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**Assessing attachment in middle childhood:  
Psychometric evaluation of current self-report measures  
and development of a new questionnaire**

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## **Abstract**

Self-report questionnaires are useful and valid instruments to assess individuals' attachment representations (Bosmans & Kerns, 2015). Yet, few measures are available for school age children, and surprisingly little is known about the psychometric properties of extant questionnaires designed to assess attachment in middle childhood.

The current dissertation set out to address this lacuna and was guided by three interrelated aims.

The first aim was to psychometrically evaluate existing self-report measures of attachment in middle childhood. To this end, across the first section of this dissertation, we tested the psychometric properties of three widely used self-report questionnaires to assess attachment in middle childhood: the Security Scale (SS) (Chapter 2), the short form of the Experiences in Close Relationships-Revised Child version (ECR-RC) (Chapter 3), and the Preoccupied and Avoidant Coping Questionnaire (PACQ) (Chapter 4 – Study 1). We also conducted a comparative study across the PACQ and the short version of the ECR-RC (Chapter 4 – Study 2).

Taken together, our results indicate that the SS, ECR-RC and PACQ are psychometrically sound instruments to assess attachment representations of mother and father among Italian children. However, further studies are needed to clarify which specific aspects of insecure attachment are measured by the PACQ-preoccupied and ECR-RC anxiety subscales.

The second aim was to test and compare the psychometric properties of Harter ('Some kids...other kids') and Likert response formats as applied to attachment questionnaires designed for use in middle childhood (Chapter 5 – Study 2). Despite empirical evidence suggests that item response format plays a critical role in obtaining reliable and valid data (e.g., Borgers et al., 2004), less attention has been devoted to investigating which of the currently used response formats fits best with children's cognitive characteristics and may adequately capture attachment representations in this developmental phase. In the attachment field, questionnaires designed for school age children use the "some/other" format (Harter, 2012), whereas questionnaires designed for other developmental periods (i.e., adolescence and adulthood) and subsequently adapted for use in middle childhood follow the Likert format. To address this issue, we focused on the aforementioned SS and on the short form of the ECR-RC by creating additional versions of each scale with both Harter and Likert response formats, and then compared the four versions by evaluating their psychometric properties in terms of factorial structure and criterion validity. Our findings suggest that both the ECR-RC and the SS could be used with either response format. However, because the Harter's format carries an impersonal structure it may facilitate children's sharing their feeling regarding their relationship with parents.

The third aim was to develop an age-appropriate questionnaire – namely the Attachment in Middle Childhood Questionnaire (AMCQ) for children between 8 and 12 years of age (Chapter 6 – Study 1 and Study 2) – based on existing measures, and to examine its underlying psychometric properties in terms of factor structure, invariance across age and gender, and concurrent and convergent validity (Chapter 6 – Study 3). The questionnaire comprised two dimensions, i.e., anxiety (5 Items) and avoidance (5 Items), as well as a supplementary scale assessing perceived security (5 Items). Results provided

evidence for the factorial validity and structural invariance of its underlying construct across age and gender; concurrent and convergent validity were also supported. Overall, the AMCQ is a promising tool to assess attachment in school-aged children in the Italian context, demonstrating good psychometric properties. Further research is warranted to examine its psychometric properties in other countries to establish cross-cultural invariance.



## **Sommario**

I questionari self-report sono strumenti utili e validi per valutare le rappresentazioni dell'attaccamento (Bosmans & Kerns, 2015). Tuttavia, sono disponibili poche misure per valutare le rappresentazioni dell'attaccamento in bambini di età scolare, e sorprendentemente poco si sa sulle proprietà psicometriche dei questionari esistenti. La presente lavoro si proponeva di affrontare questa lacuna ed è stata guidata da tre obiettivi correlati.

Il primo obiettivo era valutare le proprietà psicometriche dei self-report disponibili per rilevare l'attaccamento durante la media infanzia. A tal fine, nella prima sezione di questa tesi, abbiamo testato le proprietà psicometriche di tre self-report ampiamente utilizzati per valutare l'attaccamento nella media infanzia: la Security Scale (SS) (Capitolo 2), la versione breve dell'Experiences in Close Relationships-Revised Child version (ECR-RC) (Capitolo 3) e il Preoccupied and Avoidant Coping Questionnaire (PACQ) (Capitolo 4 – Studio 1). Abbiamo inoltre condotto uno studio comparativo tra il PACQ e la versione breve dell'ECR-RC (Capitolo 4 – Studio 2).

Nel complesso, i risultati hanno indicato che la SS, l'ECR-RC e il PACQ sono strumenti psicometricamente solidi per valutare le rappresentazioni dell'attaccamento verso la madre e il padre nei bambini italiani. Tuttavia, sono necessari ulteriori studi per chiarire quali aspetti specifici dell'attaccamento insicuro sono misurati dalle scale di ansia e preoccupazione incluse nell'ECR-RC e nel PACQ.

