

KOÇ UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES & HUMANITIES

PARENT AND CHILD CHARACTERISTICS IN DEVELOPMENTAL
PSYCHOPATHOLOGY

BY

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A Dissertation Submitted for the degree of Doctor of Philosophy in Psychology

Koç University

November 2015

KOÇ UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES & HUMANITIES

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This thesis contains no material which has been accepted for any awards or other degree or diploma in any university or other institution. It is affirmed by the candidate that, to the best of her knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

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THESIS ABSTRACT

Developmental psychopathological approach argues for the importance of examining the pathways for both typical and atypical development to increase understanding of pathological as well as normative functioning. This dissertation includes three research papers investigating important topics in developmental psychopathology. The first paper examines the role of basic cognitive representational abilities (see-know understanding and internal state understanding), and both verbal and non-verbal communication skills in social competence in children with Autism Spectrum Disorders (ASD); the second paper is a meta-analysis study which examines the effectiveness of the intervention programs with parental involvement that aim to alleviate obesity or overweightedness in children; and the third paper focuses on an important concept for child developmental outcomes: maternal sensitivity, and its cross-cultural relevance across mothers and professionals (i.e., clinicians working with children and their mothers) in six different cultures (i.e., Turkish and Dutch majority, and Turkish-Dutch, Antillean-Dutch, Surinamese-Dutch, and Moroccan-Dutch ethnic minority). The results of the first study showed that socially competent behaviors of children with ASD were positively related to their non-verbal communication skills when cognitive representation and verbal communication skills were controlled for. The second study revealed that interventions targeting childhood obesity/overweightedness with parental involvement were effective in the short run, but not in longer term follow-ups. Interventions were found to be more effective if they targeted one modality of intervention (i.e., either by providing educational materials or interactive intervention sessions) as compared to providing multiple modalities. Finally, the results of the third study indicated that the beliefs of mothers from different cultures about “ideal parenting” are very similar to the concept of sensitive parenting in the literature and the beliefs of professionals. These results had important applied implications. The results of the first study suggested that interventions targeting better social

relations in children with ASD might benefit from including trainings for non-verbal communication skills. The second study implied that interventions for childhood obesity/overweightness might benefit from being conducted within single modalities as opposed to targeting multiple modalities. And the findings of the third study implied that sensitive parenting is a cross-culturally applicable concept for both mothers as well as clinicians working with parents and children, and the intervention programs targeting maternal sensitivity might be well received by mothers from different cultures. These findings may be useful for future intervention and prevention programs aiming to ameliorate outcomes in both typically developing children and in children with atypical development.

Keywords: Autism Spectrum Disorder (ASD), childhood obesity/overweightness, intervention, meta-analysis, sensitive parenting

TEZ ÖZETİ

Gelişimsel psikopatolojik yaklaşım, patolojik ve normatif gelişimi daha iyi anlamak için hem tipik hem de atipik gelişime yol açan süreçlerin incelenmesinin önemine dikkat çeker. Bu tez, gelişimsel psikopatolojideki önemli soruları araştıran üç araştırma makalesinden oluşmaktadır. İlk araştırma temel bilişsel temsil becerilerinin (görmenin bilmeyi sağlayacağı ilkesini ve içsel durumları anlama) ve hem sözel hem sözel olmayan iletişim becerilerinin Otizm Spektrum Bozukluğuna sahip olan çocukların sosyal yetkinliklerine etkisini incelemiştir. İkinci araştırma bir meta-analiz çalışmasıdır ve çocukluk çağındaki obezite ve fazla kiloluluk üzerine ebeveynleri de içeren müdahale programlarının etkisini, ve etkin müdahale programlarına yol açan faktörleri belirlemeyi amaçlamıştır. Üçüncü araştırma ise çocuklardaki gelişimsel çıktılar ile çok yakından ilgili olan duyarlı ebeveynlik kavramını ve bu kavramın farklı kültürlerdeki anneler ve profesyonel olarak anneler ve çocuklar ile çalışan klinisyenler tarafından algılanışını altı farklı kültürel grupta (Türk, Hollandalı ve Türkiye, Surinam, Antiller ve Fas göçmeni Hollandalı) incelemiştir. İlk araştırmanın sonuçları otizm spektrum bozukluğuna sahip olan çocukların sosyal yetkinlik becerilerinin, bilişsel temsil ve sözel iletişim becerileri kontrol edildiğinde, çocuklardaki sözel olmayan iletişim becerileri ile yakından ilişkili olduğunu göstermiştir. İkinci araştırmanın sonuçları çocuklardaki obezite ve fazla kilolu olma üzerine yapılan ve ebeveynleri de içeren müdahale programlarının kısa vadede olumlu etkilerinin olduğunu, fakat uzun vadede bu etkilerin kaybolduğunu göstermiştir. Bulgular ayrıca müdahale programlarının birden fazla modül (hem eğitimsel materyal hem de etkileşimleri içeren programlar) yerine bir modülü (sadece eğitimsel materyal veya sadece etkileşim) içerdiklerinde daha etkili olduklarını göstermiştir. Son olarak, üçüncü araştırmanın bulguları farklı kültürlerdeki annelerin “ideal ebeveynlik” ile ilgili düşüncelerinin literatürdeki duyarlı ebeveynlik kavramı ile benzerlik gösterdiğine, ayrıca annelerin düşüncelerinin klinisyenlerin düşünceleri ile de benzerlik gösterdiğine işaret

etmektedir. Bahsedilen alıřmaların uygulama alanına ynelik nemli ıkarımları vardır. İlk arařtırmanın sonuları otizimli ocukların sosyal iliřkilerini glendirmeyi hedefleyen mdahale programlarının ocukların szel olmayan iletiřim becerilerini geliřtirmeyi hedeflemelerinin nemini ortaya ıkarmaktadır. İkinci arařtırmanın bulguları ocukluk ağında obezite ve fazla kiloluluk soruna ynelik mdahale programlarının tek modll olmasının daha yararlı olabileceğini gstermiřtir. nc arařtırma ise duyarlı ebeveynlik kavramının farklı kltrlerde geerli bir kavram olduėuna ve duyarlı ebeveynliėi geliřtirmeye ynelik mdahale programlarının farklı kltrlerdeki anneler tarafından kabul grebileceğine iřaret etmiřtir. Tm bu bulguların hem tipik hem de atipik geliřim gsteren ocukların geliřimsel ıktılarını olumlu ynde etkilemeyi amalayan mdahale ve koruma programları iin yararlı olacaėı ngrlmektedir.

Anahtar szckler: Otizm Spektrum Bozukluėu, ocukluk ağında obezite / fazla kilolu olma, mdahale programları, meta-analiz, duyarlı ebeveynlik

DEDICATION

to my family...

ACKNOWLEDGEMENTS

First and foremost, I would like to express my gratitude to my advisor Assoc. Prof. Dr. Bilge Selçuk Yağmurlu who has been a constant provider of support and encouragement for me, and who has been my role model as a successful researcher. Her supervision and energy allowed me to advance in different areas of research. Her experience, teaching, and wise advices have advanced my understanding, but apart from these, her kindness and patience gave me the power to pursue my studies further. During my Ph.D. years, I have learned so much from her and I am grateful that I had the chance to work with her as her Ph.D. student.

I would also like to express my gratitude and appreciation to Prof. Dr. Judi Mesman and Prof. Dr. Marinus van IJzendoorn who had provided me the opportunity to work under their supervision for one year in Leiden University. I am thankful for their invaluable knowledge and advice which they offered generously as well as their work attitude and energy. I would like to thank Assist. Prof. Dr. Shelley van der Veen for her constant supervision as well as all kinds of support (including emotional) during all phases of my research in Leiden University.

I am also grateful for the helps of my thesis committee members for their invaluable contributions to my research. I especially would like to thank Prof. Dr. Çiğdem Kağıtçıbaşı and Assoc. Prof. Dr. Nazlı Baydar for their presence in my thesis monitoring and final thesis committees and for their valuable comments for my studies. With their help, I have gained a wider perspective about my research questions. I would like to thank Assist. Prof. Dr. Banu Çankaya and Assoc. Prof. Dr. Asiye Kumru for taking part in my thesis committee and for their insightful and constructive comments about my thesis. The guidance and support of these professors were very valuable for me and for the completion of this thesis.

I also would like to thank all my colleagues both from Koç University and from Leiden University. I would like to thank all the members of Child and Family studies

laboratory at Koç University, including but not limited to Müge Ekerim, Ceymi Doenyas, Wenke Niehues, Özlem Sümer, and Seçil Gönültaş. I am also grateful for the help of all the graduate and undergraduate students whom I had a chance to work with. I also would like to thank my colleagues Dr. Burçin Erarslan, Dr. Berivan Ece Uslu, and Dr. Hilal Şen whose presence and support were invaluable. From Leiden University, I am grateful for the friendship of Dr. Hatice Baydar Ekmekçi, working with her was a most pleasurable experience. I am also grateful for all the support and friendship of my roommate Marielle Prevoo, whose diligence had fueled me for more work. I am also thankful for having met and had a chance to work with Dr. Nihal Yeniad, Dr. Rosanneke Emmen and Dr. Maike Malda during my stay in Leiden. I am grateful for their kindness and friendship. The help, support, and most importantly kind friendship of all my colleagues made everything easier for me and allowed me to have a pleasurable working environment. I am grateful for all of their emotional contribution to the preparation of this thesis.

Last but not the least I would like to thank my dearest friends and my family. I would like to thank to my best friend and housemate for 11 years, Dr. Zeynep Ülker, for merely being in my life and making it more beautiful in happy but also in sad moments. I am also thankful for the friendship of Dr. Bengisu Seferoğlu with whom we shared not only our house but also our most happy as well as stressful and sad moments. I am truthfully grateful that you are in my life since life is better with you. I am thankful for my parents, Nurşin and Metin Yavuz, and for my sister, Zeynep Yavuz. They were always there to support me, provide me the strength to continue even during the hardest times, and share my joy with their whole hearts during happy times. I also would like to thank my mother -in-law, Emel Ağınlı, who has provided endless support during all phases of our lives. Finally, I would like to thank my lovely husband Doğa Müren and by far the cutest member of our family (for the time being), Leo. Their deep and unconditional love, patience, and friendship made me a better person.

They are the most important, enduring and strongest sources of support and happiness in my life. I would not be able to complete this journey without these people. Thank you all!

I also would like to acknowledge the financial support of the Scientific and Technological Research Council of Turkey (TÜBİTAK) during my graduate study. This thesis would not be possible without their funding.

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CHAPTER 1: GENERAL INTRODUCTION

CHAPTER 1:

GENERAL INTRODUCTION

This dissertation includes three research papers, presented in separate chapters, that focus on three major topics in developmental psychology: social competence in children with autism; childhood obesity; and maternal sensitive parenting. These are also important research questions in the field of developmental psychopathology, which is a field arguing that knowledge on typical development would increase understanding of the course and development of psychopathology, while knowledge of atypical development would also enhance knowledge on typical development; and understanding the different (biological, psychological, social-contextual) pathways to typical and atypical outcomes would inform each other (Cicchetti 1984; 2006). The first paper (Chapter 2) investigates relatively under-investigated factors influencing the social competence of children with Autism Spectrum Disorder such as see-know understanding, internal state understanding, and non-verbal communication. The second paper (Chapter 3) presents a meta-analysis study which examines the factors that are related to the effectiveness of childhood obesity interventions with parental involvement. And the third paper (Chapter 4) focuses on cross-cultural relevance of sensitive parenting, and investigates the perceived importance of sensitive parenting by mothers and professionals in six different cultures. Overall, each paper focuses on a different aspect of developmental psychopathology such as precursors of a developmental condition, and cultural relevance of a fundamental construct in developmental psychopathology. In the following paragraphs, the main aims and targeted applied implications of each paper are summarized.

An important psychopathological problem that showed a rapid increase in prevalence over the past decades in early childhood is Autism Spectrum Disorder (Elsabbagh et al., 2012). Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is characterized by delays and anomalies in social interaction and communication as well as

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restricted and repetitive behavioral patterns (APA, 2013) which are related to serious social impairments in individuals with ASD. High and increasing prevalence rates increased the need for more research investigating factors influencing the lives of children with ASD, and the first paper presented in this dissertation aims to examine the factors related to their social competence. Even if social impairments is a defining criteria for autism (APA, 2013), not all children with ASD share the same level of social difficulties, raising interest in the developmental mechanisms related to the impaired social competence in children with ASD. Previous research has shown two important factors that are related to social competence of typically developing children: communication skills and mental representation skills (Jenkins & Astington, 2000; Longoria et al., 2009). Similar to children with typical development, children with ASD who have better communication skills and better mental state understanding are also more competent in their social interactions (Peterson, Garnett, Kelley & Attwood, 2009). However, these studies have predominantly used tasks that measure higher order mental state understanding such as false belief understanding, on which children with ASD generally perform poorly (Lerner et al., 2011), and they generally focused on receptive or expressive verbal communication skills without investigating the non-verbal communication skills. In order to gain a more coherent understanding of the factors related to the social competence of children with ASD, the first paper examines cognitive representation and communication skills in a more comprehensive way by measuring see-know ability and internal state understanding, as well as verbal and non-verbal communication skills.

Another important and rapidly increasing problem in childhood is obesity. Even though various intervention and prevention studies are targeting obesity in early childhood years (e.g., Stark et al., 2001; Taveras et al., 2011), some interventions are effective while other interventions remain to be ineffective in changing child weight-related outcomes. The second paper targets this heterogeneity in the results of the intervention studies and

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investigates the factors related to the effectiveness of obesity interventions that involve parents. Globally, the prevalence of overweight and obesity in children and adolescents (younger than age 18) rose by 47.1% from 1980s to 2013 (Ng et al., 2014). Importantly, the rate of prevalence is very high and increasing in preschool aged and younger children as well. The prevalence of overweight and obesity in young children (before the age of 6) has increased from 4.2% to 6.9% between 1990 and 2010 (de Onis, Blossner, & Borghi, 2010). This increased prevalence rate, especially in young children, is alarming since overweight and obesity in childhood tend to persist into adulthood (Magarey, Daniels, Boulton, & Cockington, 2003; Reilly et al., 2003) and are related to various concurrent and longitudinal negative physiological (e.g., lower life expectancy, higher likelihood of coronary health diseases), cognitive (lower executive functions, working memory, attention span), and psychological outcomes (e.g., higher internalizing and externalizing outcomes, and peer victimization) (Eschenbeck, Kohlmann, Dudey, & Schürholz, 2009; Galvan et al., 2014; Halfon, Larson, & Slusser, 2013; Lumeng et al., 2010; Reilly & Kelly, 2001; Schwartz & Puhl, 2003; Smith et al., 2011; Warschburger, 2005). In response to this increase in the prevalence, various intervention and prevention programs were developed and used with children. While targeting childhood obesity, most intervention programs were conducted with school aged children in the school context, but showed limited success (Birch & Ventura, 2009; Summerbell et al., 2009). Instead, researchers concluded that an important environment to target childhood obesity is the home environment and an important period to target weight problems is the preschool years (Birch & Ventura, 2009). Especially in the early childhood years, parents are important agents in shaping the obesity related habits in their children (Faith et al., 2012; Lindsay, Sussner, Kim, & Gortmaker, 2006). Research shows that parenting styles (e.g., authoritarian parenting) and behaviors (e.g., parental monitoring and reinforcement of child eating and physical activity patterns) are related to the development of

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overweight and obesity (Birch & Ventura, 2009; Faith et al., 2002; Gerards et al, 2011; Harrist et al., 2012; Kitzman et al., 2010). In line with this, most of the intervention programs that target early childhood obesity involved parents in the intervention (e.g., Barkin et al., 2012; Bocca et al., 2012); and previous meta-analyses have shown that intervention programs were more effective in decreasing childhood obesity when the program involved parents, especially in young children (Neimeier, Haktner, & Enger, 2012; Young, Northern, Lister, Drummond, & O'Brien, 2007). However, the findings regarding the effectiveness of childhood obesity interventions involving parents are highly heterogeneous and give mixed information about what aspects of parental involvement might be more effective. In order to provide an answer to these questions, the second paper presents a meta-analysis study about interventions targeting childhood obesity. A meta-analysis is a statistical technique allowing the synthesis of statistical results from previous studies via combining and comparing results of independent research. When there is high heterogeneity in the literature about a phenomena, meta-analysis can be used to explain this heterogeneity. The meta-analysis study presented in this dissertation synthesizes and analyzes the results of different intervention studies targeting child obesity in young children (before the age of 6), with the aim of investigating their effectiveness in general. It also aims to shed light into the heterogeneity in the literature by investigating the features related to the effectiveness of child obesity intervention programs with parental involvement. Since previous studies showed that parenting is an important factor related to childhood obesity (Faith et al., 2012), several interventions targeted general parenting styles and behaviors to alleviate child obesity (e.g., Bocca et al., 2012; French et al., 2012). This paper also aims to investigate whether targeting general parenting styles and behaviors are related to increased intervention effectiveness or not.

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Not only the interventions on childhood obesity target parenting styles and behaviors, but also the interventions aiming to prevent and intervene upon various child outcomes such as externalizing behaviors and internalizing behaviors target parenting, especially maternal sensitive parenting (Mesman et al., 2008; Moss, Dubois-Comtois, Tarabulsky, Laurent & Bernier, 2011; van Zeijl et al., 2006; Velderman et al., 2006). Even though sensitive parenting interventions are applied in different cultures (Eshel, Daelmans, de Mello, & Martines, 2006), our knowledge of the relevance of the sensitivity construct across different cultures is still limited. The third paper investigates the similarities and differences of maternal cognitions about ideal parenting with the sensitivity construct in mothers with different cultural backgrounds. Maternal sensitivity refers to mothers' ability to promptly and appropriately respond to child's needs and bids for attention (Ainsworth et al., 1974). Attachment theory predisposes sensitive parenting as important for a secure attachment relationship between the parent and the child and argues that sensitive parenting is universally positive across cultures and leads to various positive outcomes (e.g., secure attachment; better emotion regulation; lower internalizing and externalizing behaviors) (Cassidy, 2008; DeKlyen & Greenberg, 2008; Thompson, 2008), which implies that sensitive parenting is an important aspect of parenting. However, most of the research conducted on attachment is generally conducted with Western populations and our knowledge about the perceived importance of sensitive parenting in different cultures is limited. The third paper presented in this dissertation attempts to investigate whether sensitive parenting represented ideal parenting for mothers from six different cultural groups (ethnic majority Turkish and Dutch and ethnic minority Turkish, Surinamese, Antillean, Moroccan mothers living in the Netherlands) and examines the role of demographic factors and religious beliefs on mothers' cognitions about ideal parenting. Another aim of the study presented in the third paper is to examine convergence of the cognitions of the mothers and professionals (clinicians working with mothers and children

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to ameliorate parenting and child outcomes, via clinical therapies) about the sensitivity construct. For an intervention program to be effective, among other things, the program contents should be socio-culturally relevant (Nation et al., 2003), and there should be a positive alliance and collaboration between the treatment provider and the person receiving the treatment (Berlin et al., 2008; Kazdin et al. 2005; Knipscheer & Kleber, 2004; Nation et al., 2003). The study presented in the third paper aims to understand whether mothers and professionals have similar cognitions on maternal sensitivity, which can have a role on the effectiveness of the interventions aiming to increase positive parenting. This study is important for its implications for culturally sensitive parenting intervention and prevention programs.

Over the past decades, prevalence and recognition of various psychopathological outcomes in childhood have increased (Collishaw, Maughan, Goodman, & Pickles, 2004; Elsabbagh et al., 2012; Kelleher, McInerney, Gardner, Childs, & Wasserman, 2000), which arose the need for early preventive and intervention studies. As a whole, this dissertation aims to contribute to the literature in three ways. First, it aims to improve our understanding about the precursors and outcomes of two child disorders (autism and obesity) that show an increased prevalence in the last decades. Second, it aims to investigate the cultural relevance of the sensitivity construct among mothers and professionals from different cultures. And finally it aims to inform future preventive and treatment intervention programs towards positive child development.

The three studies that form this dissertation may have applied contributions for the literature and for future intervention studies. The first paper aims to shed light on the understudied factors related to social competence of children with ASD, via measuring the developmentally earlier cognitive representation skills and both verbal and non-verbal communication skills; which would inform future research about possible new venues for

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intervention for social competence in children with ASD. The second paper investigates general effectiveness of early childhood obesity interventions that involve parents and examines factors that might be related to more effective interventions. This study is an important attempt to formulate effective interventions to target early childhood obesity. Finally, the third paper investigates the cross cultural applicability of the sensitivity construct and the convergence between mothers and professionals on this construct. This study aims to inform future intervention programs by confirming that sensitive parenting is regarded as ideal parenting in mothers from different cultures, and mothers and professionals agree on the importance on this construct. The three papers are presented in the following chapters and the final chapter of this dissertation provides a general summary and discussion of the results obtained from these three papers.

