the child?</strong></td>
<td><strong>What other activities did the child engage in?</strong></td>
<td><strong>Title of the book/story</strong></td>
<td><strong>Language/Dialect used in the activity</strong></td>
<td><strong>Time Began</strong></td>
<td><strong>Time Ended</strong></td>
<td><strong>With whom was the child doing the activity?</strong></td>
<td><strong>Who else was there but not directly involved in activity?</strong></td>
<td><strong>Additional Notes</strong></td>
<td></td>
</tr>
<tr>
<td>e.g., In the living room, in her/his bedroom, in the parents’ bedroom, in the car, at the mall.</td>
<td>e.g., Playing with blocks, playing with dolls, reading a story, playing football outdoor, going to a theme park.</td>
<td>If the activity was reading, give the title of the book (e.g., Natharat Jaddati, Barney Goes to the Dentist, Alarnab Wa Assulhafa.). If the activity was not reading, put X.</td>
<td>e.g., Modern Standard Arabic, English, Hijazi Arabic, Najdi Arabic. If there were no sounds during the activity, put X.</td>
<td>e.g., 5PM</td>
<td>e.g., 6:30PM</td>
<td>Role of the person(s) involved (e.g., Mother, Nanny, Sister, Friends, Brothers.). If no one was sharing the activity with the child, put X</td>
<td>e.g., Father, Grandmother, Sister, Father &amp; Brother.</td>
<td>Add any additional notes</td>
<td></td>
</tr>
</tbody>
</table>
Please answer the following questions:

1. How typical was this day (for that day of the week specified on the front cover)?

(Please Mark an X in the Box)

<table>
<thead>
<tr>
<th>Very Typical</th>
<th>Not At All Typical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

2. On what date did the diary activities take place?

_______ (DAY) _______ (MONTH) _______ (YEAR)

3. On what date did you fill out this diary?

_______ (DAY) _______ (MONTH) _______ (YEAR)

4. How long did it take you to fill out this diary?

______________ (minutes)

THANK YOU!

345
Appendix D. Paper 3 - Study Survey

Home Literacy & Media Survey

Thank you for agreeing to take part in this survey which is conducted as part of a research project aiming to explore the literacy and media environment of young Saudi children.

All of your answers and comments will remain confidential and anonymous. If you have any questions about the survey, please contact the Principal Investigator, Haifa Alroqi (Mobile: +966-531666108/ Email: haifa.alroqi@postgrad.manchester.ac.uk).

A. Demographic Information

1. Name of child to which this form applies .................................................................

2. Child’s Gender: □ Female □ Male

3. Child’s Date of Birth? ........... / ........... / ...........
   (Day)  (Month)  (Year)

4. Child’s Place of Birth ............................................................................................  (City/ Country)

5. Your Name (Person filling out this form) ................................................................

6. Your email address ................................................................................................

7. Your phone number ..............................................................................................

8. Your relationship to the child: □ Mother □ Father □ Other, please specify ..............

9. How many other children do you have? (Put 0 if you have no other children)
   Boys ........... Girls ...........

10. What is your age?
    □ 17 or younger
    □ 18-20
    □ 21–24
    □ 25–29
    □ 30–34
☐ 35–39
☐ 40–44
☐ 45–49
☐ 50 or older

11. What is your place of birth? .................................................................

12. Which of the following best describes your current marital status?

☐ Single
☐ Married
☐ Widowed
☐ Divorced
☐ Separated

13. What is the highest level of school you have completed or the highest degree you have received?

☐ No schooling completed
☐ Elementary School Certificate
☐ Intermediate School Certificate
☐ High School Certificate
☐ Post HSC Diploma
☐ Bachelor degree
☐ Master degree
☐ Doctoral Degree
☐ Other, please specify ..............................................................................

14. Which of the following categories best describes your employment status?

☐ Employed, working full-time
☐ Employed, working part-time
☐ Businesswoman
☐ Not employed, currently looking for work
☐ Not employed, NOT currently looking for work
☐ Student
☐ Retired
☐ Disabled, not able to work
☐ Other, please specify ..............................................................................
15. In what language do you speak most often?

- Arabic
- English
- Other, please specify: .................................................................

16. Identify any other language(s) that you speak fluently: .................................................................

17. What is the age of the child’s father?

- 17 or younger
- 18-20
- 21–24
- 25–29
- 30–34
- 35–39
- 40–44
- 45–49
- 50 or older

18. What is the place of birth of the child’s father? ...........................................(Cit/ Country)

19. What is the highest level of school the father has completed or the highest degree he has received?

- No schooling completed
- Elementary School Certificate
- Intermediate School Certificate
- High School Certificate
- Post HSC Diploma
- Bachelor degree
- Master degree
- Doctoral Degree
- Other, please specify .................................................................

20. Which of the following categories best describes the father’s employment status?

- Employed, working full-time
- Employed, working part-time
- Not employed, currently looking for work
- Not employed, NOT currently looking for work
- Student
21. In what language does the father speak most often?
   □ Arabic
   □ English
   □ Other, please specify: ..................................................

22. Identify any other language(s) that the father speaks fluently: ...........................................

23. How many people live in your household (including the child)? ...........................................

24. How many children age 12 or younger live in your household (including the child)? ..............

25. What is the birth order of the child?
   □ Oldest
   □ Middle
   □ Youngest
   □ A multiple (e.g., a twin or triplet)
   □ Only
   □ Other, please specify: ..................................................

26. How much total combined money do all members of your household earn every month?
   □ SR 0 to SR1,999
   □ SR 2,000 to SR4,999
   □ SR 5,000 to SR9,999
   □ SR 10,000 to SR14,999
   □ SR 15,000 to SR19,999
   □ SR 20,000 to SR24,999
   □ SR 25,000 to SR29,999
   □ SR 30,000 to SR34,999
   □ SR 35,000 to SR39,999
   □ SR 40,000 and up

27. In which type of housing do you currently live?
   □ Villa
   □ Duplex
   □ Apartment
28. Which of the following best describes the type of tenure of your housing?

☐ Rented
☐ Owned
☐ Provided by employer
☐ Other, please specify: …………………………………….