Il secondo obiettivo era quello di testare e confrontare le proprietà psicometriche del formato di risposta Harter ('alcuni bambini / altri bambini') con il formato di risposta Likert applicati ai questionari per rilevare l'attaccamento nella media infanzia (Capitolo 5 – Studio 2). Nonostante l'evidenza empirica suggerisca che il formato di risposta degli item gioca un ruolo critico per ottenere dati affidabili e validi (Borgers et al., 2004), meno attenzione è stata dedicata allo studio di quale formato di risposta tra quelli utilizzati si adatti meglio alle caratteristiche cognitive dei bambini e sia in grado di rilevare adeguatamente le rappresentazioni dell'attaccamento in questa fase di sviluppo. Nel campo dell'attaccamento, i questionari sviluppati per bambini di età scolare utilizzano il formato 'alcuni / altri' (Harter, 2012), mentre i questionari sviluppati per altri periodi dello sviluppo (ad esempio, l'adolescenza e l'età adulta), e successivamente adattati per l'uso nella media infanzia, seguono il formato Likert. Per affrontare questo problema, ci siamo concentrati sulla SS e sulla forma breve dell'ECR-RC creando per ogni questionario versioni aggiuntive con i formati di risposta Harter e Likert, e abbiamo poi confrontato le quattro versioni valutando le loro proprietà psicometriche in termini di struttura fattoriale e di validità di criterio. I nostri risultati suggeriscono che sia l'ECR-RC che la SS potrebbero essere utilizzati con entrambi i formati di risposta. Tuttavia, poiché il formato Harter ha una struttura impersonale, potrebbe facilitare la condivisione dei sentimenti dei bambini riguardo al loro rapporto con i genitori.

Il terzo obiettivo era sviluppare un questionario adeguato all'età, — ovvero l'Attachment in Middle Childhood Questionnaire (AMCQ) — per bambini tra gli 8 e i 12 anni (Capitolo 6 – Studio 1 e Studio 2) basato su misure esistenti, e di esaminare le proprietà psicometriche sottostanti in termini di struttura fattoriale, invarianza tra età e genere, e validità concorrente e convergente (Capitolo 6 – Studio 3). Il questionario comprende due dimensioni, ovvero ansia (5 item) ed evitamento (5 item), oltre ad una scala supplementare

di valutazione della sicurezza percepita (5 item). I risultati hanno fornito prove della validità e dell'invarianza della sua struttura fattoriale in base all'età e al genere; sono state inoltre supportate la validità concorrente e convergente. Nel complesso, l'AMCQ è uno strumento promettente per valutare l'attaccamento nei bambini di età scolare nel contesto italiano, che dimostra buone proprietà psicometriche. Ulteriori ricerche sono necessarie per esaminare le sue proprietà psicometriche in altri paesi al fine di stabilire l'invarianza cross culturale.





## GENERAL INTRODUCTION

*“When people start writing  
they think they’ve got to write something definitive ...  
I think that is fatal. The mood to write in is ‘  
This is quite an interesting story I’ve got to tell.  
I hope someone will be interested.  
Anyway, it’s the best I can do for the present.’  
If one adopts that line one gets over it and does it.”  
(Bowlby in Hunter, 1991)<sup>1</sup>*

Attachment theory, proposed by Bowlby for the first time during the second half of the last century (Bowlby, 1969), is one of the most influential paradigms for the study of child-parent relationships and human development.

Originally focusing on the first years of life, attachment theory was expanded to study adult attachment representations (see Cassidy & Shaver, 2016; Mikulincer & Shaver, 2012). Overall, research provided support for the importance of attachment security for psychological well-being across the lifespan, and emphasized insecurity as a vulnerability factor for the development of a large variety of mental disorders (Mikulincer & Shaver, 2012). Yet, compared to infancy and adulthood, the study of attachment in middle childhood and early adolescence has been relatively neglected.

Over the past 20 years, a growing body of research has attempted to fill this gap and significant theoretical advances have been achieved. However, Thompson and Raikes’s

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<sup>1</sup> Retrive from Holmes, 2014

(2003) claims regarding attachment beyond infancy are still highly relevant as several challenges continue to exist, including (a) the identification of factors that contribute to the development and maintenance of secure attachment in middle childhood, (b) the analysis of associations among attachment, contextual vulnerability factors, and later adjustment (Thompson & Raikes, 2003), and (c) the validation of measures designed to assess attachment in this specific developmental period.