CHAPTER 2**SOCIAL COMPETENCE IN CHILDREN WITH AUTISM**

Yavuz, H. M., Yağmurlu, B., & Korkmaz, B. (revised and resubmitted). Social competence in children with autism. *Focus on Autism and Other Developmental Disorders*. Manuscript ID:

Focus-15-194

CHAPTER 2: SOCIAL COMPETENCE IN CHILDREN WITH ASD

Abstract

This paper investigates the associations of social competence with cognitive representation and communication skills in children with Autism Spectrum Disorders (ASD), by measuring these abilities in an expansive way through assessing both mental and internal-state understanding, and verbal and non-verbal communication. The data were collected from 45 Turkish children ($M_{age} = 8.52$ years, $SD = 3.05$, min-max = 3-14) with a diagnosis of ASD. Individual assessments were used to measure mental-state and internal-state understanding. Teacher-rated scales were used to assess child's verbal and non-verbal communication skills, and social competence. The results showed that social competence, cognitive representation, verbal and non-verbal communication skills were all significantly associated, but over and above cognitive skills, non-verbal communication (both use and comprehension) had a salient role in adaptive social relationships of children with ASD. Applied implications of this finding are discussed.

Keywords: autism, cognitive representation, verbal communication, non-verbal communication, social competence

CHAPTER 2: SOCIAL COMPETENCE IN CHILDREN WITH ASD

Social Competence in Children with Autism

Social competence involves establishing and maintaining positive social interactions with others while achieving one's social goals and requires displaying appropriate behaviors in social situations, and problems in social competence are related to various negative outcomes like peer rejection and low self-esteem (Rubin & Rose-Krasnor, 1992). Children with Autism Spectrum Disorder (ASD) show deficits in social relations from very early on in life (Levy et al., 2009), but they show some variations, and the correlates of these variations are less well understood. In this study, we aimed to investigate cognitive representation and communication skills as possible factors related to individual variations in social competence of children with ASD, since these are important aspects for competent social interactions in typically developing children (Longoria, Page, Hubbs-Tait, & Kennison, 2009). Research to date have generally focused on the role of higher order mental state understanding (e.g., false belief understanding) in social competence of children with ASD, while another basic feature of mental representation, the ability to understand internal/physical states (e.g., others' feeling cold, hurt) is understudied. Literature also focused heavily on verbal communication capacities as compared to nonverbal communication; although recently nonverbal components are discussed in detail in relation to theory of mind development in autism (Korkmaz, Njiokiktjien, & Verschoor, 2013). Current research investigates the associations of social competence with cognitive representation and communication skills in children with ASD, and measures these abilities in a more expansive way by assessing both mental-state and internal-state understanding, and verbal and non-verbal communication.

Social Competence and Representation Abilities

The ability to take others' perspectives and to understand that behaviors of other people are guided by their mental states, which might be different from one's own, are central aspects of the representation ability that is referred to as theory of mind (ToM), and many

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studies revealed that ToM understanding is positively linked to prosocial behaviors (e.g., Razza & Blair, 2009). Children with ASD were generally shown to fail higher order ToM tasks like false-belief understanding (FBU) tasks, and this ability is acquired by children with ASD at an older age than typically developing children (Happé, 1995).

Since the literature on typically developing children have consistently shown better social behaviors in children who have more advanced ToM understanding (Longoria et al., 2009), it is plausible to expect the same association with children with ASD as well. However, literature investigating the role of ToM in social skills of children with ASD is relatively scarce and present mixed findings. On the one hand, Frith, Happé, and Siddons (1994) showed no differences in social behaviors of children with ASD who passed or failed FBU tasks. On the other hand, when measured social behaviors were measured with items that were expected to require a ToM understanding, children with ASD who passed the FBU tasks showed better social behaviors as compared to children who failed (Frith, Happé, & Siddons, 1994; Peterson, Garnett, Kelly, & Attwood, 2009). On the contrary, some interventions aiming to increase social competence via increasing ToM skills in children with ASD failed to show improvements in social competence despite increased ToM understanding (Begeer et al., 2011). Therefore, empirical evidence regarding the role of ToM skills on social competence of children with ASD are mixed.

While measuring ToM, previous studies mostly focused on FBU, which is shown as a higher order mental state understanding both for typically developing children and also for children with ASD (Peterson, Wellman, & Liu, 2005; Wellman & Liu, 2004). However, ToM is a complex representational ability with several components that are incorporated in its internal structure (Lerner, Hutchins, & Prelock, 2011; Wellman & Liu, 2004), and less is known about their association with social competence in children with ASD. One of these early components is the ability to understand the relation between perception (seeing) and

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knowledge (Baron-Cohen & Goodhart, 1994; Kazak, Collis, & Lewis, 1997; Lind & Bowler, 2010). Although it has been widely shown that children with ASD perform poorly on higher order ToM tasks like FBU (Lerner et al., 2011), findings with regards to their see-know ability are inconsistent. Leslie and Frith (1988) and Perner, Frith, Leslie, and Leekam (1989) found that see-know ability was less developed in children with ASD compared to children with specific language impairments. Kazak et al. (1997) showed that see-know task performance of children with ASD was linked to their language ability, but more recently, Lind and Bowler (2010) revealed that children with ASD performed worse than age- and verbal ability-matched typically developing children on see-know tasks. This finding suggested that, independent of their problems in language, children with ASD displayed deficits in understanding the see-know relation.

Another aspect of cognitive representations is about making inferences about others' unobservable inner physiological states like feeling cold, tired or hurt (Lind & Bowler, 2010). Understanding and using physiological terms are seen as onsets of communicative intentions and suggested to reflect a rudimentary ToM capacity at a young age (e.g., 2 years) in typically developing children (Bretherton, McNew, & Beeghly-Smith, 1981). Few studies investigated this particular form of understanding in ASD populations. In one study, Lind and Bowler (2010) found that understanding of internal physiological states was poorer in children with ASD than in children with typical development and intellectual impairment.

Children with ASD who have better basic cognitive representational skills might also display more positive social relations, yet previous studies have not investigated such associations, hence it is not clear whether social skill deficits are related to more basic cognitive representational skills in children with ASD or not. In this research we measured cognitive representation ability in a more inclusive way by tapping both mental and internal

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state understanding, and investigated whether they contribute to social competence of children with ASD, controlling for communication skills.

Social Competence and Communication Skills

Having a more advanced understanding of other people's mental states was associated with better social skills (Hughes, Soares-Boucard, Hochman, & Frith, 1997). Still, among children with ASD, even the ones who pass the FBU tasks were found to display poorer social skills than typically developing children who fail (Peterson et al., 2009). Therefore, having better representation abilities per se may not be sufficient for social relationships in ASD. Language is another important skill that is linked with social competence (Longoria et al., 2009). Children with ASD have problems in both expressive and comprehensive language skills (Charman et al., 2003; Loucas et al., 2008). They have difficulties in expressing themselves verbally and in understanding and reacting to verbal attempts of others, in turn, show less positive social behaviors and are more likely to be excluded from peer groups (Longoria et al., 2009), all of which decrease their social competence. Empirical studies have also revealed that both receptive and expressive language skills are positively related to social competence in children with ASD. Controlling for intelligence, better language at preschool years in children with ASD was found as an important predictor for better social functioning in later childhood and adulthood (Gillespie-Lynch et al., 2002; Luyster, Qui, Lopez, & Lord, 2007). Similarly, Howlin, Mawhood, and Rutter (2000) showed that better language skills at 7-8-year-old children with ASD were related to better social functioning in adulthood years and adulthood language skills were related to better concurrent social functioning. Therefore, both understanding and using verbal communication were found as important contributors for better social skills in children with ASD.

Within communication skills, non-verbal communication is also an important indicator of social competence (Gillespie-Lynch et al., 2012). It includes using and understanding

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behaviors like eye-contact, gestures, and joint attention. Impaired social communication, including deficits in non-verbal communication and misattributing non-verbal intents of others, is one of the core deficiencies in the classification of ASD (APA, 2013). Children with ASD demonstrate problems in both using and comprehending non-verbal communication (Maljaars, Noens, Jansen, Scholte, & van Berckelaer-Onnes, 2011; Stone, Ousley, Yoder, Hogan, & Hepburn, 1997) and these difficulties were reported to predict problems in adaptive social development in children with ASD (Charman, 2003). In children with ASD, higher responsiveness to joint attention at preschool age was found to be related to better social competence in adulthood (Gillespie-Lynch et al., 2012); and intervention studies showed that improvement in different types of non-verbal communication (e.g., joint attention, gesture understanding) was related to improvement in social skills (Ingersoll & Gergans, 2007).

To summarize, extant literature shows that children with ASD usually display deficits in understanding mental states of others and using and understanding verbal and non-verbal aspects of communication, and these problems negatively influence their social development. Previous studies have generally investigated ToM and communication skills of children with ASD compared with typically developing children with the aim of showing the areas where children with ASD have difficulty with. Previous studies generally investigated the role of higher order mental state understanding capacities, like FBU performance, in social competence of children with ASD, but their results were mixed, and they did not investigate the role of more primary cognitive representation skills in social competence of this group. Moreover, even if both verbal and non-verbal communication skills were shown as important predictors for social functioning of children with ASD, previous studies rarely controlled for the role of both. Cognitive representation and communication skills are found to be highly intercorrelated in both typically developing children and also in children with ASD (e.g., Happé, 1995; Jenkins & Astington, 1996). Still, our knowledge about the relative

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contributions of one skill over the other on social competence is limited. Hence, in the current study we aimed to investigate the relations of both verbal and non-verbal communication as well as cognitive representations skills with social competence, and examined whether these skills had unique contributions to social competence of children with ASD. Based on the literature, we hypothesized that verbal and non-verbal communication skills would be positively related to social competence of children with ASD. Regarding the mixed findings in the literature about the role of mental state understanding on social competence of children with ASD, we examined the role of cognitive representation skills without a specific hypothesis. The results of the current study might be informative in shedding light into what aspects might be targeted more in therapeutic settings and intervention studies developed for children with ASD.

Method

Participants

Data were collected from 56 Turkish children with a diagnosis of ASD, their mothers and teachers in the special education centers. The teachers had specialization in child special education and were highly experienced in working with children with ASD. All children were diagnosed with ASD by a child psychiatrist or a child neurologist, based on DSM-IV-TR criteria (American Psychiatric Association, 2000). Children with severe intellectual disabilities; i.e., children who display problems in self-care abilities, children with a diagnosis of severe intellectual disability or with any known syndromes like Fragile X, presence of dysmorphism or organ anomalies, children without any linguistic capacity defined as no words at age two or no phrases at age three were not recruited for the study. Eleven children were excluded from the data. Nine of these children were unable to pay attention to the study material and two with echolalia were unable to provide concrete answers to study questions. Therefore the data set of this study was composed of 45 children (age range = 3-14 years).

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Age of boys ($n = 34$, $M = 8.55$ years, $SD = 3.04$) and girls ($n = 11$, $M = 8.41$ years, $SD = 3.22$) did not differ significantly; $F(1, 43) = .02$, *ns*.

Nearly 75% of the children were diagnosed with ASD before the age of 3; and 57% had started to receive special education at this age. All children in the sample were attending a special education center, which use Applied Behavior Analysis, providing group and one-on-one individual therapy. On average, children spent about 4.5 hours ($SD = 5.46$) per week in the special education centers. Most of the children (86.7%) were also attending a day-care center, kindergarten, elementary school or elementary special education school. All children were from intact families and most were from low and low-middle socio-economic backgrounds. Monthly household income was less than 1500 Turkish Liras (about \$500) for approximately 50% of the families.

Measures

Background information. Mothers completed a demographic form to provide information about the child and the family. Education level of parents was rated on a 10-point Likert scale (1 = primary school drop-out, 10 = graduate degree). Approximately 25% of the mothers and 20% of the fathers were primary school graduates and about 26% of mothers and 35.5% of fathers completed four-year university education or above. Associations among mother's and father's education level and household income were all significant (r s between .70 and .73; $p < .001$); so they were converted to standardized (z) scores and averaged to derive a total socioeconomic status (SES) score ($M = -.21$, $SD = .86$).

Social competence. To measure child's social competence, special education teachers completed the Social Skills subscale of the Social Skills Rating System (SSRS; Gresham & Elliot, 1990). The Social Skills subscale has 11 items that tap cooperation and assertiveness (e.g., "Helps peers during class-work"). Items are rated on a 4-point Likert scale (1 = Never, 4

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= Always) and averaged to obtain the social competence score. The Social Skills subscale has commonly been used for assessing the social functioning and competence in children with ASD and was found to be a reliable instrument for this population (Bauminger, 2007; Reichow, Steiner, & Volkmar, 2012). The scale was adapted to Turkish by Sucuoglu and Ozokcu (2005), and had high reliability with Turkish school-aged children with typical development and learning disabilities ($\alpha = .96$). In the present study, the scale also had high internal consistency ($\alpha = .90$).

Cognitive representation. Children's cognitive representation ability was measured with two tasks assessing mental and internal states, both of which were previously used in similarly aged children with ASD (e.g., Leslie & Firth, 1988; Lind & Bowler, 2010).

Understanding mental states. Level of mental-state understanding was measured by the see-know task which measures the ability to understand the link between seeing and knowing (Baron-Cohen & Goodhart, 1994; Pratt & Bryant, 1990). In the procedure (see Lind & Bowler, 2010 for a detailed description), the child is shown five different opaque boxes and informed that each box contains a small object. Child is also introduced and familiarized with two dolls (one male and one female) until they can recall their names correctly (in the present study, the dolls were given common Turkish names, Ali and Zeynep). The child is then exposed to a procedure in which one of the dolls opens the lid of the box and looks inside to see what it contains; and the other doll only lifts up the box without opening the lid, hence without seeing its contents. Experimenter then asks the child which doll knows what is inside the box (test question). This procedure is repeated five times with different boxes containing different objects. The order of the stories was counterbalanced across children to minimize possible order effects. Child's correct answers (given a score of 1) were summed to calculate the total mental-state understanding score (max = 5) (see Table 1).

Table 1

Descriptive Statistics for Child Age and Study Variables (N = 45)

	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
1. Child's age (in years)	8.52	3.05	3	14
2. Social competence (0-4)	2.05	.53	1.18	3.27
3. Understanding internal states (0-6)	3.80	2.12	0	6
4. Understanding mental states (0-5)	2.88	1.76	0	5
5. Cognitive representation total score (z)	.00	.88	-1.71	1.12
6. Comprehension of speech (%)	78.77	25.60	20	100
7. Ability to use speech (%)	67.92	26.86	0	100
8. Comprehension of non-verbal communication (%)	87.04	20.38	16.17	100
9. Ability to use non-verbal communication (%)	72.17	23.54	14.29	100

Understanding internal states. To measure understanding of internal states, the procedure used in Lind and Bowler (2010) was utilized. In the task, the child was told six short stories about the two dolls used in the see-know task. The stories required the child to give answers to questions regarding internal, unobservable (but not mental) states of the dolls, including getting hurt, feeling tired, cold, and sick. An example question is: "It is snowing outside. Zeynep goes outside to make a snowman, while Ali stays indoors by the fire and reads a book. Who gets cold?" (Lind & Bowler, 2010, p. 482). The order of these six stories

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was counterbalanced for each child. Child's correct answers (given a score of 1) were summed to calculate a total score of internal-state understanding (max = 6) (see Table 1).

Lind and Bowler designed this task as a control task, so that it is similar to the see-know task in the way that both tasks require same cognitive skills (e.g., remembering an action, making inferences) except for the understanding of mental states, which was suggested to be required only in the see-know task. We found that children's understanding of mental and internal states were positively and significantly correlated ($r = .53, p < .001$). Moreover, both mental-state ($r = .39, p < .01$) and internal-state ($r = .34, p < .05$) understanding were significantly correlated with social competence; but neither of them were correlated with social competence when the other was controlled for. These results revealed that understanding mental states and internal states were closely linked, and neither predicted unique variance in social competence of children with ASD. Therefore, we calculated a total cognitive representation score by averaging standardized mental- and internal-state understanding scores.

Verbal and non-verbal communication. Schedule of Handicaps, Behaviors and Skills (HBS; Wing & Gould, 1979) was used to assess child's verbal and non-verbal communication. Because of the delays and deviances in language competence in children with ASD, the use of only the standardized language tests is not advised (Charman, 2004). HBS is a scale specially developed for children with developmental deviances and delays including autism (Wing & Gould, 1978), and was previously shown as a reliable and valid instrument for children with ASD (Gillberg, Nordin, & Ehlers, 1996; van Berckelaer-Onnes & Duijn, 1993). HBS is originally composed of 33 sections measuring child's developmental level in different domains like language, and abnormal or difficult behaviors. In the current study, the sections of 'comprehension of speech', 'ability to use speech', 'ability to understand non-verbal communication', and 'ability to use non-verbal communication' were used to measure

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child's communication skills. Each of these sections comprises subsections that measure the developmental level achieved by the child. The subsections are composed of a series of hierarchically ordered items. Children's special education teachers were informed about how to complete the scale and filled in the scale for the children they knew for the longest time or they knew best. The special education teachers were instructed to select the item that is most suitable to the present developmental level of the child. Higher scores in each section reflect a higher level in developmental sequence for the skill measured.

As suggested by Bernsen (1980), scoring of the sections was done by taking percentage scores. Child's developmental level in each domain was assessed by adding the score the child receives within each subsection and calculating their percentages (i.e., by dividing the total score obtained by the child with the highest possible score within that subscale) (see Table 1). The scale was translated into Turkish by the authors. The interrelations between subscales were in the expected direction, as suggested by the studies conducted with Western samples.

The *comprehension of speech* section of HBS is comprised of two subsections: ability to comprehend speech and to understand prepositions. Ability to comprehend speech subsection includes eight hierarchically scored items (0= no response when spoken to, 7= understands instructions that involves giving decisions). Ability to understand prepositions (e.g., 'in', 'behind', 'under') subsection includes three hierarchically scored items (0= does not understand these prepositions, 2= fully understands all these prepositions).

The *ability to use speech* section consists of four subsections. The first subsection measures child's development in grammar, using ten hierarchically scored items (0= no usage of speech or sounds, or makes unintelligible noises without meaning, 9= uses past, present and future tenses, and complex grammatical constructions). The second subsection measures child's ability to ask questions, using four hierarchically scored items (0 = does not ask

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questions, 3 = asks complex ‘why’ and ‘how’ questions). In the third subsection, the level of meaningfulness of child’s speech is measured with seven hierarchically scored items (0 = almost all or all speech is unintelligible, 6 = no problems in the meaningfulness of speech). In the final subsection, the intelligibility of the child’s speech is measured with four hierarchically scored items (0 = speech is nonsensical, vague and/or out of context, 3 = no problems in the intelligibility of speech).

Comprehension of non-verbal communication is measured with two subsections tapping child’s ability to understand gestures and bodily movements, and facial expressions. Understanding gestures and bodily movements are measured with five hierarchically scored items (0 = no understanding of gestures and bodily movements, 4 = understands complex social gestures and bodily movements). Understanding facial expressions are measured with three hierarchically scored items (0 = does not understand facial expressions, 2 = child’s behavior can be controlled by even a slight change in the facial expression).

Child’s ability to use non-verbal communication is measured with four subsections. The first subsection measures child’s ability to mime gestures and bodily movements using five hierarchically scored items (0 = cannot mime other people’s bodily movements, 5 = can act little parts in plays or can sing a short song while dancing with appropriate movements and facial expressions). The second subsection measures child’s ability to use gestures and bodily movements using three hierarchically scored items (0 = never nods or shakes head to mean ‘yes’/‘no’, 2 = knows the meaning of these gestures and uses them). The third subsection measures child’s ability to use facial expressions and is rated with three hierarchically scored items (0 = face is almost without any expressions, 2 = there are clear changes in child’s facial expressions). The fourth subsection measures child’s ability to use gestures as a substitute for speech and is rated with six hierarchically scored items (0 = there is no gesture at all, 5 = can show his/her needs by miming).

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Procedure

After approval was obtained from the university research ethics board, the participants were recruited from one university hospital and seven special education centers in Istanbul, Turkey. Mothers who gave written informed consent were asked to complete the demographic information form, and special education teachers who knew the child for the longest time completed the scales for social competence, verbal and nonverbal language abilities. These tasks were administered to teachers, as they were highly knowledgeable of the assessed behaviors and difficulties, and had extensive experience with these children and in general with youth with ASD. The tasks measuring understanding of others' mental- and internal-states were administered to the child by a female experimenter in a quiet room in the center/hospital.