29. What is the name of the district where you currently live? .................................... (District/ City)

B. The Child’s Health and Development

30. Were there any problems during pregnancy, birth, or right after the child was born? (premature, low birth weight, maternal infections, low Apgar, transfusion)

☐ No
☐ Yes
   If yes, please explain: …………………………………………………………………………………

31. Was the child delayed in any of the following?

☐ Babbling
☐ Talking
☐ Sitting
☐ Walking
☐ child was not delayed in any of the above

32. Do you have any concerns about your child’s hearing?

☐ No
☐ Yes
   If yes, please explain: …………………………………………………………………………………

33. Do you have any concerns about your child’s speech/language development?

☐ No
☐ Yes
   If yes, please explain: …………………………………………………………………………………
C. The Child’s Linguistic Environment

34. What language do you use when speaking to the child?
   □ Arabic
   □ English
   □ Mixture of Arabic and English
   □ Other, please specify:  .................................................................

35. What language does the father use when speaking to the child?
   □ Arabic
   □ English
   □ Mixture of Arabic and English
   □ Other, please specify:  .................................................................

36. Are there other people (other than parents) living at the same place where the child lives?
   □ No
   □ Yes

   If yes, please specify how many and their relationship to the child
   ...........................................................................................................
   ...........................................................................................................

37. Is there a domestic helper/ au pair who regularly interacts with the child at home?
   □ Yes
   □ No → (Skip to 39)

38. For each domestic helper, please identify the following:

   □ The domestic helper’s nationality.

   □ The language she uses when interacting with the child (e.g., Arabic, English, Mixture of Arabic & English, etc.)

   □ Her proficiency level in that/those language(s) (i.e., High, Medium, or Low)

   DH1: Nationality: ...................... Language: ...................... Proficiency:......................
   DH2: Nationality: ...................... Language: ...................... Proficiency:......................
   DH 3: Nationality: ...................... Language: ...................... Proficiency:......................
   Other, please specify:  ..............................................................................
39. How often do you read to your child?
   □ Never       □ rarely       □ Once a week       □ 2-3 times a week       □ Everyday

40. How often do you read bedtime stories to your child?
   □ Never       □ Rarely       □ Sometimes       □ Often       □ Always

41. Approximately, how many books does your child have (including books shared with siblings, & excluding school textbooks)?
   □ No books       □ 1-2 books       □ 3-9 books
   □ 10-19 books       □ 20-49 books       □ 50 plus

42. What is the language of the books you often read to your child? (Please mark all that apply)
   □ Arabic only
   □ English only
   □ Arabic and English books equally
   □ Arabic books more than English books
   □ English books more than Arabic books
   □ Wordless picture books
   □ Other, please specify:  ........................................................................................................

D. The Child’s Media Environment

43. Is there a TV set in your household?
   □ Yes
   □ No ➔ (Skip to 45)

44. How many TV sets do you have in your household?  ............................................................

45. How many of the following do you have in your household? (If any is not available, please put 0)
   Local TV  ............................................................
   Cable or satellite TV  ..............................................
   Desk computer or laptop  ...........................................
   DVD player or VCR  ................................................
   Games console e.g., PlayStation, Xbox, or Wii  ..............................................
   A music CD player or audiocassette  ..............................................
   An iPod Touch or other type of video iPod  ..............................................
   A smartphone such as iPhone, Galaxy, or BlackBerry  ..............................................
   A tablet device, such as iPad, Galaxy Tab, or Galaxy Note  ..............................................
   A handheld video game player e.g., Gameboy or PSP  ..............................................

352
46. Do you have an internet connection at home?

☐ No
☐ Yes

47. Which of the following items, if any, does your child have in her/his bedroom? (Please mark all the apply)

☐ Local TV
☐ Cable or satellite TV
☐ Desk computer or laptop
☐ DVD player or VCR
☐ Games console e.g., PlayStation, Xbox, or Wii
☐ A music CD player or audiocassette
☐ High speed Internet access
☐ None of the above

48. How likely is it that your child has a media device (e.g., TV, Games console, DVD player, Computer, etc.) in her/his bedroom because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>I let my child watch TV and/or use electronic devices …</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Because it helps her/him fall asleep</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Because it keeps her/him occupied in their room so I can do other things around the house</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Because it frees up the other TVs so other family members can watch their own shows</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Because it was a reward for good behaviour</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. Because she/he shares a room with an older brother or sister</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6. Because she/he shares a room with an adult</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7. Because she/he sleeps in a family room that has a TV in it</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8. Because we bought a new TV and decided to give her/him the old one</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9. To get her/him to sleep in her/his own room</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

49. Which of the following items do you have, if any?

☐ Your own smartphone
☐ Your own tablet or iPad
☐ Your own iTouch or other video iPod
☐ Your own non-video iPod or other MP3 player
☐ None of these → (Skip to 54)

50. What type of cell phone, if any, do you have?
☐ I have a smartphone (you can send email, watch videos, or access the Internet on it)
☐ I have a regular cell phone (just for talking or texting)
☐ I don’t have a cell phone

51. Approximately, how many apps, if any, have you downloaded onto your own:
   a. Smartphone: ........................................
   b. Tablet (e.g., iPad) .................................
   c. iPod Touch ...........................................

52. Approximately, how many of the apps that you’ve downloaded were for your child/children to use on your:
   a. Smartphone: ........................................
   b. Tablet (e.g., iPad) .................................
   c. iPod Touch ...........................................

53. Approximately, how many of the apps you’ve downloaded for your child/children are educational apps (i.e., apps that are designed to teach kids something)?
   a. Smartphone: ........................................
   b. Tablet (e.g., iPad) .................................
   c. iPod Touch ...........................................

54. Which of the following items does your child have, if any?
☐ her/his own smartphone
☐ her/his own iPad or tablet
☐ her/his own iTouch or other video iPod
☐ her/his own non-video iPod or other MP3 player
☐ her/his own handheld video game player like a Gameboy or PSP
☐ None of the above

55. Which of the following items does your child share with someone else (e.g., parent, siblings, etc.)?
☐ A smartphone
☐ A tablet or an iPad
- An iTouch or other video iPod
- A non-video iPod or other MP3 player
- A handheld video game player like a Gameboy or PSP
- None of the above

56. How many hours per day does your child spend on watching TV? ...........................................

57. How do you evaluate your child’s TV watching time?
   - She/he never watches TV
   - She/he rarely watches TV
   - She/he moderately watches TV
   - She/he frequently watches TV
   - She/he excessively watches TV

58. How many hours per day does your child spend on using electronic media? .................................

59. How do you evaluate your child’s electronic media use?
   - She/he never uses electronic media → (Skip to 62)
   - She/he rarely uses electronic media
   - She/he moderately uses electronic media
   - She/he frequently uses electronic media
   - She/he excessively uses electronic media