With regard to the first challenge, middle childhood (ranging approximately from age 7/8 to 11/12) represents an important turning point in human development due to the prominent changes occurring in all the major behavioral and psychological domains (see Eccles, 1999; Raikes & Thompson, 2005). From an attachment perspective, it is marked by the formulation and consolidation of representations of experiences, expectations, and skills related to the secure base (Waters & Cummings, 2000). While empirical evidence has provided support for the continuity of attachment style from infancy to childhood, only few studies have found such support from childhood to early adulthood (Sroufe, 2006; Thompson, 1998). Although it is not without its difficulties, the evaluation of such process is crucial to identify determinants of change in attachment style across the life especially in a transitional phase such as middle childhood. In fact, the substantial changes occurring in all the major behavioral and psychological domains render middle childhood a sensitive period in which children are maximally responsive to the influence of risk and protective factors (Del Giudice, 2018). Therefore, this may be a period of high plasticity to developmental and environmentally driven changes.

Moving to the second point, the association between attachment and related developmental outcomes has been largely documented in young children (see Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012). In particular, research has provided compelling evidence that early secure children develop effective emotion

regulation strategies for dealing with threats and distress (Thompson, 1994, Mikulincer & Shaver, 2012) and exhibit fewer behavioral problems during childhood. Consistently, insecure children have been found to show higher levels of maladaptive behavior later in childhood (Groh et al., 2012). However, less is known about how attachment style relates to adaptive/maladaptive outcomes in this phase. Overall, this general scarcity of data may reflect — at least in part — the lack of well-validated measures (Brenning, Soenens, Braet, & Bosmans, 2011; Kerns, Schlegelmilch, Morgan, Abraham, 2005).

Concerning the third challenge, the major difficulty in developing age-appropriate measures to assess attachment in middle childhood may be ascribable to the substantial cognitive, social, and emotional changes occurring at this stage, which result in more elaborate and organized attachment representations (Kerns & Bramariu, 2016). Hence, behavior observations used in infancy (e.g., Strange Situation, Ainsworth, Blehar, Waters, & Wall, 1978) may be less suitable for school-age children; also, semi-structural interviews that are often used to assess attachment representations in adults (e.g., Adult Attachment Interview; George, Kaplan, & Main, 1985) may be problematic because formal operational reasoning is still underdeveloped (Crowell et al., 1999).

For these and other reasons, self-report questionnaires are the most commonly used assessment methods in middle childhood (Kerns, et al., 2005). Yet, empirical studies investigating the psychometric properties and the validity of such instruments in middle-childhood are extremely scarce/scattered. This lacuna is the major challenge addressed by this dissertation. Indeed, the use of effective and age-appropriate measures is without doubts the first mandatory step when a construct is investigated. Furthermore, the lack of well-validated measures represents a great obstacle in order to fill the knowledge gap reported above. The availability of well-validated measures is key to better understand how attachment style interacts with further risk/protective factors in determining psychological

well-being in middle childhood. In turn, the understanding of such dynamics is crucial for the development of effective intervention programs aimed at preventing the potential long-term detrimental effects of middle childhood maladjustment related to insecure attachment.

### **General Aims**

The current dissertation was driven by three interrelated aims.

The first aim was to psychometrically evaluate existing self-report measures of attachment in middle childhood. Although the importance of testing the reliability and validity of attachment measures is widely recognized (e.g., Solomon & George, 2008), few studies have systematically tested the psychometric properties of these self-reports in a systematic way. To address this gap, across the first section of this dissertation, we tested the psychometric properties of three self-report questionnaires which are considered promising tools to assess attachment in middle childhood: the Security Scale (SS) (Chapter 2), the short form of the Experiences in Close Relationships-Revised Child version (ECR-RC) (Chapter 3), and the short Preoccupied and Avoidant Coping Questionnaire (PACQ) (Chapter 5 – Study 1). We also conducted a comparative study across the PACQ and ECR-RC (Chapter 4 – Study 2).

The second aim was to test and compare the psychometric properties of Harter and Likert response formats as applied to attachment questionnaires designed for use in middle childhood (Chapter 5). Despite existing empirical evidence suggests that item response format plays a critical role in obtaining reliable and valid data (e.g., Borgers et al., 2004; Borgers & Hox, 2000; Borgers, Hox, & Sikkel, 2003; De Leeuw, & Otter, 1995; Marsh, 1986), less attention has been devoted to investigating which of the currently used response formats fits best with the cognitive constraints of children and may best capture attachment representations in this developmental phase. In his regard, questionnaires designed for school age children use the “some/other” format (Harter, 2012), whereas questionnaires

designed for other developmental periods (i.e., adolescence and adulthood) and subsequently adapted for use in middle childhood follow the Likert format. To fill this knowledge gap, we focused on the aforementioned Security Scale and on the short form of the Experiences in Close Relationships-Revised Child version by creating additional versions of each scale with both Harter and Likert response formats, and then compared the four versions by evaluating their psychometric properties in terms of construct and criterion validity.