Results

Preliminary analysis revealed that all the study variables demonstrated acceptable levels of normality (see Table 1). Children mostly displayed poor to moderate levels of social competence: 22 (48.9%) received a score between 1 and 2, and 21 (46.7%) received a score between 2 and 3 (out of 4). No children scored 0 and only two children scored above 3. Children's cognitive representation levels were moderate (*Median* = .08). Analysis of verbal and non-verbal communication skills revealed that the highest percentage scores children received were in the comprehension of non-verbal communication; and the lowest scores were obtained in the ability to use speech. With regard to comprehension of non-verbal communication, 27 (60%) children received the highest score possible (a score of 100%), and most of the remaining children (16 children, 35.6%) received a score between 66% and 84%. Only 3 (6.7%) children received the highest score possible in the ability to use speech scale, with 10 (22.2%) children receiving a score less than 50%. In the comprehension of speech scale, 20 (44.4%) children obtained the highest score possible, while 9 (20%) obtained a score

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less than 50%. In the ability to use non-verbal communication scale 9 (20%) children received the highest score possible and 8 (17.8%) received a score less than 50%.

To examine if demographic characteristics were linked with the study variables, we conducted ANOVAs and Pearson correlations. Results showed that there were no significant gender differences in social competence ($F(1,43) = .00, ns$), comprehension ($F(1,43) = .56, ns$) and use of speech ($F(1,43) = 1.22, ns$), comprehension ($F(1,43) = .48, ns$) and use of non-verbal communication ($F(1,43) = .08, ns$), and cognitive representation ability ($F(1,43) = 1.01, ns$). SES was significantly correlated with the ability to use speech ($r = .31, p < .05$) and had a marginally non-significant association with comprehension of speech ($r = .28, p = .058$).

Children who were diagnosed with ASD at an earlier age were found to start attending a special education center earlier ($r = .39, p < .05$). But, having an earlier diagnosis was not related to the number of hours the child spent in the center ($r = .01, ns$). Child's age, the age at which the child was diagnosed with ASD, the hours child spent in the special education center, and the age at which the child started to attend a special education center were not significantly associated with child's social competence, cognitive representation, or verbal and non-verbal communication skills (r s between $-.26$ and $.21, all ns$).

In order to investigate the associations among variables, we calculated zero-order correlations. Results revealed that social competence was significantly and positively related to cognitive representation, and comprehension and use of verbal and non-verbal communication. Cognitive representation ability was also significantly associated with both comprehension and use of verbal and non-verbal communication skills (see Table 2). These results showed that the developmental skills investigated were all meaningfully linked in varying levels, and pointed to the possibility of some overlap among them.

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Table 2

Zero-order Correlations among Variables (N = 45)

	Child's age	1	2	3	4	5
1. Social competence	-.06	-				
2. Cognitive representation	.09	.42**	-			
3. Comprehension of speech	-.21	.50***	.58***	-		
4. Ability to use speech	-.14	.48**	.61***	.71***	-	
5. Comprehension of non-verbal communication	-.10	.62***	.45**	.71***	.48**	-
6. Ability to use non-verbal communication	-.12	.68***	.48**	.55***	.54***	.58***

* $p < .05$, ** $p < .01$, *** $p < .001$.

We conducted regression analysis to examine the individual predictive values of cognitive representation ability and the abilities to comprehend and use verbal and non-verbal communication in social competence. Age, gender, and SES were not examined further in the regression analysis as they were not related to social competence. When all the five variables were in the regression equation (adjusted $R^2 = .49$), the ability to use non-verbal communication ($\beta = .45$, $p < .01$) and comprehension of non-verbal communication ($\beta = .39$, $p < .05$) were significantly associated with social competence; whereas cognitive representation ($\beta = .04$, ns), comprehension of speech ($\beta = -.17$, ns), and ability to use speech ($\beta = .14$, ns) were not. However, the Variance Inflation Factor (VIF) (above 2.5) and the tolerance values (below .40) indicated multicollinearity among the variables (Allison, 1991). In the condition of multicollinearity, it is suggested to aggregate the variables that are highly correlated and

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conceptually similar (Tabachnick & Fidell, 2007). Following this suggestion, we standardized the comprehension of speech and ability to use speech variables into z scores and took their mean to calculate a composite ‘*verbal communication*’ score. Using the same procedure, we computed the ‘*non-verbal communication*’ composite score from the standardized ability to comprehend and use non-verbal communication scores. In the new regression model, we examined the predictive values of cognitive representation, verbal communication, and non-verbal communication for social competence in children with ASD (see Table 3 for the zero order correlations). The VIF (below 2.5) and tolerance values (above .40) did not indicate multicollinearity. When all three variables were in the equation, non-verbal communication was the only factor that was significantly associated with social competence in children with ASD (see Table 4).

Table 3

Zero-order Correlations among Verbal Communication, Non-verbal Communication, Cognitive Representation, and Social Competence (N = 45)

	1	2	3
1. Social competence	-		
2. Cognitive representation	.42**	-	
3. Verbal communication	.53***	.64***	-
4. Non-verbal communication	.73***	.53***	.70***

** $p < .01$, *** $p < .001$.

Table 4

Regression Analysis for Social Competence (N = 45)

	<i>B</i>	<i>SE (B)</i>	<i>B</i>
Verbal communication	.02	.10	.03
Non-verbal communication	.42	.09	.69***
Cognitive representation	.02	.09	.04
R ² (Adjusted R ²)	.53 (.50)		

*** $p < .001$.

Discussion

Previous studies conducted with children with ASD revealed that communication skills and cognitive representation ability are critical for social competence (Longoria et al., 2009). In the current study, we assessed different aspects of cognitive representation and communication skills, and examined their concurrent associations with social competence. Supporting our hypotheses, correlational analyses showed that children with ASD who had better communication skills and cognitive representation ability were more socially competent. However, when verbal communication and cognitive representation were controlled in the regression, the aggregate measure of understanding and using non-verbal communication was the only significant factor associated with social competence of children with ASD, with children with better non-verbal communication skills having higher social competence.

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Researchers argue that non-verbal communication attempts in children represent an early intent to communicate (e.g., Bourdais, Danis, Bacle, Santolini, & Tijus, 2013). Hence better non-verbal communication capacity might reflect a higher capability to be socially responsive towards others in children with ASD. Understanding the meaning of non-verbal communications would allow the child to understand the needs and desires of others (Stone et al., 1997), which would increase positive social interactions. Empathy is an important skill facilitating prosocial behaviors and situation-appropriate acts (Eisenberg & Fabes, 1998). The situations that require empathic understanding generally occur within contexts requiring individuals to understand the needs of others from non-verbal bids. It is possible that children's understanding of these non-verbal bids and their use of non-verbal communication to indicate their needs might evoke more positive interactions. Understanding and using non-verbal communication were also shown to be related to prosocial acts and competence in social interactions in typically developing children and in children with ASD (Buttelmann, Carpenter, & Tomasello, 2009; Sigman & Ruskin, 1999), which are in congruence with the results of this study. Even at very young ages (e.g., 13-18 month olds), typically developing children are capable of understanding the meaning of non-verbal communication and capable of using it in prosocial interactions with adults (Bourdais et al., 2013; Buttelmann et al., 2009). Similar links between non-verbal communication and social competence were previously obtained in children with ASD (Maljaars et al., 2011). Longitudinally, preschool aged children with ASD with better non-verbal communication skills were found to display higher competence in social functioning in adulthood years (Gillespie-Lynch et al., 2012). Likewise, intervention studies targeting non-verbal communication revealed that children with ASD could acquire skills like joint attention and understanding and using gestures, which were related to increases in social competence (Ingersoll & Gerson, 2007). Supporting

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earlier findings, results of the current study revealed that non-verbal communication has a critical role in social competence of children with ASD.

In this study, results showed that when verbal and non-verbal communication skills were both in the model, non-verbal communication was the only factor that was significantly related to social competence of children with ASD. There are few studies that examined the associations among different aspects of communication and social behavior in autism. In one such study, Kjellmer et al. (2012) found that adaptive social functioning in children with ASD was linked with verbal and non-verbal communication, but its association with non-verbal communication was stronger. Similarly, Luyster et al. (2007) found that controlling for expressive language, non-verbal gesture use at ages 2 and 3 was related to adaptive social behaviors at age 9 in children with ASD. Our findings are in line with these studies showing that non-verbal communication is important for social functioning in children with ASD. In the current study the assessment of verbal communication was based on vocabulary and grammatical language knowledge of children (e.g., understanding and using certain words like prepositions and following grammatical rules), while the assessment of non-verbal communication tapped pragmatics (e.g., using gestures and facial expressions appropriately). Among communication skills, pragmatics or the social use of language is one of the most challenging for children with ASD (Baron-Cohen, 1988; Tesink et al., 2009). Hence, it is plausible that competence in pragmatic use and understanding of non-verbal communication is essential for effectiveness in social relations, even in the presence of relative verbal proficiency. Therefore, confirming previous studies, our results also showed that non-verbal communication skills might be especially important in the development of social competence of children with ASD. However, in the present study, verbal and non-verbal communication skills were strongly associated, hence results should be interpreted cautiously, since the literature (e.g., Charman et al., 2003; Mundy & Crowson, 1997) also shows that non-verbal

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communication might provide a base for verbal language in autism. Longitudinal studies are necessary to delineate these possible associations between non-verbal and verbal communication skills as well as social competency in children with ASD.

In the current study, cognitive representation ability was significantly linked to social competence, while this association became non-significant when communication skills were statistically controlled for. Being able to represent mental and internal states of others is important for understanding and anticipating needs, desires and wishes of others, and for appropriately acting upon this insight, and was found to be necessary for better social interactions. Our results provided support for previous studies which showed that ToM understanding was related to better social competence of children with ASD (e.g., Peterson et al., 2009), and extended these studies by showing that not only performance in higher order ToM understanding tasks like FBU, but also developmentally earlier cognitive representation skills might be related to social competence of children with ASD. However, it is also acknowledged that better cognitive representations might not be sufficient for developing positive relations with others in children with ASD (Peterson et al., 2009). Our results showed that understanding and using non-verbal communication predict better social competence over and above cognitive representation abilities. It is again possible that competence in non-verbal communication is an underlying skill that is linked to both cognitive representation ability and social competence.

Present study had some limitations. It had a cross-sectional design and the results had a correlational nature which did not allow us to make causal predictions. A longitudinal design would allow for a better understanding of the precedence of different cognitive and communicative skills and their effect on the development of social competence in children with ASD. The sample size was relatively small; which limits generalizability of the findings. Results of the correlational analyses might also be statistically underpowered to detect

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significant results because of the small sample size. The usage of teachers for gaining information about both children's verbal and non-verbal communication skills and for their socially competent behaviors was another limitation of the study. Although teachers were found to be reliable informants of children's social competence and communication skills (Szatmari, Archer, Fisman, & Steiner, 1994), interviews might also be conducted with mothers to have a more comprehensive assessment of children's social and communicative skills. Moreover, being rated by the same observer might have increased the shared rater variance and might have resulted in significant correlations among variables. Nevertheless, teachers were selected as informants on these skills because as special education teachers of these children, they were highly knowledgeable about their skills. Future studies could use multiple informants to assess children's skills.

Apart from these limitations, the study has many strengths. It employed multiple assessment methods (individual assessments, teacher ratings), and both communication and cognitive representation abilities were measured comprehensively via measuring both verbal and non-verbal communication as well as mental-state and internal-state understanding. Results extended earlier findings (e.g., Hughes & Dunn, 1998) in showing that apart from higher order understanding of mental states, developmentally earlier cognitive representation abilities like see-know and understanding physiological states also had a significant relation with social competence of children with ASD.

These findings have implications for intervention studies and suggest that improvements on non-verbal communication skills might be important in increasing positive social relations of children with ASD. Moreover, training and intervention programs aiming to ameliorate cognitive skills of children with ASD should not only focus on ToM but also target earlier understanding of mental and internal states, which are simpler but fundamental. Since more competent social relations are related to a variety of positive outcomes in

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individuals with ASD, this study is an important attempt to show the relative importance of cognitive representation and communication skills and suggest new venues for therapeutic and intervention settings for children with ASD.

CHAPTER 3**INTERVENTIONS AIMED AT REDUCING OBESITY IN CHILDHOOD: A
META-ANALYSIS OF PROGRAMS THAT INVOLVE PARENTS**

Yavuz, H. M., van IJzendoorn, M. H., Mesman, J, & van der Veek, S. (2015). Interventions aimed at reducing obesity in early childhood: A meta-analysis of programs that involve parents. *Journal of Child Psychology and Psychiatry*, 56, 677-692. doi: 10.1111/jcpp.12330

CHAPTER 3: META-ANALYSIS OF OBESITY INTERVENTIONS WITH PARENTAL INVOLVEMENT

Abstract

Obesity is a growing problem even in very young childhood, resulting in high costs for individuals and society. As a response, numerous obesity prevention and intervention programs have been developed. Previous research has shown that early intervention programs are more effective when parents are involved, but the effectiveness of specific aspects of programs with parental involvement has not been investigated. This meta-analysis aims to investigate the features related to the effectiveness of different types of obesity intervention programs involving parents and targeting young children (0-6 year olds). The Web of Science, PubMed, PsycInfo, CINAHL, and ERIC databases were searched for childhood obesity prevention and intervention programs involving parents. Data were analyzed using the Comprehensive Meta-analysis (CMA) software. Fifty studies with effect sizes measured at short-term follow-up (within 3 months from the end of the intervention) and 26 studies with effect sizes measured at long-term follow-up (all reported in a total of 49 publications) were identified. The combined effect size of interventions was small but significant at short-term follow-up ($d = .08, p < .01$). The results suggested the presence of a potential publication bias in studies providing results at long-term follow-up, with a non-significant adjusted effect size ($d = .02$), which indicated that obesity interventions were not effective at long-term follow-up. Multivariate meta-regression analyses showed that interventions were more effective when including either interactive sessions or educational materials as opposed to those including both interactive sessions and non-interactive educational materials. No other moderators regarding sample characteristics, study design, or methodological quality were significant. Interventions targeting young children that require parental involvement are effective at short-term follow-up, specifically when interventions include one mode of intervention rather than two. However, results were not retained in the long run.

Keywords: obesity, intervention, prevention, parental involvement, meta-analysis, preschooler, infant

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Interventions Aimed At Reducing Obesity in Childhood: A Meta-Analysis of Programs

That Involve Parents

Over the last decades the prevalence of overweight and obesity has increased drastically across the world, even in very young children (Wang & Lobstein, 2006), which is alarming since obesity in childhood is generally found to persist into adulthood (Magarey, Daniels, Boulton, & Cockington, 2003; Reilly et al., 2003), is linked to a host of physiological problems such as coronary heart diseases and premature mortality (Reilly & Kelly, 2011), and represents a major financial cost in health care systems (Withrow & Alter, 2010). Moreover, children with obesity have more problems with peers (Lumeng et al., 2010; Warschburger, 2005; Xie, Ishibashi, Lin, Peterson, & Susman, 2013) and are at risk for various forms of internalizing and externalizing psychopathological problems (Eschenbeck, Kohlmann, Dudey, & Schürholz, 2009; Halfon, Larson, & Slusser, 2013; Schwartz & Puhl, 2003). In childhood, parents are important in shaping obesity-related habits (Faith et al., 2012; Lindsay, Sussner, Kim, & Gortmaker, 2006), and several meta-analyses have shown that intervention programs involving parents are more effective in reducing childhood obesity than those that do not (e.g., Niemeier, Hektner, & Enger, 2012; Young, Northern, Lister, Drummond, & O'Brien, 2007). However, the programs with parental involvement show mixed effectiveness and it is not clear which aspects of the programs with parental involvement lead to more effective outcomes in young children, and meta-analyses have thus far not included studies on young children and/or did not provide information on the effectiveness of specific aspects of parental involvement (e.g., Stice, Shaw, & Marti, 2006; Wilfley et al., 2007). The current meta-analysis aims to examine the effectiveness of obesity interventions including parents and young children (0 to 6 years). The effectiveness of the intervention was calculated for both short-term (within 3 months from the end of the intervention) and long-term follow-up results.

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Moderators regarding intervention characteristics as well as sample and study characteristics are also examined.

Early childhood obesity has become a world-wide epidemic (Wang & Lobstein, 2006), and has become a major economic concern posing increased physical and psychological health-care costs as well as non-health-care costs like higher job-absenteeism and lower productivity (Finkelstein, Ruhm, & Kosa, 2005). Given that obesity-related behaviors like consumption of energy-dense foods and beverages together with high levels of sedentary behaviors already start in early childhood (Certain & Kahn, 2002; Fox, Reidy, Novak, & Ziegler, 2006), it is vital to conduct intervention and prevention programs at an early age. Although cost-effectiveness analyses are generally not conducted for obesity interventions for young (0-5 year-old) children (see Bond, Wyatt, Lloyd, Welch, & Taylor, 2009; Hesketh & Campbell, 2010; Waters et al., 2011), obesity interventions for older children have been found to be cost effective (e.g., Hollingworth et al., 2012). In fact, analyses taking lifetime economic costs and gains in terms of medical expenses and extended quality of life years (duration and quality of 'healthy life') into account suggest that making large investments in prevention/treatment programs for childhood obesity is cost-effective by widely accepted criteria (Trasande, 2010). More specifically, an intervention costing over 400 dollars per child would be cost-effective even if it reduces the prevalence of obesity in 6-year-olds by only one percent and increases the prevalence of overweight by that same one percent (Trasande, 2010). Considering that early childhood interventions are generally claimed to be more cost-effective than interventions conducted with school-aged children or adults (Heckman, 2006), interventions in the very early years of life are likely to be most promising in this respect.

The development of obesity is related to various genes and genomic positions (Snyder et al., 2004), with estimates of 20 to 60% heritability (Maes, Neale, & Eaves, 1997), as well as metabolic and hormonal dysregulations (Speiser et al., 2005). However, there is evidence

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for gene-environment interactions predicting childhood obesity (Speiser et al., 2005), and the sharp increase in obesity over the past decades has not been accompanied by equally sharp changes in human gene pool, and metabolic dysregulations are generally found to be insufficient to explain the development of obesity (Weinsier, Hunter, Heini, Goran, & Sell, 1998). It is therefore necessary to take a closer look at factors in the environment that may help us understand the development of obesity in children, and the role of parenting is likely to be particularly salient in early childhood (Faith et al., 2012). Nevertheless, in Web of Science (July 6, 2014), only 1% of the publications on childhood overweight include the term ‘parenting’ in title or abstract, and 80% do not mention parents at all. Yet, parents are crucial in child weight-related behaviors in many ways. Parental feeding behaviors including high control over eating, structured feeding, sensitivity to child satiety cues, feeding as a response to hunger as opposed to general ‘fussiness’, as well as general parenting styles (e.g., authoritarian versus authoritative parenting), and specific parenting behaviors (e.g., modeling, reinforcement, goal setting) have all been linked to concurrent and later child obesity-related behaviors (Birch & Ventura, 2009; Gerards, Sleddens, Dagnelie, de Vries, & Kremers, 2011; Harris et al, 2012; Jeor et al., 2002; Lindsay et al., 2006). For these reasons, interventions with parental involvement might be promising in decreasing childhood obesity. However, there is high heterogeneity among interventions with parental involvement in terms of the content of the interventions as well as the outcomes that were measured and the factors that are related to increased effectiveness within these interventions are not clear. The most salient factors that may relate to intervention effectiveness include intervention focus, type of intervention delivery, sample characteristics, and study characteristics, discussed below.

First, the focus of interventions targeting parents can be categorized into three broad types of behaviors that also co-occur within programs: (a) general parenting skills/behaviors (e.g., modeling, monitoring, reinforcement, setting goals), (b) diet/nutrition related behaviors,

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(c) physical activity/sedentary behaviors. In the literature there is no consensus as to whether one type of intervention is more effective than the others (see Hingle, O'Connor, Dave, & Baranowski, 2010; Sung-Chan, Sung, Zhao, & Brownson, 2013). However, a meta-analysis showed that general parental behavior modification training was effective after controlling for parenting education regarding nutrition and food preparation (Kitzman et al., 2010). Therefore, we hypothesize that the inclusion of a general parenting skill or behavior component in early childhood obesity interventions would be related to increased intervention effectiveness.