60. How often is internet connection available for the devices your child regularly uses?
   - Never    Rarely    Sometimes    Often    Always

61. How often, if ever, does your child use the following kinds of apps on a cell phone, iPod, iPad, or other tablet device? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Educational games, like puzzles, memory games, math, or reading</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Games that are just for fun</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Creative apps and programmes for things like drawing, making music, or creating videos</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. Apps and programmes based on a character my child knows from a TV show</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
5. Apps and programmes that have audio songs

6. Apps and programmes that have video songs

7. Apps and programmes with religious content like teaching Quran, prayers, and Islamic rituals.

8. Apps and programmes that have photo and video albums

9. Other types of apps and programmes

62. How often does your child do each of the following activities? (Please mark ONE answer for each statement below. Answer options are: Never, Once a week, Several times a week, Once a day, Several times a day)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Once a week</th>
<th>Several times a week</th>
<th>Once a day</th>
<th>Several times a day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read or be read to</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. Watch DVDs or videotapes</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. Watch TV</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. Use the computer</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5. Play video games on a console player</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>like an Xbox, PlayStation, or Wii</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Play games on a handheld player like a</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Gameboy or PSP</td>
<td></td>
<td></td>
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<tr>
<td>7. Use a mobile device (like a smartphone,</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
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<tr>
<td>tablet, iPad, iPod Touch, or similar device)</td>
<td></td>
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<tr>
<td>to play games, use apps, or watch videos</td>
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</tbody>
</table>

63. How likely is it that you let your child watch TV and/or use electronic devices because of each of the following reasons? (Please mark ONE answer for each statement below. Answer options are: Very likely, Likely, Unlikely, Very unlikely.)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Very likely</th>
<th>Likely</th>
<th>Unlikely</th>
<th>Very unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. because my child wants to watch TV or use electronic devices to</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>have fun</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. because I find it difficult to say 'No' to my child when she/he</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>asks to watch TV or use electronic devices</td>
<td></td>
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</tbody>
</table>
3. as a reward for good behaviour
4. because they make parenting easier
5. because they help distract my child when I have some chores to attend to
6. to get my child to remain quiet or not move when in public (restaurants, social gatherings, waiting areas, etc.)
7. to distract my child so she/he can eat
8. to get my child to stop crying
9. because my child needs to be skilled with computers and new tablet devices to be successful in life
10. because they have educational materials that are good for my child’s brain development
11. because they help in teaching my child language basics such as alphabets and numbers
12. because they help in teaching my child new vocabulary
13. because they help in teaching my child religious values and morals
14. because they help in teaching my child good manners and habits
15. because they help in teaching my child languages (e.g., Arabic, English or French)

64. If there are other reasons, other than the ones mentioned above, please explain below. Otherwise, leave blank.

65. How often does each of the following happen? (Please mark ONE answer for each statement below. Answer options are: Never, Rarely, Sometimes, Often, Always, I don't know.)

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
<th>I don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you watch TV together with your child?</td>
<td></td>
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<tr>
<td>2. How often do you use electronic devices together with your child?</td>
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<tr>
<td>3. When the child is watching TV, how often does someone else watch with her/him?</td>
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<tr>
<td>4. When the child is using electronic devices, how often does someone else use/play with her/him?</td>
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<tr>
<td>5. How often do you or someone else discuss/explain the content of the programme viewed on TV or electronic devices to your child?</td>
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6. How often do you or someone else specify in advance the programmes/applications that may be viewed/played?  

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7. How often do you or someone else set specific media viewing/playing hours for your child?  

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8. How often do you or someone else tell your child to turn off the TV/electronic device or switch the channel/quit an application when she/he is viewing an unsuitable content?  

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9. How often does your child eat her/his main meals while watching TV or using electronic devices?  

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10. On a typical day, how often do you leave the TV on, even if no one is actually watching it?  

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</thead>
</table>

66. Do you or someone else forbid your child to watch/play certain programmes/channels/applications?  

- [ ] Yes  
- [ ] No → (Skip to 68)

67. Please specify the channels, programme types, or programme titles that you or someone else forbid your child to view/play  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

68. In general, do the media in your home—TVs, computers, video games, and mobile devices—cause your family to spend more time together with other family members, less time together with other family members, or don’t they make much difference one way or the other?  

- [ ] Media cause us to spend more time with other family members  
- [ ] Media cause us to spend less time with other family members  
- [ ] Media don’t make much difference in how much time we spend with other family members

69. Who is adult who would usually watch TV with the child? If more than one, please list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

70. Who is adult who would usually use electronic devices with the child? If more than one, please list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

71. What is your child’s favourite activity? If more than one, list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

72. What is your child’s favourite TV channel? If more than one, list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

73. What is your child’s favourite TV programme? If more than one, list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

74. What is your child’s favourite tablet/smartphone application? If more than one, list all.  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

75. At what age did your child start watching TV?  

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………
76. At what age did your child start using electronic devices (e.g., smartphone, tablets, computers, etc.)?

………………………………………………………………………………………………………………………………………………………………………………………………………………

77. From your point of view, which channel(s) or programme(s) do you think is beneficial for your child?
   Please provide details.

………………………………………………………………………………………………………………………………………………………………………………………………………………

78. From your point of view, which channel(s) or programme(s) do you think is harmful for your child?
   Please provide details.

E. The Child’s Day Care Environment

79. Does your child attend day care?
   □ Yes
   □ No → (Skip the remaining questions)

80. Please name the day care center your child attends: ........................................................

81. How many hours per week does the child spend in day care? ................................................

82. At which age did your child start attending day care? ............................................................

83. What is the nationality of your child’s day care worker(s)? If more than one, please list all.
   ...........................................................................................................................................
   ...........................................................................................................................................

84. What is the primary language used for communication in your child’s daycare center?
   □ Arabic
   □ English
   □ Mixture of Arabic and English
   □ Other, please specify: .............................................................................................................
Appendix E. Paper 3 - Study Recruitment Flyer

Help us learn more about the language development of Saudi children

Participants Needed!

Researchers at the University of Manchester want to learn more about electronic media and language in the lives of young Saudi children

Who can participate?
Parents of Saudi children aged 1-3 years

What will I do?
• Complete a diary
• Complete a survey
• Complete a child language assessment measure

If you take part, you will get a SR 30 book token to thank you for your time

Interested?
More questions?