The third aim was to develop an age-appropriate questionnaire – namely the Attachment in Middle Childhood Questionnaire (AMCQ) for children between 8 and 12 years of age (Chapter 6 – Study 1 and Study 2) – and to examine its underlying psychometric properties in terms of factor structure, invariance across age and gender, and concurrent and convergent validity (Chapter 6 – Study 3). In this process we addressed both methodological and conceptual issues, such as the theoretical structure of attachment representation in middle-to-late childhood.

The main findings of this dissertation will be summarized and discussed in Chapter 7. Furthermore, we will discuss their implications for the measurement of attachment in middle childhood as well as their relevance from a theoretical and applied prospective. Last, we will highlight the main strengths and limitations, and provide suggestions for future research.



## GENERAL OUTLINE

<b>Chapter</b>	<b>Main aim</b>
<b>GENERAL INTRODUCTION</b>	
CHAPTER 1	- To provide an overview of the attachment in middle childhood
<b>SECTION 1: EVALUATION OF THE EXTANT SELF-REPORT TOOLS</b>	
CHAPTER 2	- To evaluate the psychometric properties of the Security Scale (SS; Kerns, Klepac, & Cole, 1996)
CHAPTER 3	- To evaluate the psychometric properties of the short Experiences in Close Relationships Revised Child version (ECR-RC; Brenning, Van Petegem, Vanhalst, & Soenens, 2014)
CHAPTER 4	- To evaluate the psychometric properties of the Preoccupied and Avoidant Coping Questionnaire (PACQ; Finnegan, Hodges, & Perry, 1996) (Study 1) - To compare the PACQ and the ECR-RC (Study 2)
<b>SECTION 2: DEVELOPMENT OF A NEW SELF-REPORT</b>	
CHAPTER 5	- To compare the Harter and Likert response format
CHAPTER 6	- To develop the Attachment in Middle Childhood Questionnaire (AMCQ) (Study 1 and Study 2) - To evaluate the psychometric properties of the AMCQ (Study 3)
<b>GENERAL CONCLUSIONS</b>	
CHAPTER 7	- To discuss dissertation's findings, strength, limit and future direction in a methodological and theoretical prospective





## CHAPTER 1

### Overview of attachment theory

In this chapter, we will first provide a general overview of attachment theory by introducing some of its basic principles and assumptions. Because changes in child-attachment relationships emerge simultaneously, with remarkable changes in several domains, we will, therefore, provide a broad overview of the main achievements that mark the middle-childhood phase. Next, we will delve more deeply into attachment in middle-childhood. This chapter will also encompass an examination of the extant measures for assessing attachment in this in-between stage. A detailed explanation of the existing self-report measures will thoroughly discuss step-by-step along the different studies included in the first section of this dissertation.

#### Basic concepts

The attachment theory (Bowlby, 1958; 1969) marks a critical turning point for the study of the ‘specific mother-child relationship’, in which the “mother does not become important because she gratifies, [he argues]; she is important from the start” (Greenberg & Mitchell, 1983, p. 185).

Conceived within an evolutionary framework, attachment theory melds core principles from different disciplines, including psychoanalytic theory, control systems theory, the structural approach to cognitive development, and, primarily, ethological studies. Notably, the phenomenon described by Lorenz as “imprinting” (Lorenz, 1965) and

Harlow's study with Rhesus monkeys (1958) became the basis for the development of the concept of attachment.

For many months after birth, human babies are utterly helpless and are unable to provide for their own needs. As a result, their chances for surviving in the “environment of evolutionary adaptedness” (Bowlby, 1969, p. 50) would be enhanced by a strong motivation to remain close to their primary caregiver, similar to the motivation for tiny goslings to follow their mothers. Natural selection has endowed human baby with a relatively stable innate psychobiological system that promotes closeness with significant others (i.e., attachment figures) to facilitate protection, which in turn increases infant survival. This system is referred to by Bowlby as the attachment behavioral system and is enhanced by the complementary maternal behavioral system designed to promote closeness and care when the child is exposed to potential danger (Cassidy, 1999). Therefore, the term “attachment” goes well beyond what can be defined as a simple social bond; attachment refers to a specific asymmetrical and complementary relationship between the child and the attachment figure, acts as an organizational system by setting as a goal the achievement of a sense of felt security, and determines the balance between proximity-seeking and exploration behavior (Sroufe & Waters, 1977). The attachment figure, generally represented by the mother, plays the role of a secure base “a secure base from which a child or an adolescent can make sorties into the outside world and to which he can return knowing for sure that he will be welcomed when he gets there, nourished physically and emotionally, comforted if distressed, reassured if frightened” (Bowlby, 1988, p. 10).