Second, childhood obesity interventions are delivered in either one or both of two ways, (a) receiving interactive sessions, (b) receiving non-interactive educational materials. Both significant and non-significant program effectiveness have been found in interventions that required parents and/or children to participate in interactive sessions (e.g., De Bock, Breitstein, & Fischer, 2011; Stark et al., 2011), or that provided both interactive sessions and educational materials to the participants (e.g., Bellows et al., 2013; Verbestel et al., 2014). We hypothesize that receiving interactive sessions were more effective than receiving only non-interactive educational materials, since interactive sessions would be more intense and provide more opportunities for questions from participants and clarification of intervention objectives.

Third, divergent findings regarding the effectiveness of obesity interventions might also result from the characteristics of the sample, including child age, gender, minority status, as well as baseline weight status of the child and parent. Early intervention programs initiated in the preschool years have been suggested to be more effective than later (childhood or adolescence) interventions (Heckman, 2006). Yet, there is no evidence for superiority of early interventions starting in infancy as opposed to the preschool years, therefore no age differences within early childhood were hypothesized. The literature suggests no gender effect

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for young children (Waters et al., 2011), and participant ethnicity also was not found to be a significant moderator in a previous meta-analysis (Stice et al., 2006). Therefore, we did not hypothesize differential effectiveness of interventions regarding age, gender, and minority status. Baseline weight of children and parents, however, might be related to intervention effectiveness. However, previous studies investigating this moderator yielded mixed results regarding eating disorders and obesity (Stice & Shaw, 2004; Stice et al., 2006). Thus, no specific hypotheses about relative effectiveness of targeted versus universal interventions were formed. Finally, regarding study characteristics, longer interventions have been found to be more effective than shorter ones, possibly because they allow program content to be repeated, and allow participants to reflect upon, tryout, and internalize program materials (Campbell & Hesketh, 2007; Stice & Shaw, 2004), but longer interventions have also been found to be less effective than shorter ones, maybe because they increase drop-out rates and decrease effectiveness (Stice et al., 2006). Given these contradictory results, in the current meta-analysis, the role of duration of intervention on intervention effectiveness was examined without a specific hypothesis.

Method

Selection of Studies

Intervention studies as reported in journal articles and dissertations were retrieved via three different search strategies. First, the electronic databases Web of Science, PubMed, PsycInfo, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and ERIC were searched, until June 2013, using the following keywords (obesity OR obese OR overweight) AND (intervent* OR prevent* OR treat* OR therap* OR behavior modification OR health education OR weight reduct* OR lifestyle OR program*) AND (random OR randomized control* trial OR randomised control* trial OR RCT OR assign*) AND (child*

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OR youth OR infant OR infants OR infancy OR preschool* OR baby OR babies). This search yielded 3,715 hits after removing duplicates.

Studies were included if they (a) test the effectiveness of a preventive intervention or treatment intervention program, (b) on a weight-related outcome (e.g., BMI, zBMI, percentage overweight and/or obesity), (c) using a randomized controlled trial design (cluster randomized trials were also included), (d) conducted with children up to 6 years old at baseline, (e) with levels or types of parental involvement that vary between the intervention and control groups. Since studies conducted with infants generally provided weight-for-height information, weight and weight-for height were also accepted as a weight-related outcome, but only for infancy studies. Studies were excluded if (a) they were conducted with children with intellectual disabilities (e.g., mental retardation, genetic syndromes), (b) they investigated the effect of a specific type of controlled-diet (e.g., high versus low protein), and (c) they were not published in English. We defined parental involvement as either one or a combination of (a) parents receiving non-interactive educational materials, and/or (b) parents participating in interactive sessions. Studies providing only an information session about the intervention to parents or only requiring parents to sign the consent form were not included. This procedure yielded 48 publications reporting on 74 effect sizes.

Our second search strategy was to screen the reference lists of the selected empirical studies and previous relevant reviews and meta-analyses retrieved from the electronic data base search, by using the same inclusion and exclusion criteria as mentioned above. One additional study was identified in the reference lists of the selected studies, while the reference lists of the reviews and meta-analyses did not yield additional results. Finally, we conducted another search within the same data bases as mentioned above to find other meta-analyses about childhood obesity. We used the following keywords: (obesity OR obese OR overweight) AND (meta-analysis OR metaanalysis) AND (parent*) AND (child*). This

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search yielded five relevant meta-analyses. Their reference lists were screened to find additional studies that met our inclusion criteria, but none were found. Thus our final set consisted of 49 publications with 76 eligible unique effect sizes (see detailed descriptions of reasons for exclusion in Figure 1). Studies were coded for short-term and long-term follow-up

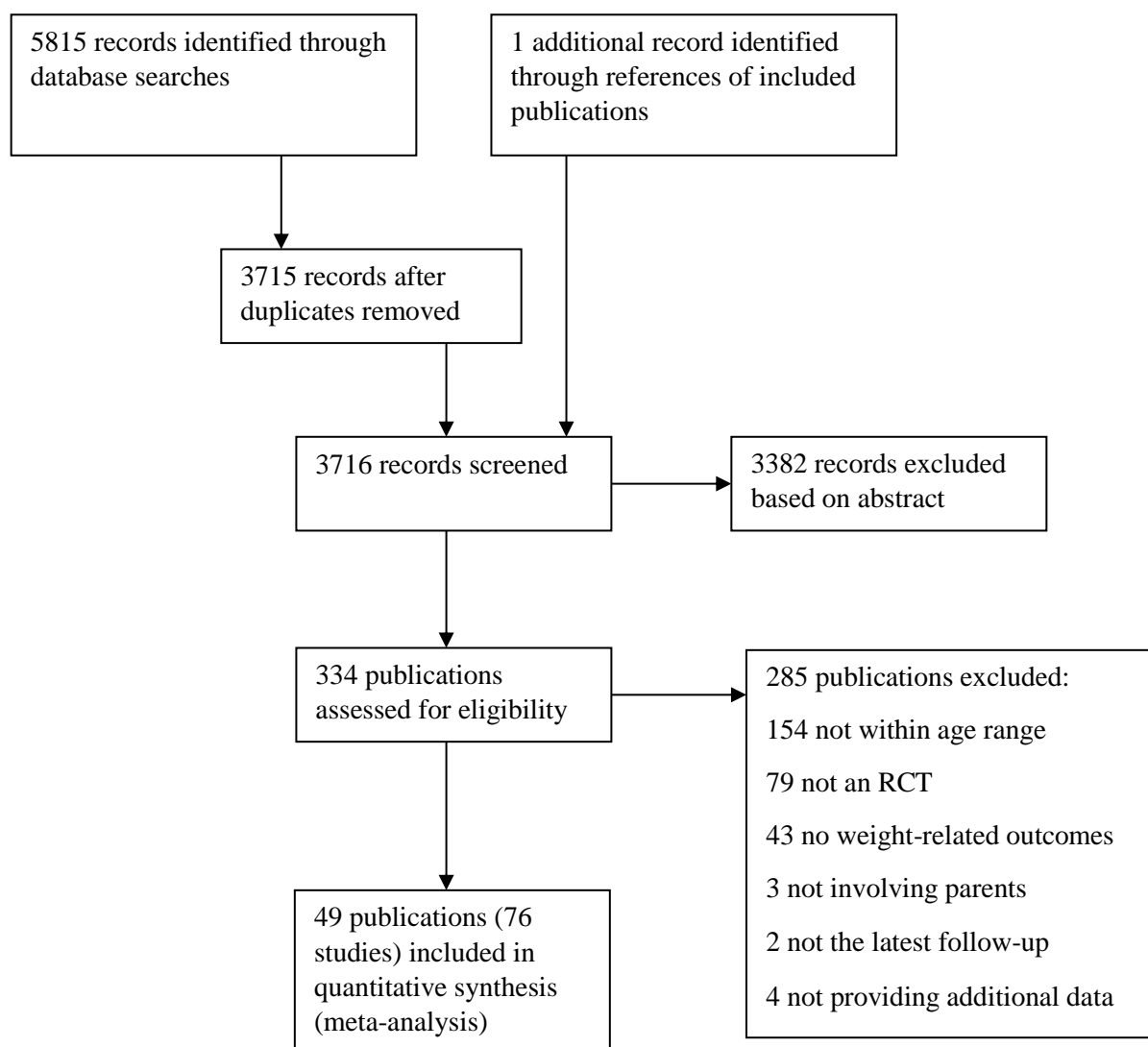


Figure 1. Flow chart illustrating the inclusion and exclusion of publications.

results separately and Tables 2 and 3 provide overviews of the included studies for short-term and long-term follow-up results respectively.

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The selection of the studies was conducted by three researchers (first and last author, and a research assistant). For reliability purposes, we screened 50 articles regarding the inclusion and exclusion criteria. Agreement between the three researchers ranged from 92% to 96%.

Coding System

The coding system that was used to rate studies on *sample characteristic*, *study design*, and *methodological quality* is presented in Table 1. For *sample characteristics*, demographic information from the sample, including sample size (at outcome), child age (at the beginning of the intervention), baseline overweight-obesity status of the child and the mother, percentage of female children and minorities in the sample, and the geographical area in which the data was collected were coded.

For *study design*, we coded the duration of the intervention in months, the timing of the outcome assessment (short-term or long-term follow-up), follow-up interval (the time between the end of the intervention and the assessment of the outcome, coded for articles with follow-up information only), presence or absence of a dummy intervention (either on obesity-related behaviors or not) in the control group, content of the intervention (only general skills intervention, only eating habits/physical activity intervention, or mixed), mode of delivery of the intervention (interactive sessions, non-interactive educational materials, or both), and the target of the intervention (parent or parent and child). For the content of the intervention we coded the behaviors targeted to change within the intervention. We coded ‘general skills’ as general parent-child interactive behaviors and skills including (a) general parenting behaviors (e.g., praise, modeling, reinforcement, monitoring, being sensitive to infant cues, calming down an infant), and (b) general parenting skills (e.g., goal setting, self-efficacy, problem solving, conflict resolution, cognitive restructuring, sleep management). We coded ‘eating habits/physical activity intervention’ when interventions provide informative interactive

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sessions either to parents, to children, or both, on eating behaviors (e.g., diet, nutrition) or physical activity/sedentary behaviors, and when interventions are aimed at changing eating, physical activity and/or sedentary behaviors. The ‘mixed’ category included interventions that provided both general skills and eating habits/physical activity interventions. For the mode of delivery of the intervention we coded how the intervention was delivered to parents and children. We coded ‘interactive sessions’ if parents and/or children in the intervention group received face-to-face sessions with an intervener, or they have received training/intervention through phone calls about childhood obesity. We coded ‘non-interactive educational materials’ when parents received educational materials (e.g., pamphlets, educational websites) about childhood obesity. If parents and/or children received both interactive sessions and non-interactive educational materials, we coded these studies as ‘both’. If the control group received a dummy intervention, then the components that were provided only to the intervention group were coded as constituting the intervention program.

For the *methodological quality* of the studies we coded whether or not the provider of the outcome information was blind to participants’ group assignment, and whether or not there were significant differences between intervention and control groups on baseline weight-related information (either provided by the study authors or calculated based on the available information provided in text or tables).

There were also a number of other possible moderators that were coded but could not be used for the analyses because there was not enough variance between studies as indicated by less than four studies in a subcategory or because the information provided by studies were inconsistent and could not be categorized. An example of a low-variance moderator is the presence (reported in 4 % of the studies) versus the absence (reported in 20 % of the studies) of differential attrition rates between the intervention and control groups. Examples of inconsistently reported moderators are parental education level and socioeconomic status.

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Moreover, the presence or absence of information on child baseline weight was also coded for each study as an indicator of methodological quality. Yet, this information was present in 47 out of 50 studies in short-term follow-up, and 22 out of 26 studies in long-term follow-up. Since, there was not sufficient variance in this moderator with most studies including this information, this moderator was not included in the analyses.

For selection of the publications, we focused exclusively on those reporting on programs in which participants were randomly assigned to the intervention and control groups. There were two studies in which the participants were randomly assigned across intervention groups but the participants in the control group were not randomly assigned (Jouret et al., 2009; Karanja et al., 2010). In these cases, the group receiving the lowest level of intervention in terms of duration and content was coded as the control group, and the other intervention group(s) receiving higher levels of intervention duration and content was coded as the intervention group(s). When a publication did not provide sufficiently detailed information about the intervention program, supplementary publications on the same intervention (e.g., study protocols) were retrieved for further information. If multiple follow-up results of the same intervention were published, the results with short-term follow-up information and with the longest follow-up period were selected for comparing the effect of time on the efficacy of the intervention programs.

The moderators were coded by two coders (first author and a research assistant). Inter-coder reliability among the coders was established by coding 25 articles (for the first 15 articles, all items were coded, for the next 10 articles, only specific items for which reliability was unsatisfactory because of restricted variation in the first set were coded). The Kappa values for agreement were $> .80$ for categorical variables and intra-class correlations were $> .70$ for continuous variables. Disagreements were resolved via discussions among coders and

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when necessary, they were discussed with a third researcher (the last author) until a consensus was reached.

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Table 1

Coding System for Rating Intervention Studies

Variable	Coding system
<u>Sample characteristics</u>	
Sample size ¹	Number of participants with information at post-test
Child age at baseline in years	1 = Before birth (during pregnancy) and infancy (0-12 months) 2 = Toddler and Preschooler (13-78 months)
Classification of baseline weight ^{2,3}	1 = Obese (OB) and Overweight (OW) 2 = Mixed (OB-OW and normal weight) 3 = Non-obese
Gender ratio (% girls) ³	1 = Less than or equal to 20% girls 2 = Between 21% and 79% girls 3 = More than or equal to 80% girls
Racial make-up (% minority) ³	1 = Less than 20% minority 2 = Between 21% and 79% minority 3 = More than 80% minority
Continent	1 = North America (USA- Canada) 2 = Europe 3 = Other (Latin America, Asia, Australia)
<u>Study design</u>	
Duration of the intervention (in months) ³	1 = 6 months or less 2 = Between 7 and 12 months 3 = Between 13 and 24 months 4 = 25 months or more
Follow-up interval (in months) ⁴	1 = 11 months or less 2 = Between 12-36 months 3 = 37 months or more
Control group received	1 = Dummy intervention 2 = No intervention
Content of intervention	1 = Focused on general skills 2 = Focused on eating habits/physical activity 3 = Mixed
Mode of delivery of intervention	1 = Interactive only (e.g., face to face sessions, phone calls) 2 = Non-interactive only (e.g., educational materials, websites) 3 = Mixed (i.e., both interactive sessions and non-interactive educational materials)
Intervention provided to	1 = Parent only 2 = Parent and child
<u>Methodological Quality</u>	
Blinding ³	1 = Blind 2 = Not blind
Difference in baseline weight-related data ³	1 = Significant difference between IG and CG ⁵ 2 = Non-significant difference between IG and CG ⁵

¹ When there were more than one intervention groups, the sample size of the control group was split up according to the number of intervention groups

² Separately coded for mothers and children

³ When no information was provided, it was coded as not reported

⁴ Coded only for interventions with available long-term follow-up data. When there are multiple long-term follow-up results, the information from the latest follow-up was coded

⁵ IG = Intervention group; CG = Control group

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Table 2

Intervention Studies: Descriptives and Effect Sizes for Studies Providing Results at Short-term Follow-up

Study	N	Duration of intervention (months)	Baseline Age ¹	Child Baseline Weight ^{2,3}	Content ⁴	Mode of delivery	Effect of intervention		
							d	95 % CI	P
Barkin et al. (2012)	75	3	2	Mixed	3	Interactive only	.77	.30, 1.24	.00
Bayer et al. (2009, sample 1)	1,295	6	2	NR	3	Mixed	.13	.02, .24	.02
Bayer et al. (2009, sample 2)	1,326	18	2	NR	3	Mixed	.03	-.08, .14	.61
Bellows et al. (2013)	201	4.5	2	Mixed	3	Mixed	.00	-.28, .28	1.00
Berry et al. (2011)	56	6	2	NR	3	Interactive only	.69	.14, 1.23	.01
Bocca et al. (2012)	62	4	2	OB-OW	1	Interactive only	.52	.01, 1.03	.05
Campbell et al. (2013)	457	15	1	Mixed	3	Mixed	-.10	-.28, .08	.29
Cespedes et al. (2013)	1,116	5	2	Mixed	3	Mixed	.12	-.00, .23	.06
Crespo et al. ⁶ (2012, IG ⁵ 1 ⁶)	173	36	2	Mixed	3	Mixed	-.03	-.38, .33	.88
Crespo et al. ⁶ (2012, IG ⁵ 2 ⁶)	141	36	2	Mixed	3	Interactive only	-.02	-.36, .32	.91
Crespo et al. ⁶ (2012, IG ⁵ 3)	128	36	2	Mixed	3	Mixed	.02	-.34, .38	.92
De Bock et al. (2011)	202	6	2	NR	3	Interactive only	.00	-.28, .28	1.00
De Coen et al. (2012)	1,112	18	2	NR	3	Mixed	.03	-.09, .15	.61
Dennison et al. (2004)	77	18	2	NR	3	Mixed	.21	-.24, .66	.35
Epstein et al. (2008)	67	24	2	OB-OW	3	Non-interactive	.06	-.42, .54	.82
Fitzgibbon et al. (2005)	362	3.5	2	Mixed	2	Mixed	.00	-.21, .21	1.00
Fitzgibbon et al. (2006)	383	3.5	2	Mixed	2	Mixed	.00	-.20, .20	1.00
Fitzgibbon et al. (2011)	589	3.5	2	Mixed	2	Mixed	.05	-.11, .21	.56
Fitzgibbon et al. (2013)	143	3.5	2	Mixed	3	Mixed	-.05	-.38, .28	.78
French et al. ⁷ (2012, IG ⁵ 1)	93	12	1	Mixed	1	Mixed	-.05	-.48, .38	.82

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Table 2 cont.

Study	N	Duration of intervention (months)	Baseline Age ¹	Child Baseline Weight ^{2,3}	Content ⁴	Mode of delivery	Effect of intervention		
							<i>d</i>	95 % CI	<i>P</i>
French et al. ⁷ (2012, IG ⁵ 2)	91	12	1	Mixed	3	Mixed	-.41	-.84, .02	.06
Hakanen et al. (2006, boys) ⁸	303	43.5	1	Mixed	3	Interactive only	.02	-.21, .24	.89
Hakanen et al. (2006, girls) ⁸	282	43.5	1	Mixed	3	Interactive only	.25	.01, .48	.04
Harvey-Berino&Rourke (2003)	40	4	1	Mixed	2	Interactive only	.43	-.20, 1.06	.18
Jouret et al. (2009)	1,253	24	2	Mixed	2	Mixed	.04	-.07, .15	.50
Karanja et al. (2010)	177	28.5	1	Mixed	2	Interactive only	.41	.09, .73	.01
Kavanagh et al. (2008)	38	.03	1	Mixed	1	Non-interactive	-.31	-.95, .33	.35
Llargues et al. (2011)	504	18	2	Mixed	2	Mixed	.06	-.12, .24	.50
Louzada et al. (2012, boys)	223	12	1	Mixed	3	Interactive only	.05	-.22, .31	.73
Louzada et al. (2012, girls)	173	12	1	Mixed	3	Interactive only	.05	-.26, .35	.77
Nemet et al. (2011a, boys)	393	9	2	Mixed	2	Mixed	.10	-.09, .30	.30
Nemet et al. (2011a, girls)	332	9	2	Mixed	2	Mixed	.06	-.16, .27	.61
Nemet et al. (2011b, boys)	167	9	2	Mixed	2	Mixed	.50	.19, .81	.00
Nemet et al. (2011b, girls)	130	9	2	Mixed	2	Mixed	.35	-.00, .69	.05
Østbye et al. (2012)	301	8	2	Mixed	3	Mixed	-.08	-.31, .15	.48
Puder et al. (2011)	625	9	2	NR	3	Mixed	.03	-.13, .18	.75
Quattrin et al. (2012)	96	6	2	OB-OW	1	Interactive only	.69	.28, 1.11	.00
Reilly et al. (2006, boys)	244	6	2	Mixed	2	Mixed	.02	-.23, .27	.88
Reilly et al. (2006, girls)	237	6	2	Mixed	2	Mixed	-.12	-.38, .13	.35
Rush et al. (2012)	926	24	2	Mixed	2	Interactive only	-.04	-.17, .09	.53
Small et al. (2013)	60	4	2	OB-OW	3	Mixed	.42	-.10, .93	.11

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Table 2 cont.