Contact Haifa Alroqi at:
Mobile: 0531666108
Email: haifa.alroqi@postgrad.manchester.ac.uk

* The principal researcher is Haifa Alroqi, a lecturer at King Abdulaziz University and a PhD candidate at the University of Manchester.
* This research has been approved by the University of Manchester Research Ethics Committee (Ref XXXXX)
Dear ____________,

My name is Haifa Alroqi, and I am currently conducting research as part of a doctoral thesis in the School of Arts, Languages and Cultures at the University of Manchester. My research aims at exploring the impact of Saudi children’s literacy environment and media viewing habits on the children’s language development.

I am writing to ask if you would consider allowing me to post and distribute recruitment flyers (Attached) around your site and also allowing me to approach potential participants individually, providing them with information about the study, and asking them whether they would like to take part in the study.

Yours sincerely,

Haifa Alroqi

Mobile: +966- 531666108
Email: haifa.alroqi@postgrad.manchester.ac.uk

If you are willing to allow me to recruit participants from your site, I would be grateful if you could sign below.

____________________ (Signed) __________________ (Printed) ____________________ (Date)
Chapter 5: General Discussion and Conclusion

In this chapter, I first briefly describe the significance of studying children’s screen media use and its association with early language development. I then provide a summary of the main findings of this thesis, discuss the limitations of our work, suggest future research directions, and draw implications for practice and policy.

Significance of Studying Children’s Screen Media Use

Exploring toddlers’ screen media use practices and examining the relation between these practices and their language development is of extreme importance, as the first 3 years of life are a critical period for cognitive and language development (Bornstein, 2015; Bradley et al., 1989; Cote & Bornstein, 2005; Huttenlocher, 2002; National Research Council and Institute of Medicine, 2000; Rodriguez et al., 2009; Stiles, 2000). Children’s brains undergo massive development during infancy and early childhood when the brain is more malleable and plastic than later in life (Bremner & Slater, 2003; Huttenlocher, 2002; Lamb, Teti, Bornstein, & Nash, 2002; Nelson & Luciana, 2001). Brain development is influenced by both biological factors such as genetics and nutrition and environmental factors such as relationships and experiences (Bick & Nelson, 2017; Chugani et al., 2001; Fox, Levitt, Nelson, 2010; National Scientific Council on the Developing Child, 2012; Tierney & Nelson, 2009). Research shows that environmental stimulation in early childhood has direct and profound consequences for the developing brain (Bick & Nelson, 2017; Chugani et al., 2001; Huttenlocher, 2002; Tierney & Nelson, 2009). Children who are reared in stimulating, enriched, and responsive nurturing environments demonstrate better performance on measures of cognitive and language development than those who are brought up in under-stimulating and unresponsive caregiving environments (Allen & Oliver, 1982; Culp et al., 1991; Hildyard & Wolfe, 2002; National
Scientific Council on the Developing Child, 2012; Spratt et al., 2012). In contrast, children in under-stimulating environments are exposed to a reduced range of sensory, cognitive, and linguistic input (Bick & Nelson, 2017; Hart & Risley, 1995).

Developmentally stimulating activities and practices such as parent–child interactions, shared reading, and play have all been found in the literature to be strong predictors of language, cognitive, and social development (Dickinson & Tabors, 2001; Fisher, 1992; Hart & Risley, 1995; Hurtado, Marchman, & Fernald, 2008; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010; Levy, 1984; Liebeskind, Piotrowski, Lapierre, & Linebarger, 2014; Lonigan & Whitehurst, 1998; Payne, Whitehurst, & Angell, 1994; Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004; Zucker, Cabell, Justice, Pentimonti, & Kaderavek, 2013). Screen media can provide children with alternative forms of these practices such as the opportunity to interact online with other conversational partners, to be exposed to varied linguistic input, to engage with digital storybooks, and to play with games and apps. However, there are concerns that the excessive use of screen media may displace engaging with these activities in natural, direct, three-dimensional settings, and therefore negatively affects children’s language development (Anderson & Subrahmanyam, 2017; Hofferth, 2010; Holloway, Green, & Livingstone, 2013; Hudon, Fennell, & Hoftyzer, 2013; Johnson, 2015; Schmidt, Pempek, Kirakorian, Lund, & Anderson, 2008; Seo & Lee, 2017; Taylor, Monaghan, & Westermann, 2018; Zimmerman & Christakis, 2007).

This thesis maintains that screen media have become an integral part of children’s daily lives in many societies and an important element of children’s home environments today. Therefore, screen media use was examined in light of several theoretical perspectives that place greater emphasis on the role of the environment in children’s linguistic and cognitive
development (e.g., Bronfenbrenner’s ecological systems theory, Tomasello’s usage-based theory, and Vygotsky’s social interactionist theory). Screen media are an integral part of children’s immediate environments and, as a result, are expected to have a major impact on children’s development, especially in the first critical years of their lives.

Summary of Thesis Findings

The main aim of this thesis was to examine the association between screen media use and language development in toddlers. Since no prior details exist, to my knowledge, on Saudi toddlers’ screen media use, the studies in Chapter 2 (Paper 1) and Chapter 3 (Paper 2) were carried out to provide information not previously available on Saudi toddlers’ media use patterns and their caregivers’ media mediation practices, before attempting to look at the relation between children’s and parents’ media-related practices and developmental language outcomes. The relationship between screen media use and language development was then addressed in Chapter 4 (Paper 3).

The thesis focused on exploring the screen media use practices that have been described in the literature as having an impact on infants and toddlers, especially in relation to language and learning outcomes (see Chapter 1). Based on the literature, more positive language and learning outcomes associated with screen media use have tended to be found in the following scenarios: (a) a moderate amount of screen media exposure (specific to certain age groups); (b) an older onset age of screen media use (preferably after 2 years of age); (c) age-appropriate, educational, child-directed content; (d) fewer salient formal features for younger children; and (e) co-viewing with a contingently responsive adult. Paper 1 provided information on the prevalence of screen media use among children under 3 in Saudi Arabia, the amount of time they spend with screens, the age at which they are introduced to screens, and the types of media.
content they view or use. Paper 2 was conducted on the same sample as in Paper 1, but it focused on exploring Saudi parents’ views and beliefs about children’s screen media use, the relation between these views and their children’s actual media use behaviours, and the media mediation styles and strategies they utilise to manage their young children’s media use. Paper 2 also provided information on the social context aspect of screen media use. Paper 3, which was conducted on a different sample, provided information on toddlers’ screen media use (amount of screen time, onset age of viewing, types of media content viewed, and social context of media use) and examined its association with language outcomes.