Two additional systems — biologically determined and intrinsically interwoven with the attachment system — are posited: the exploratory system and the fear system. The interaction between these two systems with the attachment system yields opposite results: the former deactivates the attachment system, whereas the latter triggers it (Cassidy &

Shaver, 2016). Consistently, certain circumstances, such as separation from the mother or experiences that children perceive as dangerous, elicit the activation of the attachment system, which in turn is deactivated when the system reaches its goal: proximity to the caregiver (Bowlby, 1969). The key lies in a good balance between these two systems, which is achieved when the child considers the caregiver a secure base from which to go out and explore and to which to retreat under conditions of stress (*safe haven*).

As stated by Sroufe and Waters (1977), the attachment behavioral system must not be conceived as a set of behaviors that are constantly and uniformly operative, but rather as a flexible system that operates in terms of the set goal and in interaction with other behavioral systems, in which different behaviors cover similar meaning and role. Thus, children's behavior is influenced by context rather than constant situations. In light of this, based on the situation, children will implement the behaviors that best support their goals. Differences in parental availability and responsiveness produce individual differences in attachment security (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). Individual differences in attachment behaviors reflect differences in attachment style. In summary, interactions with sensitive and responsive attachment figures promote a stable sense of attachment security, fostering positive mental representations of self and others (Shaver & Michulincer, 2014). However, when the attachment figure fails to meet the child's needs and proximity – seeking fails to soothe the child's distress, felt security is weakened.

### **Individual differences in attachment**

Mary Ainsworth's work (Ainsworth, 1977) provided empirical support for Bowlby's theorizations concerning the relationship between differences in attachment behavior and differences in parental responsiveness. Particularly, the experimental Strange Situation Procedure (SSP; Ainsworth et al., 1978) allowed researchers to identify three attachment styles: secure, avoidant, and ambivalent (Ainsworth et al., 1978).

Secure attachment develops when the caregiver is capable of responding adequately to the child's proximity requests and shows the characteristics of accessibility and responsiveness that fall into the category of 'availability' (Bowlby, 1973). Securely attached children engage in high levels of exploration, are self-confident, and use their mother as a secure base when they are anxious or distressed. On the other hand, avoidant attachment more likely develops when the caregiver is consistently unresponsive to the infant's needs. Infants with an avoidant attachment style show less effective engagement with the caregiver and avoid seeking care and support from her to cope with stressful events (Ainsworth et al., 1978). Lastly, inconsistency in the mother's behavior was associated with the development of an anxious/ambivalent attachment pattern. These infants appear to engage less in environmental exploration and express hyper-vigilance and anger while showing inconsistent attempts to obtain support and to be comforted by the caregiver.

A fourth category – disorganized attachment – was added later by Main and Solomon (1990) in response to difficulties in classifying a minority of infants into one of the three previous categories. Disorganized attachment was associated with unpredictable parental behavior and subsequent child failure to develop an organized strategy that allowed them to feel safe (Main & Solomon, 1990).

The SSP leads to a taxonomy of attachment patterns (Wilkinson & Parry, 2004) by coding and categorizing children into specific attachment patterns. However, a few authors recently investigated whether variations in attachment patterns could be better explained through continuous dimensions rather than with a categorical approach (Fraley & Spieker, 2003). Taxometric analyses of existing SSP data have suggested the presence of two latent continuous dimensions (Fraley & Spieker, 2003): (a) proximity seeking versus avoidant, and (b) angry and resistant. Subsequently, analyses performed on the Adult Attachment Interview, widely used to provide a categorical assessment of attachment in adults, led to

similar results (Roisman, Fraley, & Belsky, 2007). Although often questioned, the dimensionality approach has contributed significantly to the study of individual differences in attachment style (Waters & Beauchaine, 2003). Furthermore, studies on self-report measures have argued that the dimensional approach is more adequate than the categorical one suggesting two continuous oblique dimensions: anxiety and avoidance (Brennan, Clark, Shaver, 1998). By crossing these dimensions, it is possible to group respondents into three attachment styles: secure (low in both dimensions), avoidant (high in avoidance) and anxious (low in avoidant and high in anxiety).

### **Internal working models**

Early attachment experiences give rise to mental representations – including memories, thoughts, expectations, and emotions of the self and others, called internal working models (IWMs) (Bowlby, 1973). These models represent “a set of conscious and/or unconscious rules for the organization of information relevant to attachment, and for obtaining and limiting access to that information, i.e., to information regarding attachment-related experiences, feelings, ideations” (Main, Kaplan, & Cassidy, 1985, p. 66).