Study	<i>N</i>	Duration of intervention (months)	Baseline Age ¹	Child Baseline Weight ^{2,3}	Content ⁴	Mode of delivery	Effect of intervention		
							<i>d</i>	95 % CI	<i>P</i>
Stark et al. (2011)	17	6	2	OB-OW	1	Interactive only	1.74	.61, 2.87	.00
Story et al. (2012)	440	18	2	Mixed	3	Mixed	.01	-.18, .19	.95
Taveras et al. (2011)	445	12	2	OB-OW	3	Mixed	.07	-.12, .26	.45
Verbestel et al. (2014)	153	12	1	Not OB-OW	3	Non-interactive	.55	.22, .89	.00
Warren et al. ⁹ (2003, IG ⁵ 1)	56	14	2	Mixed	3	Mixed	.00	-.61, .61	1.00
Warren et al. ⁹ (2003, IG ⁵ 2)	60	14	2	Mixed	3	Mixed	.00	-.60, .60	1.00
Warren et al. ⁹ (2003, IG ⁵ 3)	56	14	2	Mixed	3	Mixed	.00	-.61, .61	1.00
Wen et al. (2012)	483	24	1	Mixed	2	Interactive only	.15	-.03, .33	.09
Zask et al. (2012)	438	10	2	NR	3	Mixed	.09	-.10, .28	.36

¹ 1 = Before birth, Infant; 2 = Toddler- Preschooler

² OB = Obese; OW = Overweight

³ NR = Not reported

⁴ 1 = General parenting; 2 = Eating habits/physical activity; 3 = Mixed

⁵ IG = intervention group

⁶ IG 1 = School/Community only; IG 2 = Family only; IG 3 = Both (Crespo et al., 2012)

⁷ IG 1 = Maternal-focused intervention; IG 2 = Ounce of prevention (French et al., 2012)

⁸ The exceptionally long duration of intervention (120 months) reported by Hakanen et al. (2006) was winsorized (to *N* = 43.5) to avoid disproportionate influence of this duration on analyses

⁹ IG 1 = Eat smart; IG 2 = Play smart; IG 3= Eat smart, play smart (Warren et al., 2003)

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Table 3

Intervention Studies: Descriptives and Effect Sizes for Studies Providing Long-term Follow-up Results

Study	N	Duration of intervention (months)	Baseline Age ¹	Child Baseline Weight ^{2,3}	Content ⁴	Mode of delivery	Effect of intervention		
							d	95 % CI	p
Birken et al. (2012)	132	.03	2	NR	3	Mixed	.12	-.22, .46	.50
Bocca et al. (2012)	57	4	2	OB-OW	1	Interactive only	.67	.13, 1.21	.01
Brotman et al. (2012, study 1)	40	6	2	NR	1	Interactive only	.51	-.14, 1.16	.12
Brotman et al. (2012, study 2)	146	6	2	NR	1	Mixed	.56	.20, .91	.00
Cespedes et al. (2013)	596	5	2	Mixed	2	Mixed	-.06	-.22, .11	.50
De Bock et al. (2011)	202	6	2	NR	3	Interactive only	.00	-.28, .28	1.00
Fitzgibbon et al. (2005)	300	3.5	2	Mixed	2	Mixed	.23	.01, .46	.05
Fitzgibbon et al. (2006)	331	3.5	2	Mixed	2	Mixed	.07	-.15, .28	.55
Fitzgibbon et al. (2013)	128	3.5	2	Mixed	3	Mixed	-.05	-.39, .30	.80
Llargues et al. (2012, boys)	220	18	2	Mixed	2	Mixed	.19	-.08, .46	.16
Llargues et al. (2012, girls)	204	18	2	Mixed	2	Mixed	.02	-.25, .30	.87
Louzada et al. (2012, boys)	175	12	1	Mixed	3	Interactive only	.05	-.25, .35	.74
Louzada et al. (2012, girls)	133	12	1	Mixed	3	Interactive only	.11	-.23, .45	.53
Martin et al. (2013) ⁵	1,788	NR	1	Mixed	2	Interactive only	-.06	-.15, .04	.24
Nemet et al. (2013)	203	9	2	Mixed	2	Mixed	.28	-.01, .56	.05
Paul et al. ⁷ (2011, IG ⁶ 1)	39	5	1	Mixed	3	Mixed	-.25	-.97, .47	.49
Paul et al. ⁷ (2011, IG ⁶ 2)	39	5	1	Mixed	1	Mixed	-.03	-.75, .69	.94
Paul et al. ⁷ (2011, IG ⁶ 3)	32	5	1	Mixed	3	Mixed	.55	-.21, 1.31	.16
Plachata-Danielzik et al. (2011)	1,192	4.5	2	NR	2	Interactive only	.02	-.09, .13	.72
Reilly et al. (2006, boys)	247	6	2	Mixed	2	Mixed	.13	-.12, .38	.31

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Table 3 cont.

Study	<i>N</i>	Duration of intervention (months)	Baseline Age ¹	Child Baseline Weight ^{2,3}	Content ⁴	Mode of delivery	Effect of intervention		
							<i>d</i>	95 % CI	<i>p</i>
Reilly et al. (2006, girls)	248	6	2	Mixed	2	Mixed	-.11	-.36, .14	.38
Scheiwe et al. (2010)	86	9	1	Mixed	2	Interactive only	-.15	-.57, .28	.50
Slusser et al. (2012)	81	4	2	Mixed	3	Mixed	.25	-.19, .70	.26
Small et al. (2013)	60	4	2	OB-OW	3	Mixed	.19	-.32, .70	.47
Stark et al. (2011)	16	6	2	OB-OW	1	Interactive only	1.68	.54, 2.83	.00
Wake et al. (2011)	193	2	1	Mixed	1	Mixed	-.09	-.38, .19	.52

¹ 1 = Before birth, Infant; 2 = Toddler- Preschooler; ² OB = Obese; OW = Overweight; ³ NR = Not reported; ⁴ 1 = General parenting; 2 = Eating habits/physical activity; 3 = Mixed

⁵ The exceptionally large sample size ($N = 13,879$) reported by Martin et al. (2013) was winsorized (to $N = 1,788$) to avoid disproportionate influence of this sample size on analyses

⁶ IG = intervention group; ⁷ IG 1 = Introduction of solids; IG 2 = Soothe/Sleep; IG 3 = Both (Paul et al., 2011)

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Statistical Analyses

The effect sizes (Cohen's d) for the meta-analysis and the 95% confidence intervals around the point estimates of effect sizes were calculated using the Comprehensive Meta-Analysis (CMA) program (Borenstein, Rothstein, & Cohen, 2005). When a study reported more than one weight-related outcome (e.g., BMI and percentage of obese children), these outcomes were meta-analytically combined into one effect size. When a study provided information on two different interventions or samples, separate effect sizes were computed for each intervention or sample. Likewise, when a study reported results for boys and girls separately, the results for these sub-samples were considered to reflect the outcomes of two studies. Some interventions provided results for more than one intervention group. In that case, the information on all intervention groups was retained and analyzed independently, and the sample size in the control group was divided by the number of intervention groups to prevent participants being included in the analyses more than once. When an effect was congruent with the hypothesis (e.g., higher decrease in BMI in the intervention group compared to the control group), it was assigned a positive sign. When the effect was incongruent with the hypothesis, it was assigned a negative sign. Studies that did not report exact statistical information on the significance of the results were assigned a conservative non-significant p value of .50 (Mullen, 1989). Two effect sizes for short and long-term follow-ups were calculated separately to examine effectiveness at short and long-term.

The significance of effect sizes and moderators were analyzed by random effects models (Borenstein, Hedges, & Rothstein, 2007). In contrast to fixed effects models, random effects models allow for random variation in the size of the effect due to differences in procedures, measures or settings across studies (Borenstein et al., 2007; Lipsey & Wilson, 2001). Moreover, when the assumption of homogeneity is not met, random effects model adequately reflect the heterogeneity in the studies without inflating the alpha levels. Q -

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statistics (Q_h) were computed to test the homogeneity of the moderator variables (Borenstein et al., 2005). Contrast Q (Q_c)-statistics were computed to assess differences in effect sizes of subsets within a moderator. Q_c -statistics were only computed when there was a minimum of two subsets containing at least four studies to avoid reaching conclusions based on small sample sizes (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003, 2005).

In order to address a possible publication bias, funnel plots and fail safe numbers were examined separately for studies providing short and long-term follow-up results. A funnel plot is a plot of each study based on its effect size and standard error (usually plotted as $1/SE$ or precision). The plot is expected to show a funnel shape with a symmetrical distribution on the right and left side of the mean if there is no publication bias. However, smaller studies with non-significant results are less likely to be published and in the case of such a publication bias, the bottom left-hand corner of the funnel plot is not symmetrical with the bottom right-hand corner (Duval & Tweedie, 2000b; Sutton, Duval, Tweedie, Abrams, & Jones, 2000). The degree of asymmetry is examined by the number of studies that have no symmetric counterpart on the other side of the funnel plot. The “trim and fill” method which trims the symmetrically unmatched studies and imputes (fills) their symmetrical counterparts, is used for analyzing the influence of a possible publication bias. The trim and fill method also allows for the computation of adjusted effect size and confidence intervals with the imputed values (Gilbody, Song, Eastwood, & Sutton, 2000; Sutton et al, 2000). The fail safe N represents the number of studies required to nullify the intervention effect.

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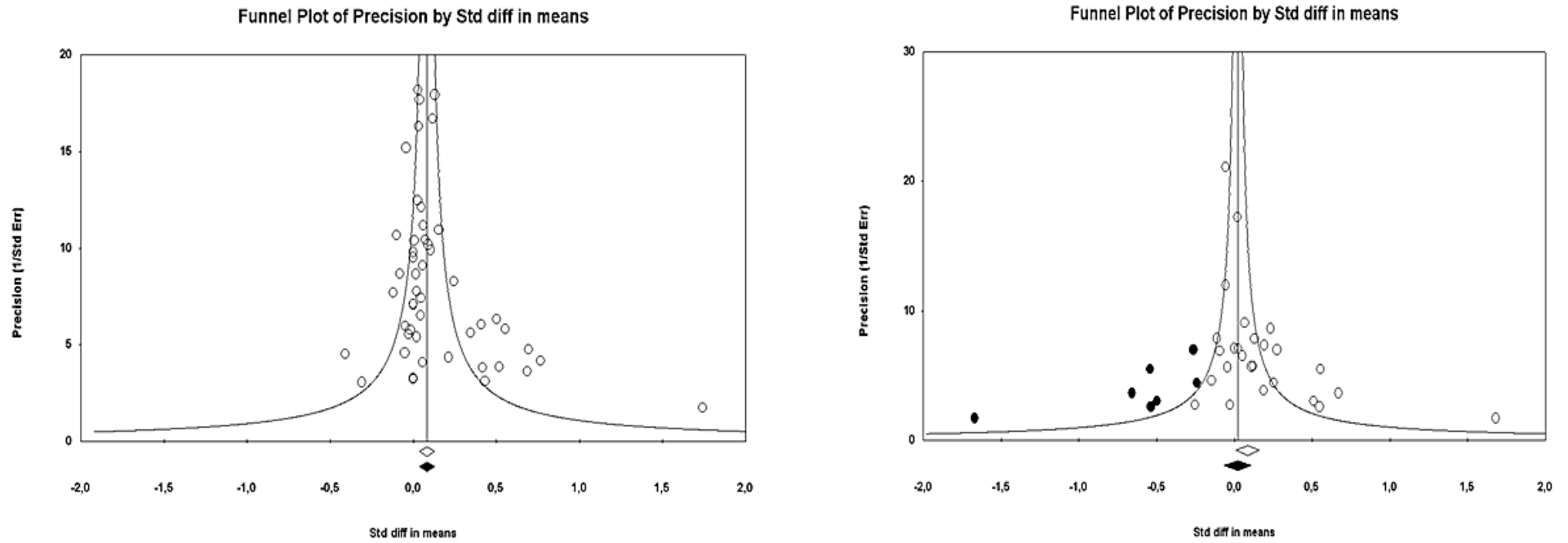


Figure 2. Funnel plots for short-term (at left) and long-term (at right) follow-up results. Filled black dots indicate number of studies filled.

Filled black diamonds indicate the effect size after the trim and fill method.

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Results

The current meta-analysis included 50 studies (total $N = 16,801$) providing effect sizes at short-term follow up (within 3 months) and 26 studies (total $N = 6,888$) providing effect sizes at long-term follow-up (reported in 49 publications). Tables 2 and 3 provide overviews of the studies and basic characteristics of studies including effect sizes at short-term and long-term follow-ups, respectively. The sample sizes of the selected studies ranged from 17 to 1,788 (with winsorized sample size of the outlying study by Martin et al., 2013) and publication dates ranged from 2003 to 2014. Interventions were mostly conducted with toddlers and preschool children (75%) and most of the interventions were universal (68%) rather than targeting children who are obese or overweight. Many of the interventions were conducted in North America (46%) followed by Europe (29%) and other countries (25%) and usually lasted 12 months or less (75%).

The results of the meta-analyses of short- and long-term follow-up outcomes are presented in Tables 4 and 5, respectively. Overall, the interventions were related to decreases in weight-related outcomes in children. The combined effect size of interventions in child obesity-related outcomes were small but significant both at short-term follow-up ($d = .08$, 95% CI = .04, .13, $p < .01$) and at long-term follow-up ($d = .09$, 95% CI = .01, .16, $p < .05$). Both sets of studies were heterogeneous (with $Q_h = 85.64$, $p < .001$ for short-term follow-up and $Q_h = 43.41$, $p < .05$ for long-term follow-up results). Based on the results of the trim and fill method, there was no evidence for a publication bias in studies providing short-term follow-up results, i.e., no studies needed to be trimmed and filled (Duval & Tweedie, 2000a,b) (Figure 2). The fail-safe N was also high ($N = 318$), indicating that more than 300 null results would be required to cancel out the combined effect size (Mullen, 1989). The presence of some asymmetry in the funnel plot and the trim and fill results did indicate a potential publication bias in studies providing results at long-term follow-up (7 studies had to

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be trimmed and filled) (Figure 2). Moreover, the fail-safe N was lower than the threshold suggested by Rosenthal (1995), i.e., $5k + 10$, with 52 studies required to nullify the effect size. It should however be noted that in this relatively new field of inquiry with only 50 studies in total, 26 of which reported long-term effects, it seems doubtful that more than 24 studies can be found not reporting follow-up results because of null findings. After trim and fill, the adjusted effect size for follow-up studies was .02, and non-significant (95% CI = -.07-.11, $Q = 77.56$). This indicated that obesity interventions were effective at long-term follow-up but the combined effect did not survive adjustment for publication bias, suggesting the need for additional studies assessing follow up effects. This is especially urgent because the number of studies with long-term follow-up assessments was restricted.

Moderators

We tested whether moderators regarding sample characteristics, study design, and methodological quality were related to the effect sizes for studies providing outcome at short-term (Table 4) and long-term (Table 5) follow-ups.

For outcomes at short-term follow-up, analyses revealed a significant effect of child baseline weight. Targeted interventions (i.e., with obese and overweight children) ($d = .29$) were more effective than both universal interventions (i.e., interventions targeting both obese-overweight and non-obese, non-overweight children) ($d = .05$), and interventions that did not provide any information on child baseline weight ($d = .08$). Regarding the content of the intervention, the interventions targeting only general skills ($d = .35$) were also found to be more effective than interventions targeting eating habits/physical activity ($d = .08$) and mixed interventions ($d = .07$). Moreover, effect sizes were significantly higher for interventions in which the participants received only interactive sessions ($d = .18$) compared to when they received interactive sessions and educational materials ($d = .05$). None of the other moderators revealed significant effects at short-term follow-up.

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Results for the long-term follow-up studies revealed a higher effect size for interventions targeting only general skills ($d = .31$) than interventions targeting only eating habits/physical activity ($d = .04$). Moreover, there was a significant difference between different regions, with interventions conducted in North America revealing a stronger effect ($d = .20$) than interventions conducted in Europe ($d = .01$) and other countries ($d = .06$). No other moderators yielded significant effects on intervention effectiveness at long-term follow-up.

With short-term follow-up results only, multivariate meta-regression analyses were also conducted to measure the relative effects of the moderators including child baseline obesity/overweight status, mode of intervention, and content of intervention. The analyses revealed that when these moderators were entered in the model, only the mode of intervention was significant, with results suggesting that interventions were more effective when interactive sessions or educational materials were used in the intervention as opposed to both interactive sessions and non-interactive educational materials ($\beta = -.10, p < .05$). No other moderator remained significant. This meta-regression outcome should, however, be interpreted with caution as several predictors had to be dummy-coded and were rather strongly associated. Small differences in predictive power might have led to the exclusion of some predictors that in a larger set of studies may have been included. Statistically, the power of meta-regression with categorical predictors is restricted, and replication is required.

Since the interventions were not effective after the trim and fill method at long-term follow-up, and the set of studies even smaller than with the short-term follow-up studies multivariate analyses were not conducted for long-term follow-up results.

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Table 4

Meta-Analytic Results of Randomized Interventions at Short-term Follow-up (k = 50 Study Outcomes)

	K	N	Cohen's <i>d</i>	<i>P</i>	95% CI	<i>Q</i> Heterogeneity	<i>Q</i> Contrast	<i>p</i> Contrast
Total set	50	16,801	.08	.00	.04, .13	85.64***		
BMI-related outcomes only ¹	42	11,020	.10	.00	.04, .16	85.07***		
<u>Sample characteristics</u>								
Child age							.01	.76
Before birth and Infancy	12	2,513	.10	.06	-.01, .20	25.97**		
Toddler / Preschool	38	14,288	.08	.00	.03, .13	59.30*		
Child baseline weight ²							6.50	.04
OB and OW	6	747	.29 ^a	.00	.12, .47	16.68**		
Mixed	35	10,770	.05 ^b	.04	.00, .11	46.52		
Non-Obese	1	153	.55	.00	.18, .93	.00		
NR	8	5,131	.08 ^b	.09	-.02, .17	8.16		
Parent baseline weight							3.07	.22
OB and OW	6	548	.25	.02	.05, .45	24.70***		
Mixed	12	2,334	.05	.37	-.06, .16	16.20		
NR	32	13,919	.08	.00	.03, .13	42.56		
% Girls ²							.55	.76
<= 20% girls	5	1,330	.12	.10	-.02, .26	7.60		
21 %- 79% girls	38	13,657	.07	.01	.01, .12	65.08**		
>= 80% girls	5	1,154	.10	.18	-.05, .25	6.52		
NR	2	660	.24	.03	.02, .45	1.83		
% Minority in sample							2.62	.46
<= 20 % minority	8	3,391	.09	.14	-.03, .22	10.61		
21 %- 79% minority	13	4,047	.03	.55	-.06, .12	22.22*		
>= 80% minority	11	2,530	.07	.19	-.04, .18	17.13		
NR	18	6,833	.12	.00	.05, .20	31.28*		
Continent							.06	.97
North America	23	4,193	.09	.03	.01, .17	49.20***		
Europe	15	7,266	.08	.07	-.01, .16	18.66		
Other	12	5,342	.09	.04	.01, .17	17.72		
<u>Study design</u>								
Duration of intervention							1.97	.58
6 months or less	18	5,216	.12	.01	.04, .20	42.80***		
7-12 months	14	4,490	.08	.07	-.01, .16	27.82**		
13-24 months	12	5,891	.04	.42	-.05, .13	4.60		
25 months or more	6	1,204	.12	.12	-.03, .26	6.58		
Control group							.05	.83
Dummy intervention	26	5,822	.09	.02	.02, .16	53.01***		
No intervention	24	10,979	.08	.01	.02, .14	32.63		
Content of intervention							4.71	.10
General skills	5	306	.35 ^a	.01	.10, .60	16.35**		
Eating habits/physical activity	19	7,508	.08 ^b	.02	.01, .15	23.61		
Mixed	26	8,987	.07 ^b	.04	.00, .13	39.88*		

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Table 4 cont.

	K	N	Cohen's <i>d</i>	<i>P</i>	95% CI	<i>Q</i> Heterogeneity	<i>Q</i> Contrast	<i>p</i> Contrast
Mode of delivery ²							5.83	.02
Interactive sessions	15	3,256	.18 ^a	.00	.08, .27	43.28***		
Non-interactive materials	3	258	.26	.07	-.02, .53	6.61*		
Mixed	32	13,287	.05 ^b	.09	-.01, .10	29.18		
Intervention provided to							.01	.92
Parent only	10	1,928	.09	.14	-.03, .21	23.85**		
Parent and child	40	14,873	.08	.00	.03, .13	61.71*		
<u>Methodological quality</u>								
Blinding							.19	.91
Yes	22	6,068	.08	.04	.00, .15	42.73**		
No	10	1,946	.07	.26	-.05, .19	21.03*		
NR	18	8,787	.10	.01	.02, .17	21.46		
Difference in baseline data							2.15	.34
Significant	4	1,217	.18	.02	.02, .34	11.11*		
Non-significant	37	11,026	.08	.00	.03, .14	59.57**		
NR	9	4,558	.04	.42	-.06, .14	12.97		

Note. Effect sizes (*ds*) were calculated with one-tailed (unless specifically stated as two-tailed in the study) alpha set at .05. *k* = number of studies; *N* = total number of participants; CI = confidence interval; OB = obese; OW = overweight; NR = Not reported.