This thesis makes several contributions to knowledge both globally and locally (in Saudi Arabia). At the global level, our work in Paper 3 was aimed at ascertaining the contribution of each of the three screen media use parameters (quantity, content, and context) to language outcomes in children under 3. Our findings highlight the importance of the social context of screen media use. Young children aged 12 to 16 months had higher expressive and receptive vocabulary scores when they were more frequently accompanied by others when using screens and when those who co-viewed or co-used media with them engaged in verbal communication with them while co-viewing or co-using.

The significant association found in this study between Joint Media Engagement (JME; Takeuchi & Stevens, 2011) and early language development can be explained from several perspectives. First, from a Vygotskian social interactionist view, JME scaffolds children’s learning within their Zone of Proximal Development (ZPD) and extends it beyond what they could learn on their own from solitary viewing (Wartella, 2015). The joint participation of screen media increases children’s interest in the content viewed, maintains their attention, and scaffolds their learning, especially when the educational content is challenging (Vaala, Ly, &
Levine, 2015). Second, co-viewing or co-using media with children can stimulate verbal exchanges with caregivers and peers, which, in turn, are known to foster cognitive and language development (Bornstein, Haynes, & Painter, 1998; Branco, 2003; Coplan & Arbeau, 2009; Hart & Risley, 1975, 1995; Huttenlocher et al., 1991; McGee, Krantz, & McClannahan, 1985; Rodriguez & Tamis-LeMonda, 2011; Tudge & Rogoff, 1989). Third, JME creates opportunities for joint attention. The role of joint attention in children’s language development is well documented in the science of child development and learning (Ahktar, Dunham, & Dunham, 1991; Bakeman & Adamson, 1984; Bates, 1979; Bruner, 1983; Scott et al., 2013; Tomasello, 1988, 1995). It should be noted, however, that we did not control for the quantity or the quality of parent-child interactions in the current body of work. Therefore, it is also possible that families who are generally more talkative and who interact more with their children (whether during joint media engagements or at other times) positively impact their children’s language gains.

Although concerns over the association between children’s screen media use and developmental outcomes are shifting from a focus on the quantity of screen media exposure to a focus on the quality of media contents and on the social context of media use (Bailey, 2017; Barr, Lauricella, Zack, & Calvert, 2010; Doyle, 2014; MacDonald, 2018), our findings in Paper 3 confirm previous findings (e.g., Becker, 2013; Chonchaiya & Pruksananonda, 2008; Duch et al., 2013; Tomopoulos et al., 2010) and contribute additional evidence suggesting that quantity of screen media exposure is still an important element to consider when looking at the relation between media use and language outcomes. In Paper 3, a significant association was found between the amount of time that children spend with screens and language outcomes. More specifically, Paper 3 showed that 17- to 36-month-old children who had higher amounts of
foreground and background screen media exposure and who started viewing or using screens at younger ages had lower expressive vocabulary scores and produced shorter utterances.

Nonetheless, this association does not necessarily indicate a causal link. As mentioned earlier, excessive exposure to screen media may displace other enriching and stimulating activities that are important for children’s cognitive and language development in the early years of life. The excessive use of screen media may lead children to lose interest in engaging in other activities and in communicating with people around them and, thus, to be more socially isolated. In this way, it displaces the types of real-life social interactions that are at the core of Vygotsky’s theory of development and that are essential components of Bronfenbrenner’s ecological systems theory. Although our findings cannot confirm this displacement hypothesis, our work in Paper 3 has shown that viewing screens was the most prevalent activity in toddlers’ daily lives compared to time spent in other developmentally stimulating activities such as reading and outdoor play.

In line with a large body of literature on the positive relation between reading to children and their language development (e.g., Bus, van IJzendoorn, & Pellegrini, 1995; Evans, Shaw, & Bell, 2000; Farrant & Zubrick, 2011; Foy & Mann, 2003; Frijters, Barron, & Brunello, 2000; Lonigan & Whitehurst, 1998; Ninio, 1983; Payne et al., 1994; Robb, Richert, & Wartella, 2009; Scarborough & Dobrich, 1994; Snow, 1983; Whitehurst & Lonigan, 1998), Paper 3 found that, compared to screen media use, family demographics, and child gender, reading was the most significant variable in positively predicting language outcomes (expressive vocabulary and utterance length) among children aged 17 to 36 months. This finding, as well as the results in Paper 1 and Paper 3 that showed very low reading rates among the toddlers in our samples, have implications for parents and media producers (discussed later in this chapter).
At the local level, this is the first body of work in Saudi Arabia that provides detailed information about children’s screen media use practices and parents’ roles in mediating their children’s media use. Although the studies in Paper 1 and Paper 3 were conducted on two different samples and used different data collection tools (i.e., a survey only in Paper 1; a survey and a diary in Paper 3), they produced similar results, which adds reliability to our findings in both studies. The studies in Paper 1 and Paper 3 showed that Saudi children under 3 years of age spend 2 to 3 hours daily engaged with screens and that older children (aged 2–3 years) view screens for periods longer than younger children (aged 1–2 years). Furthermore, the majority of the children in both studies were found to exceed the recommended amount of daily screen time specified for their age by the American Academy of Pediatrics (AAP). In addition, in both studies, children spent more time viewing television than using mobile media devices, which indicates that television is still the most dominant screen medium in Saudi homes with toddlers and confirms studies and reports from other parts of the world (American Academy of Pediatrics, 2013; Rideout, 2017; UK Office of Communications, 2017; Wartella, Rideout, Lauricella, & Connell, 2014; Wooldridge, 2016). Survey findings from Paper 1 and Paper 3 also showed that children in Saudi Arabia start using screens before their second birthday. On average, they are first introduced to television when they are 12 to 14 months old, while they are introduced to mobile media when they are about 18 months old.

As mentioned earlier, one of the significant findings that emerged from this thesis was that viewing screens seems to be the most prevalent activity in toddlers’ daily lives compared to time spent in other enriching activities such as reading and playing outdoors. Reading, in particular, as measured by the number of books available for children at home and the frequency of reading to children, was found in both Paper 1 and Paper 3 to be very low. Paper 1 found that
more than a quarter of Saudi households with toddlers had absolutely no children’s books at home, while another quarter had only one or two books. This was confirmed in Paper 3, where over one third of the mothers reported having no books for their toddlers at home. In addition, survey findings in Paper 1 showed that over 40% of the caregivers never read to their toddlers, while diaries in Paper 3 showed that 60% of the toddlers were never read to by their caregivers.