The structures of these models are based on children’s predictions of how likely it is that the attachment figures will be accessible and responsive as well as child’s self-representation (Bowlby, 1973). Children therefore develop complementary models of their selves and their parents, which represent both sides of the child-parent relationship (Sroufe & Fleeson, 1986). A working model of the self as valued and competent is the counterpart of a model of parents as sensitive and responsive to the infant’s signals in times of need and supportive in exploratory activities. These features promote a core sense of attachment security, including the perception of the world as a safe place and parents as generally available when needed. These features also promote environment exploration and proficient engagement in relationships with other people (Shaver & Michulincer, 2004). On the

contrary, a working model of self-devaluate is promoted by parents who reject and ignore the child's needs, and/or interfere with the child's exploration system, which lead children perceive that the world is not safe and parents unhelpful. This lowers the likelihood that the child will explore their environment and engage in new relationships.

Hence, IWMs, including the representations of the self and significant others, endure over time and predict behavior and successive affective bonds (Bowlby, 1973). In this perspective, people reconnect new affective relationships to what is known, and reshape new affective experiences according to their attachment representations. Nevertheless, these predictions can also be disconfirmed by new experiences, in which case the IWMs will undergo consequent further modification and updating. This usually requires the constant introduction of slight changes and depends on the experience in question. Such continual changes and revisions of the models, recalling the Piagetian dynamic of assimilation and accommodation (Piaget, 1970), stressing the "propensity to perceive any object in terms of some model we already have, even though that model may fit the object imperfectly: the new object of perception is said to be assimilated to the existing model" (Bowlby, 1973, p. 204). However, when important changes occur in the environment (i.e., marrying, losing a loved one) radical modifications are needed to adapt to the new context (Bowlby, 1969). This process is consistent with the principle of attachment as a dynamic system that sometimes re-organizes itself throughout the development, and which may be characterized by either continuity or change as the result of ongoing person-environment interactions. For instance, changes in the context that has served as a favorable condition for the development of a specific attachment style may lead to discontinuity in attachment styles beyond infancy (Booth-LaForce et al., 2014; Waters, Hamilton, & Weinfield, 2000; Weinfield, Sroufe, & Egeland, 2000; Zimmermann, Fremmer-Bombik, Spangler, & Grossmann, 1997).

In summary, the primary tendency of individuals to establish strong emotional bonds with specific people is ultimately a fundamental component of human nature. The attachment bond develops in early childhood and remains throughout life. During childhood, emotional ties with parents are established by the search for protection and support, remain present throughout development, and are integrated by new bonds based on different evolutionary periods. Importantly, this emotional process has great potential to affect developmental outcomes throughout the whole lifespan.

### **Developmental changes in middle childhood**

Middle childhood (ranging approximately from 7/8 to 11/12 years) represents a critical turning point in human development (Eccles, 1999). During this phase, children are in the position of becoming more and more competent and productive (Erikson, 1968), and they contribute to their family activities in a process of social learning and social integration within a system of norms, activities, and roles. In the meantime, they are still receiving sustained investment from their parents (DelGiudice, 2018).

To properly frame the middle childhood phase, we must consider the different achievements occurring in this in-between phase. Indeed, this is of crucial importance to understanding how the attachment relationship changes in older children.

Middle childhood overlaps with Piaget's operational stage (Inhelder, & Piaget, 1958) which is marked by the development of the capacity for abstract reasoning. In this developmental phase, children move from iconic to symbolic representation (Bruner, 1986) and increase their mastery of the processes of internalization and structuring (Vygotsky, 1985). The full development of a theory of mind, together with the improvement of metacognitive skills, allows children to begin to understand the concept of different points of view, the motives and intentions of others, and emotional nuances and ambivalence (Raikes & Thompson, 2005). Their communication skills and episodic memory (Tulving &

Craik, 2005) continue to improve during the entire middle childhood period. The considerable strides in memory retention lead to an increase in the ability to retrieve conscious memories of past events, leading to greater capacity to use previous experiences with more efficient and flexible action planning. This has important implications for the capacity to plan alternative strategies for children to meet their own needs and achieve goals.

Along with cognitive growth, important changes in the social domain occur during school-age years. School opens up new social contexts beyond the family, allowing children to engage in new relationships. Children learn to cooperate with both peers and adults and begin to conceive relationships in more complex forms, including ambivalence (Raikes & Thompson, 2005). Furthermore, despite family, and more specifically, parents' support, continuing to be of prominent importance, children gain increased awareness of the emotional support they can derive from peers (Selman, 2003). This stage is marked by the overcoming of self-centeredness (or egocentrism), the acquisition of role-taking abilities, and the ability to distinguish between the self and others. Children are faced with new social roles in which they try to gain their own status according to their skills and performance.

This has important implications for the development of the self-concept that gradually grows throughout childhood. Indeed, as children start school, they begin to pay much more attention to those around them, and they also start to compare their selves and their experiences with those of their peers, and this includes comparisons of child-parent relationships. Therefore, improvements in social comparison skills can allow substantial changes in the ways in which children evaluate their attachment figures (Kerns, 2008).