^{a,b}Superscripts were used to denote the significant difference between subgroups. Same superscripts refer to a non-significant difference and different superscripts refer to a significant difference.

¹BMI related outcomes refer to outcomes like BMI, zBMI, change in BMI and weight. The effect size for outcomes related to being obese/overweight (e.g., percentage of obese/overweight children) was .06 (95% CI = .01-.10, *p* < .05) at short-term follow-up

²Contrasts were tested without subgroups of *k* < 4 studies.

* *p* < .05. ** *p* < .01. *** *p* < .001.

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Table 5

Meta-Analytic Results of Randomized Interventions at Long-term Follow-up (k =26 Study Outcomes)

	K	N	Cohen's <i>d</i>	<i>p</i>	95% CI	<i>Q</i> heterogeneity	<i>Q</i> Contrast	<i>p</i> Contrast
Total set	26	6,888	.09	.02	.01, .16	43.41*		
BMI-related outcomes only ¹	23	5,388	.12	.02	.02, .22	52.14***		
<u>Sample characteristics</u>								
Child age							2.94	.09
Before birth and Infancy	8	2,485	-.02	.77	-.16, .12	4.22		
Toddler / Preschool	18	4,403	.12	.01	.04, .21	32.90*		
Child baseline weight ²							.25	.62
OB and OW	3	133	.55	.00	.18, .92	5.88		
Mixed	17	4,850	.05	.22	-.03, .14	18.08		
Non-Obese	0							
NR	6	1,905	.09	.18	-.05, .23	11.20*		
Parent baseline weight ²							.03	.86
OB and OW	1	16	1.68	.00	.52, 2.84	.00		
Mixed	8	687	.09	.32	-.08, .26	3.69		
NR	17	6,185	.07	.07	-.01, .15	31.42*		
% Girls ²							.59	.75
<= 20% girls	3	642	.13	.18	-.06, .32	.47		
21 %- 79% girls	18	5,475	.06	.16	-.02, .14	29.46*		
>= 80% girls	4	625	.03	.74	-.16, .22	3.54		
NR	1	146	.56	.01	.16, .96	.00		
% Minority in sample							3.52	.32
<= 20 % minority	6	550	.15	.15	-.06, .36	10.25		
21 %- 79% minority	4	480	.03	.77	-.18, .24	1.34		
>= 80% minority	5	945	.20	.02	.04, .37	8.14		
NR	11	4,913	.04	.42	-.06, .13	15.66		
Continent							5.24	.07
North America	12	1,344	.20 ^a	.00	.07, .33	17.57		
Europe	7	3,820	.01 ^b	.88	-.10, .12	9.62		
Other	7	1,724	.06 ^{a,b}	.35	-.06, .18	6.32		
<u>Study design</u>								
Duration of intervention ²							.45	.50
6 months or less	19	4,079	.10	.03	.01, .20	33.82*		
7-12 months	5	2,385	.04	.63	-.12, .20	5.15		
13-24 months	2	424	.11	.41	-.15, .37	.74		
25 months or more	0							
NR	0							
Follow-up interval							2.65	.27
11 months or less	10	1,021	.13	.10	-.03, .28	17.94*		
12-36 months	9	2,260	.13	.02	.02, .24	14.11*		
37 months or more	7	3,607	.01	.99	-.12, .13	5.01		
Control group							1.86	.17
Dummy intervention	10	1,134	.17	.02	.01, .32	15.31		
No intervention	16	5,754	.05	.20	-.03, .14	23.50		
Content of intervention							5.31	.07
General skills	6	491	.31 ^a	.00	.10, .52	17.96**		
Eating habits/physical activity	11	5,415	.04 ^b	.34	-.04, .13	14.10		
Mixed	9	982	.08 ^{a,b}	.28	-.07, .28	3.97		

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Table 5 cont.

	K	N	Cohen's <i>d</i>	<i>p</i>	95% CI	<i>Q</i> heterogeneity	<i>Q</i> Contrast	<i>p</i> Contrast
Mode of delivery ²							.21	.65
Interactive sessions	9	3,689	.06	.32	-.06, .19	19.12*		
Non-interactive materials	0							
Mixed	17	3,199	.10	.04	.01, .19	21.54*		
Intervention provided to							1.73	.19
Parent only	10	2,698	.01	.84	-.12, .14	6.58		
Parent and child	16	4,190	.12	.01	.03, .21	32.29**		
<u>Methodological quality</u>								
Blinding							1.30	.52
Yes	15	3,690	.08	.10	-.02, .18	26.88*		
No	7	2,657	.05	.55	-.10, .19	8.33		
NR	4	541	.20	.07	-.02, .41	4.44		
Difference in baseline data							.57	.75
Significant	6	2,282	.10	.15	-.04, .24	3.78		
Non-significant	16	4,025	.07	.22	-.04, .17	27.14*		
NR	4	581	.15	.16	-.06, .36	10.06*		

Note. Effect sizes (*ds*) were calculated with one-tailed (unless specifically stated as two-tailed in the study) alpha set at .05. *k* = fail-safe number of studies; *n* = total number of participants; CI = confidence interval; OB = obese; OW = overweight; IG = Intervention group; CG = Control group; NR = Not reported

^{a,b} Superscripts were used to denote the significant difference between subgroups. Same superscripts refer to a non-significant difference and different superscripts refer to a significant difference

¹ BMI related outcomes refer to outcomes like BMI, zBMI, change in BMI and weight. The effect size for outcomes related to being obese/overweight (e.g., percentage of obese/overweight children) was .06 (95% CI = -.04-.17, *p* > .05) at long-term follow-up. After trim and fill, the adjusted effect size for the long-term follow-up results was .02, *ns* (95% CI = -.07-.11).

² Contrast was tested without subgroups of *k* < 4 studies.

* *p* < .05. ** *p* < .01. *** *p* < .001.

Discussion

The main aim of the current meta-analysis was to investigate the effectiveness of different types of obesity intervention programs targeted at young children and involving parents. Results revealed that the average effect size for the obesity interventions targeting young children and their parents were small (Cohen, 1988) but significant at short-term, yet non-significant at the long-term follow-up assessments. Multivariate meta-regression

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analyses showed that intervention programs with significantly higher effect sizes were the ones that provided the intervention in interactive sessions or in educational materials as opposed to both interactive sessions and educational materials.

Results showed that intervention programs were effective in obtaining changes in weight status of young children at short term follow-up. Even though the effects were small and only 20% of the studies showed significant effect sizes, the combined effect size is robust. This is similar to the small effect sizes found in older children for obesity prevention (Stice et al., 2006), treating eating disorders (Stice & Shaw, 2004), and other health-related interventions like drug-use prevention (Tobler et al., 2000), indicating that high effect sizes in interventions are not easily achieved. Multiple meta-regression analysis revealed that interventions were more effective when participants received interactive sessions or educational materials than when they received both interactive sessions and educational materials. This is consistent with findings from other meta-analyses on interventions involving parents and children (e.g., Bakermans-Kranenburg et al., 2003; Stice et al., 2006). It may be that when parents receive more than one mode of intervention (i.e., both interactive sessions and educational materials), the information becomes too complex and diffused, and therefore less well received and understood as compared to information provided through only one mode of intervention. As hypothesized, demographic moderators including child age, gender, minority status, the continent that the data was obtained from, and the baseline weight status of the child and parents were not related to intervention effectiveness, suggesting that the findings can be generalized across different populations. Duration of the intervention, the content of the intervention, nor the target of the intervention were related to effectiveness either.

Even though the interventions were found to be effective at short-term follow-up, most of the studies providing results at long-term follow-up failed to show significant effects in

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changing child weight related outcomes. Only five studies were effective at long-term follow-up (Bocca et al., 2012; Brotman et al., 2012; Fitzgibbon et al., 2005; Nemet et al., 2013; Stark et al., 2011), all of which were initiated during the preschool years rather than in infancy. Moreover, three of these five studies with the highest effect sizes at long-term follow-up included an additional general parenting skills and behaviors component (Bocca et al., 2012; Brotman et al., 2012; Stark et al., 2011). Further, the study with the highest effect size at long-term follow-up (Stark et al., 2011) applied booster maintenance sessions after the end of the more intensive intervention sessions. It is possible that having booster sessions after the end of the intervention increases or maintains intervention effectiveness in the longer term by making the information better understood and reflected upon without decreasing participant motivation with prolonged sessions (Eyberg, Edwards, Boggs, & Foote, 1998; Nation et al., 2003). Interestingly, among the interventions included in the meta-analysis, only three studies were found to be effective both at short-term and long-term follow-ups (Bocca et al., 2012; Nemet et al., 2011b; 2013; Stark et al., 2011), each of which targeted preschool children. Two of these three studies were conducted with children who were obese or overweight, and focused on general parenting skills in interactive sessions. Finally, the results of the long-term follow-up studies suggested that targeting general parenting skills and behaviors was one of the very few factors positively related to intervention effectiveness. However, because of the non-significant mean effect sizes after correcting for publication bias, more intervention studies with long-term follow-up results are necessary to draw firm conclusions.

Obesity is a growing public health concern with high economical costs both to the individual and to the society. In a recent review, obesity was estimated to account for about 0.7% to 2.8% of a society's health care expenditures, with the estimated costs ranging from \$3.6 million to \$78.5 billion per country, across the world (Withrow & Alter, 2010). Indeed, a cost-effectiveness study found that making large investments in prevention and treatment

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programs for 6-, 12- and 19-year-old children with obesity/overweight seems cost-effective by widely accepted criteria (Trasande, 2010). Moreover, intervening even earlier in life, as was done by the studies included in this meta-analysis, is usually found to have much higher returns than later interventions (Heckman, 2006). As such, although the cost-effectiveness of early interventions (like the ones included in this meta-analysis) has not been investigated (Bond et al., 2009), prevention and treatment programs that focus on the first years of life are expected to be even more cost-effective.

Importantly, the current meta-analysis suggests that programs using one mode of intervention (rather than multiple modes) were more effective, which is also relevant to cost effectiveness because fewer resources may be required for single-mode interventions. Even though the overall effect size was small, the current meta-analysis does provide the important insight that at very young ages, interventions can impose positive changes in obesity development. In addition, some of the interventions that did not find significant differences in weight-related outcomes, did find significant effects in outcomes indicating a healthier lifestyle that may precede weight loss, such as increased fruit and vegetable consumption (Bayer et al., 2009 sample 2; Crespo et al., 2012; De Bock, et al., 2012; Warren et al., 2003; Zask et al., 2012), increased physical skills (Bellows et al., 2013, Puder et al., 2011, Zask et al., 2012), improved child knowledge, attitude, and habits towards diet and physical activity (Cespedes, 2013; Nemet, Geva, & Eliakim 2011; Warren et al., 2003), as well as decreased sedentary behaviors (Campbell et al, 2013; Dennison et al., 2004; Epstein et al., 2008; Taveras et al., 2011), consumption of energy dense foods (Harvey-Berino & Rourke, 2003; Louzada et al., 2012) and sugar-sweetened beverages (Story et al., 2012). Moreover, McCartney and Rosenthal (2000) warn that small effect sizes in social sciences are to be expected, generally because of methodological limitations in complex areas of research, and should not be dismissed quickly. Using an example of an experiment suggesting the use of

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aspirin to reduce (second) heart attacks based on a small effect size ($r = .03$), they argued that even small effect sizes may have very large policy implications, specifically in health-related matters that might influence a large number of individuals across the life span. Hence, small changes may be cost effective and can impose large economic gains, especially in the long term, considering the physical and psychological gains that would be obtained from effective obesity interventions (Schwartz & Puhl, 2003; Reilly & Kelly, 2011). Early childhood (preschool and before) should therefore be considered an important time for cost-effective obesity interventions.

Some limitations of the study should be noted. First of all, the studies were highly diverse in nature and even the large set of moderators that we included did not split the data into homogenous subsets. Nevertheless, our analyses do provide clues about aspects of early interventions involving parents that might be related to increased effectiveness. Using combinations of moderators may lead to more homogenous subsets of studies, but in the current meta-analysis the combination of moderators was not always possible because of the small subsets of studies when moderators were combined, and those that did yield sufficient subset sizes did not add new information to the current results and were therefore not presented. Another limitation was the relative scarcity of studies providing sufficient details about the intervention design or presenting results in adequate detail, despite the focus of the current meta-analysis on randomized controlled trials only. Finally, some moderators were closely associated with each other. For instance, even though conceptually distinct, the content of the intervention and mode of delivery of the intervention partially overlapped, with interventions focusing on general skills being more likely to be conducted in interactive sessions (or mixed) in 4 out of 5 studies. However, the other categories of these moderators did provide unique information.

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This meta-analysis has various implications for future research. First, more long-term follow-up studies of interventions targeting young children should be conducted to better understand the moderators that are linked to increased sustainability of their effects. Second, gene-by-environment interactions may be worthwhile to study in this field, as differential susceptibility depending on individuals' genetic characteristics is particularly relevant for interventions (Van IJzendoorn & Bakermans-Kranenburg, 2012). For instance, a sub-group of susceptible children, for example characterized by dopamine receptor gene DRD4 7-repeat alleles (Bakermans-Kranenburg & Van IJzendoorn, 2011), may profit more from the positive environment created by obesity interventions and the overall small effect size might reflect an underestimation of the effect for that specific group. Future studies may thus investigate the role of gene-by-intervention interactions and the possibility of differential susceptibility.

In conclusion, obesity is an expanding health problem which requires urgent attention starting from very young ages. The results of this meta-analytic study shows that interventions targeting parents who have children at preschool age or younger were effective specifically when interventions were conducted with one mode of intervention rather than using two modes. However, more studies are required to understand factors associated with the maintenance of the obesity intervention effects in the long run.

CHAPTER 4

**PROFESSIONALS' AND MOTHERS' BELIEFS ABOUT MATERNAL
SENSITIVITY ACROSS CULTURES: TOWARD EFFECTIVE INTERVENTIONS IN
MULTICULTURAL SOCIETIES**

Ekmekçi, H., **Yavuz**, M., Emmen, R., Mesman, J., Van IJzendoorn, M., Yağmurlu, B., & Malda, M. (2015). Professionals' and mothers' beliefs about maternal sensitivity across cultures: Toward effective interventions in the multicultural society. *Journal of Child and Family Studies*, 24, 1295-1306. doi: 10.1007/s10826-014-9937-0

ABSTRACT

Interventions for parents of young children often focus on enhancing parental sensitivity. A cognitive match on treatment goals has been shown to relate to the quality of the relationship (or alliance) between a therapist and the person receiving intervention, which in turn predicts the effectiveness of interventions. However, in multicultural societies therapists and patients do not always share the same ethnic background, which could influence their match on treatment goals. The aim of this study was to test the hypothesis that there is a cognitive match regarding the importance of sensitivity in early childhood parenting across Dutch and Moroccan, Turkish, Surinamese, and Antillean ethnic minority mothers and youth mental health professionals in the Netherlands and Turkish mothers and youth mental health professionals in Turkey. A total of 105 mothers with at least one child between the ages of 6 months and 6 years and 98 female professionals described their views about the ideal sensitive mother using the Maternal Behavior Q-Sort (Pederson et al. in Manual maternal behavior Q-sort version 3.1, 1999). Both professionals' and mothers' beliefs about the ideal mother converged strongly with the concept of sensitivity and within and across cultural groups of mothers and professionals. These findings point to a cognitive match on sensitivity beliefs between mothers and professionals with different cultural backgrounds. Our findings suggest that early childhood parenting interventions focused on enhancing sensitivity fit the beliefs of mothers of young children in different cultural groups.

Keywords Alliance , Maternal sensitivity, Beliefs, Culture, Socioeconomic status

**Professionals' and Mothers' Beliefs about Maternal Sensitivity across Cultures:
Toward Effective Interventions in Multicultural Societies**

In multicultural societies, the effectiveness of parenting interventions can be compromised by diverging ideas about 'good parenting' of the professional providing treatment and the parent seeking support (e.g., Karlsson, 2005; Maramba & Hall 2002; Sue 1998). Many parenting interventions aimed at improving early childhood parent-child interactions focus on increasing the sensitivity of parents towards their young children (e.g., Heinicke et al. 1999; Marcynyszyn et al. 2011; Van Zeijl et al. 2006). Sensitive parenting as indicated by appropriate responsiveness to child signals (Ainsworth et al. 1974) predicts secure attachment (Bakermans-Kranenburg et al. 2003) and other positive child outcomes (e.g., Bernier et al. 2010; Eisenberg et al. 2001; Kochanska 2002). Although the predictive value of sensitive parenting has been found across cultures (Mesman et al. 2012), it is unclear whether mothers and professionals with different cultural backgrounds agree on the importance of sensitivity in child rearing. This issue is of particular importance for designing culturally sensitive intervention and prevention programs for parents of young children in societies with multiple cultural groups.

Posada et al. (1995) showed that beliefs about secure base behavior of children converge across groups of mothers and experts from different cultures. In a recent study that also included the current sample of mothers, strong convergence was found on sensitivity beliefs between Dutch, Turkish-Dutch and Moroccan-Dutch mothers in the Netherlands and academic experts on parenting (Emmen et al. 2012). In addition, analyses including the current sample of mothers showed strong convergence regarding sensitivity beliefs between different countries such as Chile, China, the Netherlands, Turkey, and Zambia (Mesman et al. 2013). These findings show that the main tenets of attachment theory regarding child and maternal behavior are seen as important across different groups. This in turn suggest that this

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may also be the case when comparing sensitivity beliefs of mothers and youth care professionals, but this has not yet been examined.

A crucial requirement for effective interventions is the formation of a positive alliance between the treatment provider and the person receiving treatment. In the literature on treatment effectiveness, “alliance” refers to the collaborative nature of the interaction between the patient and therapist or counselor, the affective bond between them, and the ability to agree on treatment goals and tasks (Kazdin et al. 2005). Studies have shown that the stronger the alliance, the greater the therapeutic change (Kazdin et al. 2005; Knipscheer & Kleber, 2004).

In addition to the importance of alliance to enhance treatment success, it has been suggested that for therapists working with patients from different cultural backgrounds, knowledge of the culture of the patient is important for the effectiveness of the therapy (Knipscheer & Kleber, 2004; Sue 1998). Cross-cultural competence on the part of the therapist may enhance the quality of alliance with these families (Sue 1998), which in turn predicts better treatment outcomes. The ethnic-similarity hypothesis suggests that ethnic-minority patients will prefer a therapist with the same ethnic background in therapy (Knipscheer & Kleber 2004). Not matching therapist and patient on ethnicity may cause problems in establishing rapport and trust (Zane et al. 2005), and it is currently considered good practice to strive for shared culture and language of the patient and therapist (American Psychological Association 1993). However, in reality it is not always possible to match patient and therapist on ethnicity (Knipscheer & Kleber 2004).

Interestingly, in a study among Asian-, African-, Mexican-, and Caucasian-American patients, ethnic matching failed to be a significant predictor of mental health treatment outcomes for most ethnic groups (Sue et al. 1991). In addition, Turkish and Moroccan ethnic minority patients in the Netherlands have been found to value similarity in attitudes and

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beliefs more than they valued an ethnic match in therapy (Knipscheer & Kleber 2004). It has been argued that the cognitive match is the most important, referring to the match between therapists and patients in how they conceptualize treatment goals and means for resolving problems (Sue, 1998). This is consistent with the fact that shared goals are a key component of alliance between therapist and patient.

Maternal sensitivity refers to a mother's ability to perceive child signals, to interpret these signals correctly, and to respond to them promptly and appropriately (Ainsworth et al. 1974), and is related to positive child outcomes in several domains (e.g., Bakermans-Kranenburg et al. 2003; Bernier et al. 2010; Eisenberg et al. 2001; Kochanska 2002). Indeed, early parenting interventions often focus on enhancing sensitivity, and several evidence-based interventions with this focus have been developed (e.g., Heinicke et al. 1999; Van Zeijl et al. 2006; Webster-Stratton and Hammond 1997). The Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD) is an example of such an intervention (Van Zeijl et al. 2006). The aim of this intervention is to increase sensitive behavior by giving mothers positive feedback on videotaped interactions of themselves with their children. A process evaluation of the VIPP-SD program showed that greater alliance between the intervenor and the mother predicted stronger intervention effectiveness (Stolk et al. 2008). However, process evaluations of parenting interventions focusing on sensitivity have so far not included ethnic minority parents.