Playing was not assessed in Paper 1, but findings in Paper 3 showed that toddlers in the sample spent a significant amount of time playing indoors, but rarely played outdoors. Indoor play, in its various forms (e.g., object play, pretend play, symbolic play), is vital for children’s cognitive and language development (Conner, Kelly-Vance, Ryalls & Frihe, 2014; Pellegrini, 1980; Ungerer & Sigman, 1984; Weir, 1976). Playing outdoors is also an important activity that is thought to support children’s motor, social, and language development (Burdette, Whitaker, & Daniels, 2004; Cameron-Faulkner, MacDonald, Serratrice, Melville, & Gattis, 2017; Cameron-Faulkner, Melville, & Gattis, 2018; Davis & Waite, 2005; Fjørtoft, 2001; Hinkley, Crawford, Salmon, Okely, & Hesketh, 2008; Moore & Wong, 1997; O’Brien & Murray, 2007; Spencer & Wright, 2014; Tizard, Philips, & Plewis, 1976). The extreme hot weather in Saudi Arabia and the lack of greenery and outdoor play spaces could be the main reasons behind the low amount of time children spend in outdoor activities. Low engagement with reading and playing outdoors could also be the result of some caregivers’ limited understanding of young children’s developmental needs.

Another important area that was explored in Paper 1 and Paper 3 was the types of media content that young children in Saudi Arabia frequently viewed. In the two studies, young children were found to view child-directed content more often than adult-directed content. Viewing age-appropriate materials is seen as a positive media practice (Anderson &
Subrahmanyam, 2017; Courage & Setliff, 2010; Hirsh-Pasek et al., 2015; Kirkorian, Wartella, & Anderson, 2008; Tomopoulos et al., 2010). However, when investigating the types of child-directed content children viewed, children were found to view non-educational content more frequently than educational content. This is the opposite of U.S. findings, where toddlers and pre-schoolers have been shown to engage with educational content more often than with non-educational content (e.g., Li, Mendoza & Milanaik, 2017; Rideout, 2013). Reports from the UK also show that the majority of pre-schoolers watch CBeebies or use the CBeebies website or app and that most parents of users rate CBeebies as educational (UK Office of Communications, 2017). The educational value of media content is an important aspect of media use and is expected to impact the extent of children’s learning from screens. As suggested in Paper 3, it may not be the case that children necessarily prefer to view non-educational content; rather this type of content represents what is commonly available and easily accessible to children in Saudi Arabia specifically and the Middle East and North Africa (MENA) region in general.

Paper 2 enhances our understanding of Saudi caregivers’ perceptions of, and attitudes towards, children’s screen media use and the media mediation styles and strategies they employ with their children. This study found that parents’ perceptions and opinions with regard to the optimal age to introduce screens to children and the amount of time that young children should spend using screens do not align with their children’s actual screen media use practices. Similar discrepancies have been reported in previous research (e.g., Barr, Danziger, Hilliard, Andolina, & Ruskis, 2010; Pearson, Salmon, Crawford, Campbell, & Timperio, 2011; Roberts, Foehr, & Rideout, 2005; Seo & Lee, 2017). These studies have indicated that despite parental views and concerns, many parents do not adopt practical strategies to monitor their children’s screen media consumption or to better manage their media use (e.g., by turning off the TV when no one is
watching it, removing screen media devices from children’s bedrooms, selecting educational and age-appropriate programmes and apps, or establishing and following family rules that govern children’s media use). Given the widespread prevalence of media in our daily lives, the social pressure to introduce media to children, the perceived utility of media as an effective tool in teaching children, calming them down, or keeping them occupied, and the attractiveness of media to young children, it seems extremely challenging for parents to delay children’s initial introduction to screen media and to limit the amount of time that children spend with screens. This may explain the discrepancy between what parents see as ideal screen media behaviours and their children’s actual screen media behaviours.

These discrepancies raise the questions of who should decide what the right age is to introduce screens to children and what the optimal amount of screen time is for children of specific ages. These questions are highly controversial and debated among parents, researchers, educators, and policymakers. In the United Kingdom, for example, there has been an escalating debate over the need for screen time guidelines by the British government (Etchells et al., 2017; Palmer et al., 2016). Just recently, the UK Parliament launched an inquiry into the impact of social media and screen use on young people’s health (Parliament of the United Kingdom, 2018). Although there are still no official screen time guidelines in the UK, the Chief Medical Officers of the UK (2011) and the National Institute for Health and Care Excellence (2015) recommend reducing children’s sedentary behaviour, including time spent in front of screens. Globally, numerous health bodies agree that young children should not view more than 2 hours a day, and some completely discourage children under 2 years of age from viewing screens at all (e.g., American Academy of Pediatrics, 2016a; Australian Department of Health, 2017; Canadian Paediatric Society, 2017; German Federal Ministry of Health, 2016; New Zealand Ministry of
Health, 2017). In addition, the development and dissemination of physical activity guidelines, which usually include screen time as one of the most common forms of sedentary behaviour, come as part of many countries’ commitment to the World Health Organization’s Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020 (World Health Organization, 2013) and the Draft Global Action Plan on Physical Activity 2018–2030 (World Health Organization, 2018).

Saudi caregivers seem to be unaware of these global recommendations, and Saudi Arabia lacks studies and guidelines regarding children’s media use. This does not mean, however, that Saudis are not concerned about children’s screen media use. Just recently, the topic of screen media use became very popular among Saudi social media users. Unfortunately, a lot of the information about children’s screen media use circulating on social media is not based on scientific evidence. For example, an inaccurate table attributed to the American Academy of Pediatrics (AAP) regarding screen time limits for children and adolescents went viral among Arabic-speaking users, including social media influencers, paediatricians, and childcare specialists, on Twitter, Facebook, and WhatsApp (e.g., Albatti, 2017; Alharthi, 2018; Almulla, 2018), as well as in official local newspapers (e.g., Dawood, 2017). The table, which uses the logo of the AAP, states that children under 12 years are not recommended to use mobile media devices at all, and that children under 18 years are not recommended to use screens for more than 2 hours a day. In my follow-up communications with the AAP to verify the accuracy of this table, Thomas McPheron, the AAP’s Manager of Public Relations and Communications, indicated that the table did not originate from the AAP and summarised the AAP’s most recent stance on children’s use of screens as follows:
The current policy of the Academy is that there should be no media for children under 18 months (other than Skype with a beloved grandparent) and very little curated and co-viewed media for pre-school children, and then from there the policies encourage families to explore balanced lifestyles, which include digital media but where digital media doesn’t reduce involvement in other healthy activities, such as family life, friends, sports, exercise, school, and social life. (T. C. McPheron, personal communication, September 17, 2018)

The increasing interest among parents and educators to learn more about healthy screen media use habits and the widely circulated false information on this topic necessitates that more evidence-based research and awareness efforts take place in the country.