During middle school, children gain an increased ability to recognize emotions that can, in turn, be used with adaptive functions to regulate internal affect. Furthermore, the



reciprocity of social interaction and empathic/prosocial orientation increase substantially (Abuhatoum, Howe, Della Porta, Recchia & Ross, 2016).

In this paragraph we have provided an overview of the developmental changes occurring in middle childhood. However, what about the child's relationship with his or her parents? How do these maturational changes affect the child-parent relationship? This will be the focus of the next paragraph.

### **Attachment in middle childhood**

As mentioned earlier, changes occurring during middle childhood may impact child-parent relationships (Ainsworth, 1985). The recent literature (Bosmans, 2009; Kerns & Brumariu, 2016; Mayseless, 2003) stresses a few major features of attachment during the school years that we will briefly summarize below.

*Attachment behaviors become more sophisticated and are guided by cognitive-affective internalizations.* Improvements in reasoning skills allow children to reason in terms of abstract representations of events, and the abilities to plan their behavior, integrate new information, and use it in reasoning and problem-solving increase. These skills are also used in the service of attachment processes; as children increase their ability to understand their own points of view and those of their parents, they become more able to regulate and communicate their own emotions, and they adopt more sophisticated and better-organized strategies to reach their own objectives (Raikes & Thompson, 2005). Within their relationships with their caregivers, children improve their ability to negotiate and make their own projects and desires more compatible with those of the caregiver, even to the point of building a shared perspective. Thus, the attachment relationship accentuates even more deeply the characteristics of a goal-corrected partnership (Mayseless, 2005). One consequence of this new organizational level is that individual differences in attachment security (or insecurity) seem to increasingly correspond with different strategies with which

children pursue the goal of being protected and supported by someone (Waters & Cummings, 2000).

*Attachment (Internal Working Models) becomes more integrated and generalized.*

Attachment behaviors are part of a more general strategy. They are initially linked to a particular relationship and subsequently reflect the specific contributions of the child's different relationships. As previously reported, Bowlby (1969) conceived the internal working models as mental configurations in which the self, significant others, and their interrelations are represented. During school-age years, children move from internal operative models related to specific attachment figures toward more integrated representations of attachment relationships, like those thought to be present in adulthood (Verschuere & Marcoen, 1999; Raikes & Thompson, 2005). It begins to define attachment style as part of one's personality (Ammaniti, Speranza, & Fedele, 2005).

*Attachment relationships become more diversified and differentiated.* New affective bonds are established with both adults and peers, and similar but not yet identical dynamics can be observed in those typical of attachment relationships. A few authors (e.g., Mayseless, 2005) have described this period as a phase of preparation for reorienting the investment of attachment from parents to other partners. Children witness a gradual reorganization in the models of representational relations of self and others following a reactivation of the attachment system (De Vito & Muscetta, 2010).

*The circumstances that activate the attachment system change.* Children and parents work together to make their activities easier to control, simultaneously satisfying the need for both protection and exploration. Children spend more time away from their family, and parents can have less control and less influence on their children's experiences (Kerns & Richardson, 2005).

We witness what Bowlby described as the decline of attachment behavior through changes in two main domains: (a) the conditions that activate the attachment system and (b) the conditions that deactivate the attachment system (Mayseless, 2005).

The attachment system is more likely to activate due to more extended separations (e.g., going away on school trips, being home alone when ill). This, of course, also produces changes in the way in which the attachment system is deactivated, and physical proximity (which represents the primary goal of attachment in infancy and during the preschool years) is gradually replaced by the psychological availability of attachment figures (Kerns, Tomich, & Kim, 2006; Dwyer, 2005). This occurs with a shift in mental representations, in which a child increases their awareness of another person's motivations and therefore becomes more able to compromise in their own behavior for the sake of the relationship. This is more commonly known as a goal-corrected partnership (Bowlby, 1982).

Typical attachment behaviors in this developmental period include searching for the support of attachment figures when under stress and when one needs to solve specific problems (scholastic, social), desiring psychological contact when it is precluded, sharing affection and significant events, sharing information about important events or emotions, striving to maintain partner esteem, collaboration with parents in monitoring their activities, using the house as an important place to meet, and participating in family activities (Mayseless, 2005). Rather than physical proximity, the availability of the caregiver takes the forms of open communication and emotional and psychological availability to respond to the child's signals. Notably, the attachment configurations in these evolutionary periods are more closely related to how parents are perceived at that moment and to the presence of severe situations of family or social stress, rather than being closely related to early attachment patterns (Kerns & Richardson, 2005). This results in a notable plasticity in the development of internal representations.