A recent literature review (Mesman et al. 2012) showed that the relation between maternal sensitivity and positive child outcomes also applies to ethnic minority families, although several studies have shown lower maternal sensitivity for minority families than for majority families (Leseman & Van den Boom 1999; van IJzendoorn 1990; Yaman et al. 2010). This discrepancy mainly seems to reflect differences in socioeconomic status (SES) rather than cultural differences (Mesman et al. 2012); in studies in which the SES of

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participants is controlled for and in studies in which participants are matched on SES, the ethnic differences in sensitivity decreased substantially. A possible explanation for the association between SES and sensitivity (beliefs) can be found in the Family Stress Model (Conger & Donnellan 2007). This model describes that stressors such as socio-economic strains lead to family stress (e.g., depression and family dysfunction), which in turn leads to non-optimal parenting (e.g., lack of warmth and support). Given that ethnic minorities are generally overrepresented in low-SES populations, minority parents could benefit from parenting interventions with the focus on enhancing sensitivity and reducing family stressors. In addition, minority status could be related to different kinds of stressors, such as acculturation processes (Berry 1997). Acculturation stress is not only seen in first- but also in second-generation immigrants (Crockett et al. 2007).

Religiosity, referring to the extent to which parenting is guided by religion, could be another predictor of sensitive parenting beliefs and practices. Religiosity of parents helps to shape parental values and practices (Petts 2007). For instance, in a meta-analytic review it was found that greater parental religiousness relates to more positive parenting (Mahoney et al. 2001). Snider et al. (2004) found that parents who were perceived as more religious by their adolescent children were also perceived as more supportive. Also, positive relations between authoritative parenting and religiosity of parents have been shown (Gunnoe et al. 1999). In contrast, some studies found no or only a weak relation between religiosity and parenting style (Vermeer 2011). Methodological problems such as using single-item measures for religious domains and small effect sizes of studies on this topic have been reported (Mahoney et al. 2001).

Turkish, Moroccan, Surinamese, and Antillean groups represent the largest ethnic minority groups in the Netherlands [Centraal Bureau voor de Statistiek (CBS), 2012]. The CBS defines a second-generation immigrant as a person born in the Netherlands with at least

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one parent born in the country of origin and the second generations of these ethnic minority groups are the fastest growing ethnic minority populations in the Netherlands. The Turkish and Moroccan immigrants first came to the Netherlands as invited guest workers in the period 1960–1970. Their intention was to make a living and return to their countries of origin, but many stayed in the Netherlands. The Surinamese migrants share a diverse Caribbean cultural and ethnic background with other former Dutch West Indies colonies. The migration of Surinamese people happened mostly after Surinam became independent in 1975 and continued over the next two decades because of political and economic instability. Of the Antilleans, the first wave came to the Netherlands in the 1960s and 70s in order to study and many stayed and there are still Antilleans migrating to the Netherlands. The Netherlands Antilles has been recently dissolved as a country but is still part of the Kingdom of the Netherlands under a different legal status.

It has been shown that first and second-generation immigrants identify themselves more with their own ethnic culture than with that of the host society (Phinney et al. 2001). About 30–40 % of first-generation and 10–20 % of second-generation Turkish and Moroccan immigrants are never in contact with members of the Dutch majority in their leisure time. Both groups are mostly in contact with persons with a similar ethnic background and Turkish and Moroccan ethnic minorities rarely marry Dutch majority group members [Sociaal en Cultureel Planbureau (SCP) 2009, 2011].

The mentioned ethnic minority groups are considered to have a more collectivistic cultural background compared to the individualistic cultural background of the Dutch majority ethnic group. In earlier studies it has been shown that there are differences in parenting between individualistic and collectivistic cultures. For instance, parents from collectivistic cultures tend to be more authoritarian, use more restricting behaviors during social play and they expect more obedience from their children (Ispa et al. 2004; Rubin 1998).

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These parenting practices are generally related to lower levels of sensitivity (Ispa et al. 2004). In more individualistic cultures self-interest, autonomy, and self-reliance are more valued in the socialization process. Parents from these cultures tend to be more authoritative, promote independence, self-reliance, and exploration of the environment, and put less emphasis on obedience and sociability (Harwood et al. 1995; Tamis-LeMonda et al. 2007). This pattern of socialization goals is largely consistent with sensitive parenting.

The design of the current study was modeled according to the widely cited study by Posada et al. (1995) in which mother's descriptions of an ideal child in terms of secure base behavior were compared across seven countries representing different socio-cultural contexts using the Attachment Q-Set (Waters 1987). Whereas Posada and colleagues investigated beliefs about the child's contribution to secure base behavior, in this study the aim is to examine beliefs about the caregiver's contribution to this relationship, i.e., sensitive parenting. The goal of the current study is to test the hypothesis that the beliefs about the ideal mother of both mothers and professionals with different cultural backgrounds converge with the notion of the highly sensitive mother. Mothers are compared to professionals with a different cultural background. In the Netherlands, Dutch majority and Turkish, Moroccan, Surinamese, and Antillean minority mothers and professionals were included. Additionally, Turkish majority mothers and professionals in Turkey were included to be able to make a comparison with Turkish minorities in the Netherlands. Because studies on the relation between religion and parenting show diverging results, religiosity was included in this study from an exploratory perspective.

Method

Participants

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The sample consisted of 150 mothers with at least one child between the ages of 6 months and 6 years, and 98 female mental health professionals (e.g., child psychologists, parenting counselors, family therapists) working with children younger than 12 years and their parents.

Mothers. The sample with mothers consisted of five subsamples from the Netherlands and one from Turkey: Dutch majority, Moroccan minority, Turkish minority, Surinamese minority, and Antillean minority in the Netherlands and Turkish majority in Turkey (Table 1). In both Dutch and Turkish majority groups, 45 mothers were included and stratified by educational level (low, middle, high). The Dutch minority groups consisted of 15 participants each. The sample in the Netherlands included second-generation immigrant mothers who were born in the Netherlands (with at least one of their parents born in the country of interest), and first-generation immigrant mothers who migrated to the Netherlands before the age of 11. This was done to ensure the homogeneity of the immigrant sample of mothers, and to make sure they all completed at least some years of education in the Netherlands and were able to speak and read Dutch. Because of the recent history of migration of the Antillean group, it was not possible to select only Antillean second-generation and first-generation mothers who migrated to the Netherlands before the age of 11 years, therefore four first-generation Antillean mothers were also included (migrated when they were 12, 19, 21 and 23 years old). Thirty mothers were first-generation immigrants. The first-generation mothers who immigrated to the Netherlands before the age of 11 years ($n = 25$) had a mean immigration age of 5.16 ($SD = 3.39$) years and had been living in the Netherlands for 25.48 ($SD = 6.54$) years on average. The first-generation mothers who immigrated after the age of 11 years ($n = 4$) had a mean immigration age of 18.75 ($SD = 4.79$) years and had been living in the Netherlands for 11.00 ($SD = 3.83$) years on average. For one first-generation mother the age of migration was missing. The number of children of the participating mothers ranged from one to five, with an

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average of 1.87 ($SD = .75$). The mother's average age was 31.97 years ($SD = 5.37$, range = 19–46).

Professionals. The sample of professionals also consisted of five subsamples from the Netherlands and one from Turkey, representing the same ethnic groups as those included in the mother sample. Within the Netherlands, the Dutch majority, Turkish minority, and Moroccan minority subsamples consisted of 11 professionals each. The Surinamese minority and Antillean minority subsamples consisted of 10 professionals each. In Turkey 45 professionals participated. All professionals had at least two years of experience in working with children younger than 12 years and their parents. In addition, only female professionals were selected to facilitate comparisons with mothers. In contrast to the minority mother sample in the Netherlands, the minority professional sample ($n = 42$) consisted of both first-generation ($n = 22$) and second-generation ($n = 20$) women. It was not possible to include only second-generation minority professionals, because of the small number of professionals with an ethnic minority background in the Netherlands. In the group of professionals 59 (60 %) had children. The number of children ranged from zero to five, with an average of one ($SD = 1.15$). The average age of the professionals was 38.01 years ($SD = 9.79$, range = 25–65). Their experience as child care professionals was on average 11.31 years ($SD = 7.11$, range = 2–30). Of the 98 professionals 4 (4 %) had completed secondary education, 55 (56 %) had obtained a bachelor's degree and 39 (40 %) had obtained a master's degree.

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Table 1. Means (Standard Deviations) and Ethnic Group Differences for Mothers (M) and Professionals (P)

	Dutch (D)	Turkish minority (TM)	Moroccan minority (MM)	Surinamese minority (SM)	Antillean minority (AM)	Turkish (T)	F	Post Hoc
	- M (n = 45)	- M (n = 15)	- M (n = 15)	- M (n = 15)	- M (n = 15)	- M (n = 45)		
	- P (n = 11)	- P (n = 11)	- P (n = 11)	- P (n = 10)	- P (n = 10)	- P (n = 45)		
Educational level								
- Professionals (n = 98)	4.55 (0.52)	4.00 (0.77)	3.91 (0.30)	4.10 (0.32)	4.20 (0.42)	4.60 (0.49)	6.07**	MM < D, T; SM < T
- Mothers (n = 150)	3.16 (1.19)	2.93 (0.88)	3.33 (0.82)	3.60 (0.74)	3.00 (0.76)	2.67 (1.35)	2.12	
Family income								
- Mothers (n = 137)	5.51 (1.22)	3.92 (1.38)	4.92 (1.38)	4.67 (1.49)	3.93 (1.53)	3.58 (1.74)	8.30**	TM, AM, T < D; T < MM, SM
Age								
- Professionals (n = 98)	42.09 (9.15)	35.45 (8.00)	34.73 (8.11)	39.50 (13.15)	43.00 (11.91)	37.00 (9.09)	1.48	
- Mothers (n = 147)	33.11 (5.04)	29.80 (4.36)	32.20 (4.79)	30.53 (4.02)	26.53 (4.45)	33.90 (5.49)	6.23**	TM < D; TM, SM < T; AM < D, MM, SM, T
Number of children								
- Professionals (n = 98)	1.82 (1.08)	1.45 (1.29)	1.27 (1.74)	0.90 (1.52)	0.90 (0.99)	.91 (0.82)	1.52	
- Mothers (n = 150)	2.11 (0.53)	2.13 (0.74)	2.40 (1.06)	1.40 (0.63)	1.33 (0.49)	1.69 (0.70)	7.37**	D > AM, SM, T; MM > AM, SM; TM > AM

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Table 1. cont.

	Dutch (D)	Turkish minority (TM)	Moroccan minority (MM)	Surinamese minority (SM)	Antillean minority (AM)	Turkish (T)	F	Post Hoc
	- M (n = 45)	- M (n = 15)	- M (n = 15)	- M (n = 15)	- M (n = 15)	- M (n = 45)		
	- P (n = 11)	- P (n = 11)	- P (n = 11)	- P (n = 10)	- P (n = 10)	- P (n = 45)		
Religion in child-rearing								
(whole sample)								
- Professionals (n = 98)	7.73 (5.41)	15.00 (5.22)	17.18 (2.23)	10.50 (7.29)	13.20 (6.49)	9.36 (4.32)	7.09**	D, T < TM, MM
- Mothers (n = 142)	8.78 (6.07)	18.17 (2.12)	17.00 (2.37)	10.54 (5.35)	13.67 (4.12)	12.58 (4.78)	10.74**	D < TM, MM, AM, T; SM, AM, T < TM; SM, T < MM
Religion in child-rearing								
(if religious)								
- Professionals (n = 81)	12.20 (5.22)	15.00 (5.22)	17.18 (2.23)	13.29 (7.04)	17.14 (1.68)	9.93 (4.21)	7.62**	T < MM, AM
- Mothers (n = 116)	13.68 (5.28)	18.17 (2.12)	17.00 (2.37)	11.73 (4.92)	13.67 (4.12)	12.77 (4.61)	4.67*	D, SM, AM, T < TM

* $p < .05$. ** $p < .01$.

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Procedure

The Dutch high-educated mothers and the ethnic minority mothers were recruited by providing verbal and written information about the study to any potential participant within the authors' and research assistants' networks. Dutch low- and middle-educated mothers were drawn from a sample of a previous observational study on early childhood parenting conducted by our research team (Joosen et al. 2013). Dutch, Turkish minority, and Moroccan minority mothers participated in our earlier study on sensitivity beliefs (Emmen et al. 2012). In the current study the findings are extended by adding Antillean minority, Surinamese minority, and Turkish mothers and by adding professionals from all mentioned cultural groups. The professionals were recruited by providing verbal and written information about the study to any potential participant within the authors' and research assistants' networks. In addition, different psychological health care services were called to ask whether they were interested in the study and had potential participants. All mothers received the same folder which included information about the study. Professionals received the same folder with minor changes to suit the target audience. The folders were sent or personally handed to potential participants before the home visit. In addition, the folders were given to the participants at the beginning of the home visit. All mothers gave written consent and were visited at home by one of six trained students (undergraduate and graduate) in the Netherlands and by one of eight trained students (undergraduate and graduate) in Turkey. The home visits in the Netherlands were conducted in the Dutch language and in Turkey they were conducted in the Turkish language. All mothers in the Netherlands indicated that their spoken Dutch language ability was fluent ($n = 98$) or sufficient ($n = 7$). In the Netherlands the mothers received a gift coupon of 10 Euros, and in Turkey the mothers received a gift coupon of 30 Turkish Liras (approximately 11 Euros). Professionals did not receive any financial compensation. All professionals were recruited by providing verbal and written information

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about the goal of the study to any potential participant within the authors' and research assistants' networks and within different psychological health care services. All professionals gave written consent and were visited at home or at their institution by one of the (under)graduate research assistants in the Netherlands and in Turkey. The visits were conducted in the Dutch language in the Netherlands and in the Turkish language in Turkey. With four Turkish minority professionals the visits were conducted in the Turkish language, since these professionals indicated that their language ability was better for the Turkish language than for the Dutch language.

Measures

Views of the ideal mother. The Maternal Behavior Q-Sort (MBQS; Pederson et al. 1999) was used to assess views about the ideal sensitive mother. The MBQS consists of 90 cards with statements about maternal behaviors that mothers and professionals sorted into nine stacks from 'least descriptive' (1) to 'most descriptive' (9) of the ideal mother. Because the original items were designed to be evaluated by professionals rather than mothers, the behavioral descriptions were simplified for the present study to make them more understandable for mothers. For example, the item "Provides B with little opportunity to contribute to the interaction" was simplified into "Gives her child little opportunity to play along or to respond". The simplified version was also used for professionals to make their scores comparable to those of the mothers. In Turkey, the simplified version was only used for mothers. The participants were first asked to sort the cards into three stacks from 'do not fit the ideal mother at all' to 'fit the ideal mother really well'. The participants were explicitly told that there are no correct or incorrect answers and mothers were told that it is not about their own parenting behavior, but about what the ideal mother should or should not do. The professionals were told that it is not about the behavior of their clients or about their own parenting behavior (if they had children), but about what the ideal mother should or should

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not do. The construct of sensitivity was not explicitly mentioned to the mothers or to the professionals. Any question participants had concerning the meaning of an item was answered according to the item explanations in the protocol. When the participants distributed the cards across the three stacks, they were asked to sort each stack into three smaller stacks. After the participants distributed all cards across nine stacks, they were asked to evenly distribute the cards across the stacks until each stack consisted of 10 cards (Emmen et al. 2012). Sensitivity belief scores were derived by correlating the resulting profiles with the criterion sort provided by the authors of the MBQS (Pederson et al. 1999).

Religion in child-rearing. The importance of religion in child rearing was measured with four self-developed items for mothers as well as professionals, with or without a religion. The answer categories ranged from (1) 'totally disagree' to (5) 'totally agree'. Also a (6) 'not applicable' answer category was included for the participants who did not have a religion. The items were "I use my religion as a guideline for the parenting of my child", "My religion helps me to raise my child good", "I learn my child a lot about my religion", and "I learn my child that my religion plays an important role in our life". Most of the participants without a religion filled in 'not applicable' for the items. A total score was computed by summing item scores. The (6) 'not applicable' scores were transformed into (1) 'totally disagree'. The internal consistency of the scale was high for mothers (Cronbach's $\alpha = .98$) as well as professionals (Cronbach's $\alpha = .97$). In the analyses two versions of religion in child rearing were used, the variable 'religion in child rearing (whole sample)' refers to the views of all participants on the importance of religion in child rearing (with non-religious mothers all receiving the lowest score), whereas the variable 'religion in child rearing (if religious)' refers only to the views on the importance of religion in child rearing of participants who indicated having a religion.

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Educational level and family income. Educational level was measured on a scale from 1 to 5: primary school (1), vocational school (2), secondary school/middle vocational education (3), high vocational education (4) and university or higher (5). Annual gross family income was measured on a 7-point scale ranging from (1) 'no income' to (7) 50.000 euro/10.000 Turkish lira or more', for mothers only.

Results

Preliminary Analyses

The results of the ANOVAs to test whether there were significant differences between groups of mothers in background variables are shown in Table 1. For post hoc comparisons, Games and Howell's test for unequal variance and sample size was used for the variables 'number of children', 'religion in child-rearing (whole sample)' and 'religion in child-rearing (if religious)'. For the other variables LSD post hoc tests were used. The groups of mothers were similar in education level, but were different regarding family income. Turkish mothers had the lowest income and Dutch mothers had the highest income. Concerning the age of mothers, Antillean minority mothers were the youngest and Turkish mothers were the oldest. Antillean minority mothers had the lowest number of children, whereas Moroccan minority mothers had the highest number of children. Among religious mothers, Dutch, Surinamese minority, Antillean minority, and Turkish mothers found religion less important in child-rearing than Turkish minority mothers. In addition, Surinamese minority and Turkish mothers found it less important than Moroccan minority mothers. If non-religious mothers were included in analyses as well, Surinamese minority mothers found religion least important and Turkish minority mothers found religion most important in child-rearing.

Differences between professionals in background characteristics were tested with ANOVAs and are shown in Table 1. For post hoc comparisons Games and Howell's test for

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unequal variance and sample size was used for the variables ‘education level’, ‘religion in child-rearing (whole sample)’, and ‘religion in child-rearing (if religious)’. For the other variables LSD post hoc tests were used. Professionals differed in mean education level. Turkish professionals had the highest education level and Moroccan minority professionals had the lowest education level. The groups were similar in age and average number of children. Among religious professionals, Turkish professionals found religion less important in child-rearing than Turkish minority, Moroccan minority, Surinamese minority, and Antillean minority professionals. If non-religious professionals were included in analyses as well, Turkish professionals found religion least important and Antillean minority professionals found religion most important in child-rearing.

Sensitivity Beliefs

ANOVAs were conducted to test the extent to which mothers with different cultural backgrounds agreed with the criterion sort of the ideal mother. The results are shown in Figure 1. For post hoc comparisons Games and Howell’s test for unequal variance and sample size was used for mothers and LSD post hoc tests were used for professionals. For the comparison of all mothers with all professionals LSD post hoc tests were used. The average sensitivity belief scores of mothers in all ethnic groups were very high (.70-.79), indicating strong convergence between their views regarding the ideal mother and expert views about sensitive parenting. Some group differences were found, $F(5,144) = 4.04, p < .01, \eta_p = .12$. The views of Dutch, Turkish minority, Moroccan minority, Antillean minority and Turkish mothers were significantly less similar to the MBQS criterion sort than those of Surinamese minority mothers (all $p < .05$).

Again ANOVAs were conducted to test the extent to which professionals with different cultural backgrounds agreed with the criterion sort of the ideal mother. These results are also shown in Figure 1. The average sensitivity belief scores in all ethnic groups were very

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high (.74-.81). In the group of professionals some differences were found as well, $F(5,92) = 2.36, p < .05, \eta_p = .11$. The views of Dutch professionals were significantly more similar to the MBQS criterion sort than those of Moroccan minority ($p < .01$) and Antillean minority professionals ($p < .05$). Besides, the views of Turkish and Turkish minority professionals were significantly more similar to the MBQS criterion sort than those of Moroccan minority professionals (all $p < .05$).