**Limitations**

Several limitations associated with this thesis need to be acknowledged. First, the sample size in Paper 3 ($N = 85$), particularly for the group of younger children ($n = 18$), was small. Therefore, caution must be exercised in generalising the findings. It was indeed challenging to keep participants engaged and committed throughout the entire duration of the study, which lasted for approximately 2 months, and to motivate them to complete and submit seven diaries, a survey, and a language assessment measure. This was one of the reasons that may have contributed to lower participation in Paper 3. The surveys used in the three papers were lengthy, which may have also contributed to reducing the response rate. Therefore, to increase participation in future studies that may wish to replicate our work or use the data collection methods that we used, I recommend that several modifications be implemented: (1) automating the process by using electronic diaries or specially designed diary apps; (2) asking parents to
complete two diaries instead of seven (although the validity of results may be lowered with such a change, it may help motivate participants to remain committed to the study); and (3) shortening the survey length by limiting it to questions that assess the primary aims of the study.

Second, parental report measures are subject to recall bias, memory lapses, and social desirability biases (Byeon & Hong, 2015; Duch et al., 2013; Neumann, 2014; Sudman & Bradburn, 1973; Tourangeau, Rips, Rasinski, 2000). However, as the target age group in our studies was children under the age of 3 years, obtaining information directly from the children was not an option. To reduce the potential for social desirability effects, survey questions were carefully phrased so respondents could provide answers about their own and their children’s behaviours and practices without fear of being judged. I made sure to remain neutral in all questions and to not represent any of the parents’ or children’s behaviours as favourable or unfavourable. Fortunately, diaries have been found to be less subject than surveys to these drawbacks (Anderson, Field, Collins, Lorch, & Nathan, 1985; Burton & Nesbit, 2015; Ellis-Davies, Sakkalou, Fowler, Hilbrink & Gattis, 2012; Huston, Wright, Rice, Kerkman, & St. Peters, 1990). To increase validity and to reduce the chances of recall bias, I instructed parents to record their children’s activities in the diaries as they occurred, collected diaries on a weekly basis, and assessed them as soon as they were received to detect and address any problems.

An alternative to using diaries for collecting more accurate information on the duration of mobile media use and the types of content viewed is to use electronic monitoring techniques such as parental control apps (e.g., DinnerTime Plus, Qustodio, Screen Time Parental Control) or apps that are designed to monitor and manage users’ digital diet (e.g., QualityTime, Moment, Family Screen Time Tracker). However, there were several reasons why these tools were not used in our work. First, at the time of data collection, parental control apps that enable parents to
remotely view the types of content their children engage with were not available for use on iOS devices, which many children and families in Saudi Arabia use. Another issue was that young children may share the use of one device with other users (e.g., parents or siblings), and in such cases it would be difficult to clearly identify the sessions that only pertain to the target children. Moreover, almost all parental control and screen time management apps at the time of our data collection are in English, which would make it difficult for our sample’s Arabic monolingual speakers to use them.

In September 2018, Apple released iOS 12, which has a feature called Screen Time. According to Apple (2018), Screen Time was designed to give users a better understanding of how they and their children spend time with apps and websites. This tool can be available by default on parents’ iOS devices and can easily be available in Arabic by changing device language settings. Therefore, it has the potential of being useful for future research that aims to collect information on the screen media patterns of children or adults, although it would still be challenging to identify the user(s) holding and using the device for each session. It should also be noted that screen time management apps do not provide contextual information (e.g., place where media-related activities occur, people co-using screens with children, interactions that take place during co-viewing), which can usually be evaluated through observational methods.

**Future Research Directions**

Further research needs to assess the effectiveness of specific touchscreen apps on children’s language and literacy development. Previous investigations have primarily examined the efficacy of specific English television programmes (e.g., Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; DeLoache et al., 2010; Krcmar, 2014; Krcmar & Grela, 2004;
Krcmar, Grela, & Lin, 2007; Linebarger & Walker, 2005; Rice, Huston, Truglio, & Wright, 1990; Robb et al., 2009; Singer & Singer, 1998; Wright, Huston, Scantlin, & Kotler, 2001; Zill, Davies, & Daly, 1994). Locally, no prior studies, to my knowledge, have evaluated the efficacy of Arabic television programmes or touchscreen apps. Therefore, there is a need to conduct research to assess the educational value and developmental benefits of programmes and apps available in the Arabic-speaking media market.

This thesis has mainly investigated screen media use and language development in stay-at-home children who do not attend day care. However, viewing and using screens in day care and pre-school settings adds to the total amount of time that children spend with screens and exposes them to additional, and perhaps different, screen media contents that may lead to different developmental outcomes. Therefore, exploring screen media use in childcare and pre-school settings and examining its impact on children’s language and literacy development is worthy of investigation. In fact, preliminary results of a study that is currently in progress indicate that screens are widely used in day care centres in Saudi Arabia (Alroqi, 2018).

Given the low engagement with reading print books that has been found in our studies, future investigations should examine the use of digital books in the MENA region and its association with children’s language and literacy development. Future research may also make use of technological advancements and use media use tracking apps to collect more accurate information on children’s media use patterns, but the challenges laid out earlier in this chapter as well as other ethical and technical considerations need to be taken into account.
Implications for Practice and Policy

I believe that our findings are useful for various stakeholders, including parents, media producers, app developers, paediatricians, family physicians, and policymakers. First, our findings regarding the association between screen media use and young children’s language development have significant implications for parents. Parents need to be aware of the importance of the first 3 years of life for children’s development in general and for language development in particular. They also should know the types of activities and practices that have the potential to support and stimulate this development, and to understand that spending shared quality time with their children in indoor play, outdoor play, reading, or screen media use is very important for them. Parents should be informed about the growing evidence from this work, as well as from previous research, that young children can benefit more from screen media when their caregivers actively engage with them through joint media engagements. If parents decide to introduce screens to their young children, they are encouraged to use them in a way that increases, rather than displaces, opportunities for more and varied parent–child interactions.