A comparison of the average sensitivity belief score of all mothers with the average of all professionals, also presented in Figure 1, showed that the mean sensitivity belief scores of professionals (.78) were significantly higher than the mean sensitivity belief scores of mothers (.73), $F(1,246) = 31.31, p < .01, \eta_p = .11$. In addition, the same pattern was found for all comparisons between professionals and mothers with the same ethnic background.

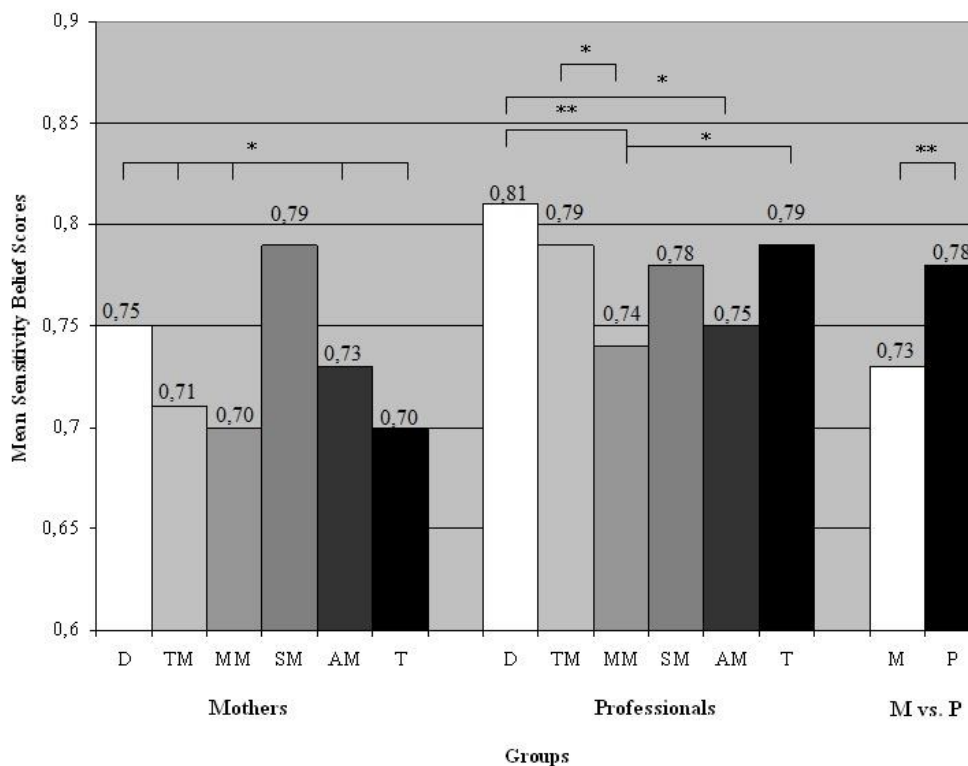


Figure 1. Differences in sensitivity belief scores between Dutch (D), Turkish **minority** (TM), Moroccan **minority** (MM), Surinamese **minority** (SM), Antillean **minority** (AM), and Turkish (T) mothers (M) and professionals (P) separately, and between all mothers versus all professionals.

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Background Variables and Views of the Ideal Mother

Because differences in sensitivity belief scores of different cultural groups of mothers and professionals were found, bivariate correlations between background variables and sensitivity belief scores were calculated (Table 2). For mothers, educational level, family income, number of children, and religion in child-rearing (whole sample) were significantly correlated with sensitivity belief scores. Higher educational levels, higher income, fewer children, and lower perceived importance of religion in child-rearing (including non-religious participants) were related to higher sensitivity belief scores. Maternal age and religion in child-rearing (in the subgroup of religious participants) were not associated with maternal sensitivity belief scores. In professionals, higher educated participants had higher sensitivity belief scores.

A one-way between-groups ANCOVA was conducted to explore the differences between the ethnic groups of mothers while statistically controlling for immigration status (i.e., not migrated, first-generation immigrant, or second-generation immigrant) and the variables that were significantly correlated with the sensitivity belief scores in mothers, namely education, income, number of children, and religion in child-rearing (whole sample). After controlling for these variables, the group differences in sensitivity belief scores of mothers disappeared, $F(5, 127) = 1.33, p = .26, \eta_p = .05$. The remaining significant predictors were educational level ($F(1, 127) = 7.07, p < .01, \eta_p = .05$), family income ($F(1, 127) = 5.65, p < .05, \eta_p = .04$) and number of children ($F(1, 127) = 4.64, p < .05, \eta_p = .04$).

A second one-way between-groups ANCOVA was conducted to explore the differences between ethnic groups of professionals while statistically controlling for education, which was significantly correlated with sensitivity belief scores in professionals, and immigration status. When controlled for these variables, the group differences in sensitivity belief scores of professionals disappeared, $F(5, 91) = 1.38, p = .24, \eta_p = .07$. Education ($F(1, 91) = 2.76, p$

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= .10, $\eta_p = .03$), and immigration status ($F(1, 91) = .38, p = .54, \eta_p < .00$) did not remain significant as predictors.

Views of the Ideal Sensitive Mother within and across Groups

To investigate differences and similarities in sensitivity beliefs of mothers and professionals, correlations were computed between groups of mothers and professionals, both within and across ethnic groups. The correlations were converted into Fisher's z , averaged within and across samples and then converted back to correlations (see Posada et al., 1995). The averages and ranges of the correlations between MBQS profiles for mothers from different ethnic groups revealed high average agreement within groups (.67 to .82) and between groups (.68 to .80). The averages and ranges of the correlations between MBQS profiles for professionals from different ethnic groups also revealed high average agreement within groups (.75 to .82) and between groups (.70 to .81). Table 3 shows the averages and ranges of the correlations between MBQS profiles for mothers and professionals from different ethnic groups and reveals high average agreement between groups (.62 to .80). In all of these analyses, the lower ends of the ranges of correlations between groups were lower than those found within groups, but the higher ends of the ranges of correlations were very similar within and between groups. Table 3 also shows high average agreement between Dutch professionals and mothers with different cultural backgrounds in the Netherlands (.76 to .81). It should be noted that the ranges in agreement between those groups are also comparable, i.e., the range of agreement between Dutch professionals and Dutch mothers was similar to the agreement range between Dutch professionals and ethnic minority mothers. The range in agreement between Moroccan minority mothers and Dutch professionals (.34-.87) is the largest, which is due to one Moroccan minority participant with a lower sensitivity belief score (.36) in comparison to the other Moroccan minority participants. We also conducted analyses on item level differences

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between groups of mothers and professionals, however, none of the differences were significant after Bonferonni correction.

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Table 2. *Correlations between Sensitivity Belief Score and Background Variables for Mothers^a (below diagonal) and Professionals^b (above diagonal)*

	1.	2.	3.	4.	5.	6.	7.
1. Sensitivity belief score	-	.24*	-	.02	.08	-.11	-.11
2. Educational level	.48**	-	-	-.10	-.18	-.19	-.24*
3. Family income	.43**	.55**	-	-	-	-	-
4. Age	.11	.24**	.30**	-	.54**	-.09	-.01
5. Number of children	-.19*	-.15	.08	.27**	-	-.01	.08
6. Religion in child-rearing (whole sample)	-.18*	-.18*	-.27**	-.14	.16	-	-
7. Religion in child-rearing (if religious) ^c	-.13	-.16	-.15	-.21*	.25**	-	-

^a Range of *n* mothers: 134 – 150.

^b *n* professionals: 98.

^c Range of *n* mothers: 108 - 116, *n* professionals: 81.

* $p < .05$. ** $p < .01$.

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Table 3. *Mean Correlations among Mother's and Professional's 90-items Q-sort Descriptions of the Ideal Mother Both Within and Across Groups*

	Mothers					
	Dutch	Turkish minority	Moroccan minority	Surinamese minority	Antillean minority	Turkish
Professionals						
Dutch	.80 (.62-.93)	.76 (.55-.91)	.76 (.34-.87)	.81 (.65-.91)	.77 (.60-.90)	.72 (.35-.88)
Turkish minority	.79 (.65-.90)	.75 (.57-.86)	.75 (.36-.89)	.80 (.68-.92)	.76 (.54-.88)	.73 (.35-.89)
Moroccan minority	.76 (.55-.80)	.74 (.53-.85)	.74 (.28-.87)	.78 (.63-.89)	.75 (.57-.84)	.69 (.26-.86)
Surinamese minority	.78 (.64-.89)	.75 (.57-.87)	.75 (.27-.88)	.80 (.70-.89)	.76 (.59-.85)	.64 (.36-.83)
Antillean minority	.78 (.57-.90)	.74 (.43-.89)	.74 (.25-.87)	.79 (.61-.88)	.76 (.60-.85)	.64 (.34-.83)
Turkish	.73 (.40-.88)	.69 (.36-.83)	.69 (.24-.86)	.74 (.46-.87)	.70 (.41-.86)	.68 (.19-.88)

Discussion

Views about the ideal sensitive mother were highly similar across cultural groups of mothers and professionals in The Netherlands and Turkey. Although some differences were found, the sensitivity beliefs of all groups converged highly with the views of experts. Across different cultural groups, mothers' and professionals' views on sensitivity were consistent with behaviors that are considered indicative of sensitivity by experts. This is in line with the study by Posada and colleagues (1995) in which mothers' descriptions of the ideal child in different sociocultural groups and professionals' descriptions of the hypothetical securely attached child were consistent with behavioral patterns that are considered as indicative of attachment security by experts. In addition, high agreement within and across groups of mothers and professionals was found. Of particular interest is the agreement between Dutch professionals and ethnic minority mothers, because this mismatch in cultural background is commonly encountered in youth care settings in the Netherlands and other multicultural societies. Our data show that there is a cognitive match between mothers and professionals with different cultural backgrounds regarding the importance of sensitivity related behaviors in child-rearing. Given that studies have shown the importance of the cognitive match instead of the ethnic match in forming therapeutic alliance (Knipscheer & Kleber, 2004), our findings suggest that parenting intervention and prevention programs focused on sensitivity would be applicable in cross-cultural therapeutic settings. However, it remains important to adapt the delivery of intervention and prevention programs for different SES groups.

There are some examples of early childhood parenting interventions that have been successfully applied to different ethnic groups. For instance, a recent study on the effectiveness of the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD) adjusted for Turkish minorities in the Netherlands, VIPP-Turkish Minorities (VIPP-TM), showed an increase in sensitive parenting of second-generation

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Turkish mothers in the Netherlands (Yagmur, Mesman, Malda, Bakermans-Kranenburg, & Ekmekci, 2014). Minor adaptations in the VIPP-SD program were made, such as the use of certain play materials and having interveners with the same cultural background and language skills in Dutch and Turkish, whereas the core aspects of the program were not adapted. The Incredible Years Program (Reid, Webster-Stratton, & Beauchaine, 2001) that was originally developed for a majority group and includes a focus on sensitivity, was found to be effective in increasing positive parenting across different ethnic groups. The few studies with parenting interventions in ethnically diverse families showed that not only the underlying principles but also the more specific content of such interventions are generally applicable across different cultural groups (Reid et al., 2002), although some procedural or methodological aspects of these programs may require cultural adjustment, such as using bilingual assistants and making more use of role play (Bjørknes & Manger, 2013; Yagmur et al., 2014). The current study provides a contribution to the literature on cross-cultural similarities in sensitivity beliefs, but because sensitivity is a core construct in child-rearing prevention and intervention programs aimed at families with young children, more studies are needed to replicate our findings to find out whether this construct is indeed valued and operationalized similarly in different cultural groups.

The Turkish, Moroccan, Surinamese and Antillean ethnic minority groups in the Netherlands are considered to have a more collectivistic cultural background, compared to the individualistic cultural background of the Dutch ethnic majority group. A recent report about minorities in the Netherlands (SCP, 2012), showed that being young, being a member of the second-generation, and having a higher education level are related to more contact with the native population. This makes it plausible that the minorities in our study could have adopted some values from the Dutch society, whereby their sensitivity belief scores highly converge with each other and with the Dutch mothers and professionals (Emmen et al., 2012).

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However, Turkish mothers and professionals from Turkey were also included in the present study and their sensitivity belief scores also converged highly with those of all groups of mothers and professionals, which suggests universality of the sensitivity construct.

In the current study educational level, income, and number of children of mothers were significant predictors of maternal beliefs about sensitivity, indicating that demographic factors, and especially SES, play an important role in beliefs about maternal sensitivity. These factors could play a role in the success of parenting interventions. The finding that SES is negatively related to convergence of maternal and expert beliefs about sensitivity may reflect the Family Stress Model (Conger & Donellan, 2007), in that higher stress levels due to economic pressures are related to a decreased ability to respond sensitively to children, and as a result sensitivity could be seen as less ideal (i.e., less important). Given the high convergence between SES groups on sensitivity beliefs, psycho-education aimed at enhancing sensitivity has the potential to effectively support mothers across SES groups.

The finding that a higher number of children relates to lower convergence between maternal and expert beliefs about sensitivity may be similarly explained. Having more children can cause more stress and less time to invest in each individual child, which can result in less sensitivity-orientated parenting beliefs. Among professionals educational level did not predict sensitivity beliefs, which is due to the fact that nearly all professionals were highly educated. The influence of SES on actual parental sensitivity has been documented in several studies (Mesman et al., 2012), and apparently also applies to parental beliefs about sensitivity.

Some limitations of the study need to be noted. A convenience sample was used and the sample size was small, which may limit the representativeness of the target population. Comparison of beliefs of mothers and professionals sharing the same ethnic background but living in different countries was only made for the Turkish. To assess whether the views of

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mothers and professionals living in host societies are just as similar to the views of mothers and professionals living in their country of origin, such a comparison needs to be made for each ethnic group. In addition, participating mothers were not selected for their need for professional assistance or support in child-rearing. Parental views of sensitivity may be more distorted in distressed families than in the current sample. Future research is needed to make a distinction between dyads in need of support and dyads who are not to find out whether our results can be generalized to distressed mother-child dyads in need of support. Moreover, there is a lack of studies assessing both sensitivity behaviors and sensitivity beliefs together, whereas this combination could provide important insights into the translating of beliefs into practice, and thus warrants future research attention. Finally, we only focused on mothers' and female professionals' views of the ideal mother. Future research should include fathers and male professionals as well.

The current study contributes to the growing evidence that sensitivity is a cross-culturally applicable concept in early childhood parenting. In our study no evidence is found for differences in sensitivity beliefs between ethnic groups of mothers and professionals within a country or between countries. We found a cognitive match regarding the importance of sensitivity as reflected in the high convergence between mothers and professionals with different cultural backgrounds. This match is of major importance for scientists and professionals working with minority families. Our findings suggest that early childhood parenting interventions focused on enhancing sensitivity could be successfully applied in programs for minority families.

CHAPTER 5

GENERAL DISCUSSION

This dissertation aimed to focus on three topics in developmental psychopathology. Developmental psychopathology approach indicates the importance of investigating both typical and atypical development and the factors leading to both. This dissertation included two separate papers on children with autism and obesity which are two of the important problems in childhood that displayed increasing prevalence in the last decades (Elsabbagh et al., 2012; Wang & Lobstein, 2006). The third paper included in this dissertation was about sensitive parenting, which is an important pathway through positive or psychopathological outcomes in early childhood years and beyond. In this chapter the main results of the three papers and their applied implications are discussed.

Children with ASD have important social deficits and various intervention programs aim to ameliorate social skills of these children. To our knowledge, the first paper was the first to simultaneously investigate the roles of more basic cognitive representational skills (i.e., see-know and internal state understanding), and both using and understanding of verbal and non-verbal communication skills on socially competent behaviors of children with ASD. The results of this first paper revealed that among these early skills, non-verbal communication skills were related to the social competence of children with ASD, when other skills were statistically controlled for. Children with ASD who have better non-verbal communication skills were found to be more competent in their social relationships. These results were important in showing the importance of non-verbal skills in social interactions in children with ASD, and implied that the intervention programs which aim better social interactions might benefit from targeting better non-verbal communication skills in this group.

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Another rapidly increasing problem in childhood that was targeted by various intervention studies is childhood obesity (Ng et al., 2014; Young et al., 2007). Early childhood years is an important period for targeting obesity since this is the time when the obesity epidemic starts and obesity related habits start to develop (Faith et al., 2012). Moreover, targeting problems in early years are more cost effective than targeting in later years (Heckman, 2006). Therefore, it was important to understand the effectiveness of the intervention programs targeting childhood obesity and to learn more about the possible factors leading to more effective interventions. Previous interventions targeting childhood obesity showed that some interventions were effective in decreasing obesity and overweightness problems in children (e.g., Barkin et al., 2012; Berry et al., 2011), but others were not as effective (e.g., Bellows et al., 2013; De Bock et al., 2012). Several researchers argued that effectiveness of interventions increased when parents were involved in the intervention (e.g., Neimeier, Haktner, & Enger, 2012), yet previous review and meta-analyses studies have not yet investigated the factors that were related to higher effectiveness in interventions with parental involvement. The second paper aimed to fill this gap. The results were informative in showing that interventions were effective in decreasing childhood overweight and obesity in the short-term (i.e., in the end of the intervention and within 3 months after the end of the intervention), however, these effects were not retained for longer term (more than 3 months) follow-ups. Interventions were more effective when participants received intervention materials either within interactive sessions or with educational materials, as opposed to when they received both. This finding implied that more modalities of interventions might be more confusing for participants and less effective in general. Neither of the demographic moderators such as child age, gender, baseline weight status, racial make-up or the continent the data was collected from was significantly related to the effectiveness of interventions, indicating that the results can be generalized to different populations. The results for the long

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term effectiveness of the interventions showed that the intervention effects were not retained in the long run. On the other hand, some studies providing long-term follow-up results did show significant effects of the intervention. These studies were the ones that were conducted with preschoolers as opposed to infants; and their targets were general parenting skills and behaviors as opposed to child diet and physical activity only. These results were informative for future intervention and prevention studies and implied that a possible venue for interventions might be targeting general parenting skills and behaviors and conducting interventions with preschool children. However, long-term results should be interpreted cautiously because of the publication bias and the scarcity of the interventions providing significant long-term effects. Therefore, these results also revealed the need for more studies examining the long-term follow-up results of intervention studies and assessing factors leading to higher effectiveness.

Intervention programs that aim to decrease the obesity and overweightedness problems in childhood have only recently started to target parenting styles and behaviors. However, parenting, especially sensitive parenting, is more widely targeted in interventions aiming to achieve other positive child outcomes like decreased child internalizing and externalizing problems (e.g., Eshel et al., 2006; Mesman et al., 2008; Moss et al., 2011; van Zeijl et al. 2006; Velderman et al., 2006). The third paper presented in this dissertation investigated the cognitions of sensitive parenting in different cultural groups. The results showed that maternal beliefs about the “ideal parent” were highly similar across different cultures and similar to the definitions of sensitive parenting in the literature (i.e., expert definitions), and showed that mothers and professionals across different cultures had similar cognitions. These results were informative for future prevention and intervention programs in showing that sensitive parenting is a cross-culturally applicable concept across both parents and professionals. The convergence of the views of mothers and professionals within the same culture was important

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in showing that applying interventions aiming to increase sensitivity would be well received by mothers in different cultures. Apart from the convergence of mothers and professionals within the same culture, the study also showed convergence between Dutch ethnic majority professionals and ethnic minority mothers from different cultures living in the Netherlands. These results were also important in showing that even if ethnic minority mothers received intervention for sensitive parenting by ethnic majority professionals, the two parties might achieve a cognitive match and interventions might be effective.

In summary, the current dissertation contributes to the developmental psychology literature in different ways and has several applied implications. First, by examining the roles of the less widely investigated factors on social competence of children with ASD, it identified new venues for interventions to increase positive social skills in this population. Second, by investigating the effectiveness of intervention studies targeting childhood obesity and examining possible moderators for intervention effectiveness, it increased our knowledge on how more effective interventions on early childhood obesity might be achieved. Third, by investigating the cultural relevance of the sensitivity construct across mothers as well as clinicians working with parents and their children, it increased our understanding of the cross cultural applicability of the interventions targeting maternal sensitivity.

Early childhood is an important period of time when several skills and competencies develop and several lifetime habits are established (Faith et al., 2012; Phillips & Shonkoff, 2000). Family environment and parenting are very important for children's development (Bornstein, 2006; Bronfenbrenner & Morris, 2006). Developmental psychopathology approach indicated the importance of examining developmental patterns, both in typically and atypically developing children, to learn more about child development, and argued for the importance of investigating different pathways to and precursors of typical and atypical development (Cicchetti, 2006). The papers presented in this dissertation are attempts in

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learning more about development of different outcomes and general well-being in early childhood years in typical and atypical populations and in investigating sensitive parenting, which is an important contributor for positive child development.

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