Based on our findings, I also suggest that parents monitor the amount of time their children spend with screens, and turn off the TV screen when no one is watching it. It is important for parents to ensure that the amount of screen time in their family does not displace time that can be spent in other enriching activities and practices. I believe that balance is key. Parents need to find a balance where they manage their children’s screen media use in ways that foster, not hinder, their development and, at the same time, maintain stimulating environments that are rich with language-promoting activities and practices.

Given the low frequency of reading to toddlers in our samples, the low number of print books in toddlers’ homes, the high amount of time that children spend using screens, and the
significant impact that reading has on language skills, it would be useful to bring books to screens as a solution that can help promote reading among young children. I recommend that app developers and book producers focus on developing age-appropriate digital books that target children in general and toddlers and pre-schoolers in particular. For digital books to support children’s language development and learning, it is important that app developers consider scientific evidence regarding the features that should be implemented or avoided when designing digital books for young users (e.g., Bus, Takacs, & Kegel, 2015; Knowland & Formby, 2016; Takacs, Swart, & Bus, 2015; Troseth & Strouse, 2017).

Our research revealed that parents use media as a tool for education and for teaching languages. However, children in our samples viewed non-educational content more often than educational content. These findings have implications for parents as well as for media producers and app developers. Parents are encouraged to monitor the media content their children frequently engage with and assess its educational value by using or viewing the media contents first, by co-using media with their children, and by reading reviews about specific media programmes and apps. Parents, especially those interested in using screen media as educational tools, need to educate themselves about the screen media content available to their children, and need to take a more active role in mediating their children’s screen media use, by searching for and downloading educational apps and programmes and by facilitating access to educational YouTube channels and videos, as well as to TV channels and programmes that carry more educational value.

Unfortunately, it is challenging and complicated for caregivers who are monolingual speakers of Arabic to find useful resources that can help them in selecting media content that is appropriate for their children. We based our evaluation of the educational value of screen media
content watched by the children in our samples on the Common Sense Media website (Common Sense Media, 2017), as no Arabic resources are available for rating children’s programmes or providing reviews for parents and educators. I feel a strong need to provide parents with a similar platform in Arabic that can help them read short descriptions of the contents their children prefer to view, ratings of these contents, and information about their educational value, as well as other parents’ and other children’s opinions. Therefore, I highly recommend this gap be filled through the development of a platform that enables caregivers as well as older children to read, contribute to, and share descriptions, ratings, and reviews about programmes and apps available in the Arabic-speaking media market.

As explained earlier, the low viewership of educational content by young children could result from the fact that most of what is shown on Arabic children channels, as indicated by their published daily programme schedules (e.g., Ajyal, MBC3, Spacetoon) is non-educational. This finding suggests that media producers and app developers in the region should fill this gap by designing and developing child-directed media content that is age-appropriate, entertaining, and educational at the same time. It is also crucial for media producers and app developers to consider the science of learning when designing children’s programmes and apps (Hirsh-Pasek et al., 2015; Strouse & Ganea, 2017; Zimmermann, Moser, Lee, Gerhardstein, & Barr, 2017; Zosh, Lytle, Golinkoff, & Hirsh-Pasek, 2017).

This research also has practical implications for policymakers. The Ministry of Health in Saudi Arabia needs to take a more active role in providing families with easy-to-access guidance and research-driven recommendations that can help them make informed decisions in managing their children’s media use. I recommend that the Saudi Ministry of Health introduce an easy-to-access, Arabic online tool similar to the Family Media Use Plan developed by the AAP
The Family Media Use Plan is a personalised interactive tool designed to help families monitor their screen time based on the AAP’s recommendations, family values, and family lifestyles (American Academy of Pediatrics, 2016a; 2016b). After making these resources available, I recommend that the Ministry of Health encourage family physicians and paediatricians to discuss children’s screen media use habits during well child visits, refer parents to available resources that promote healthy and balanced media use habits, and advise them to put together a media use plan that can help them positively manage children’s screen media use in ways that support their health, learning, and development.

I believe that it is the role of family physicians and paediatricians to monitor children’s speech and language development as an important aspect of children’s health and development. They also need to educate parents not only about biological factors but also about environmental and social such as under-stimulating environments, infrequent parent–child interactions, social isolation, and excessive use of screens – that can negatively affect young children’s language development.

Conclusion

This thesis has investigated the association between screen media use and early language development. It has also provided information not previously available on the use of screen media among toddlers in Saudi Arabia and their parents’ role in mediating their screen media use. This thesis has shown that out of the three screen media use parameters (quantity, content, and context), the most significant predictor of language development in 12- to 16-month-olds was screen media context, as measured by the frequency of children’s interactive joint media engagements. The more that caregivers engaged with their young children in viewing screen
media and the more they verbally interacted with them while co-viewing, the higher their children’s expressive and receptive vocabulary scores. In older children (17- to 36-month-olds), higher levels of screen media quantity, as measured by the amount of time spent viewing screens daily, the prevalence of background TV in the children’s environment, and the onset age of screen media viewing, had the highest negative impact on children’s expressive vocabulary scores, as well as on the length of utterances they produced.

This thesis has also found that compared to reading and outdoor play, screen media use was the most prevalent activity among toddlers in our samples. The majority of the children in our studies exceeded the maximum amount of recommended screen time for their age and viewed non-educational content more often than educational content. Furthermore, parents’ perceptions and views regarding ideal screen media practices did not align with their children’s actual media-related behaviours. These findings were discussed in detail throughout the thesis, and their implications for practice and policy were provided.

In conclusion, I believe that the debate about screen media use by children and its impact on their health and development will continue for some time. Today’s and tomorrow’s parents will continue to face complexities in dealing with the ever-changing media landscape. This thesis focused on one particular and probably vulnerable age group and on one important aspect of children’s development – language development. Research on media use among older children and adolescents and on other aspects of health and development may arrive at different findings. Nevertheless, I believe that efforts need to be focused on empowering parents by providing them with the most recent evidence-based information on media use, its relation to their children’s health and development, and the strategies they can utilise to maximise the benefits and manage the risks of their children’s screen media use.
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