### **Measuring attachment in middle childhood**

The main difficulty in developing age-appropriate measures for assessing attachment in middle childhood may be in part ascribable to the aforementioned changes that characterize the middle childhood period.

As already repeatedly highlighted, these changes may impact the child-parent relationship (Ainsworth, 1985), making attachment representations more elaborate and organized (Kerns, & Bramariu, 2016). As a consequence, behavioral observation measures recognized as the gold standard to assess attachment during infancy (i.e., the Strange Situation Procedure, SSP; Ainsworth et al., 1978) may be not effective for school-age children because it is challenging to implement age-appropriate stressors (Lewis, Feiring, & Rosenthal, 2000; Stevenson-Hinde & Shouldice, 1995; Ainsworth, 1990). Moreover, narrative approaches widely used to assess attachment representation in adults (i.e., the Adult Attachment interview, AAI; George, Kaplan, & Main, 1996) may be also may problematic because may be influenced by children's language competence and may presuppose well-developed formal operational skills (Crowell et al., 1999).

Over the past 20 years, several instruments have been developed to assess attachment in middle childhood. These measures can be categorized as (a) interviews, (b) narrative story stem techniques, and (c) self-report questionnaires. Their overlap in the literature has been rarely achieved (see Granot & Mayselless, 2001; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Kerns, et al., 2011; Kerns, Tomich, Aspelmeier, & Contreras, 2000), suggesting that they each capture specific aspects of the attachment system (Bosmans & Kerns, 2015; Psouni & Apetroaia, 2014).

Interviews (e.g., Child Attachment Interview, Shmueli-Goetz, Target, Fonagy, & Datta, 2008) and narrative story stem techniques (e.g., Attachment Doll Story Completion Task, Granot & Mayselless, 2001) capture both conscious and unconscious representations.

Thus, referring to dual process theory (e.g., Gawronski & Creighton, 2013), such measures rely on automatic processes (i.e., those outside conscious control) (Bosmans & Kerns, 2015). On the other hand, questionnaires (e.g., Security Scale, Kerns, Klepac, & Cole, 1996) are based on the child's direct reporting about experiences with attachment figures. They require participants to answer a set of questions without additional prompts or variations and require no interpretation from a coder or interviewer. Thus, they capture only conscious representations and involve strategic (i.e., explicit and/or available for conscious introspection) processes (Bosmans & Kerns, 2015).

Strategic measures, such as self-report measures, are the most commonly used to capture children's and adolescents' attachment representations in middle childhood (Kerns, Schlegelmich, Morgan, & Abraham, 2005). Overall, these measures focus on the quality of attachment relationships (Wilkinson & Parry, 2004) and while behavioral measures (i.e., SSP; Ainsworth et al., 1978) and interviews (i.e., AAI; George, et al, 1996) highlight the influence of past attachment experiences via mental representation, the assessment of the quality of attachment relationships stresses how well individuals are emotionally connected with caregivers at present.

Different authors have stressed the utility of self-report measures. For instance, Main (1999) claimed that self-report scales fruitfully capture consciously accessible aspects of attachment. More recently, Bosmans and Kerns (2015) advocated for the usefulness of combining complimentary approaches (i.e., interview, questionnaire) to better understand how attachment is organized in this in-between period, as well as how it affects attachment-related outcomes.

The use of different measures based on different approaches is recommended to obtain a more accurate understanding of the meaning of attachment in middle childhood

(Bosmans & Kerns, 2015) and to develop a thorough understanding of how attachment in middle childhood affects lifelong attachment-related outcomes.

## **SECTION 1**

### **PSYCHOMETRIC PROPERTIES OF EXTANT SELF-REPORT MEASURES**

As mentioned earlier, self-report questionnaires are a commonly used methodology to assess attachment in middle childhood and early adolescence. Some provide a broad evaluation of attachment security versus insecurity (i.e., the Security Scale; Kerns, Klepac, & Cole, 1996); others (i.e., Experiences in Close Relationships Revised Child version; Brenning et al., 2014; and Preoccupied and Avoidant Coping Questionnaire, Finnegan, Hodges, & Perry, 1996) allow to differentiate among insecurity dimensions (i.e., anxiety/preoccupation and avoidance). However, little information is available on the reliability and validity of such instruments in this developmental phaser. This is surprising, since it is widely recognized that the quality of children's attachment relationships plays a prominent role in both short- and long-term socioemotional adjustment. Thus, the availability of reliable and valid measures is of crucial importance.

The current section includes four studies focusing on three self-report questionnaires which are frequently used in studies with school-age children, and whose psychometric properties in terms of factor structure and external validity (e.g., concurrent and convergent validity) are analyzed using appropriate statistical methods.

The first study (Chapter 2) focuses on the Security Scale, a questionnaire designed by Kerns and colleagues (1996) to assess perception of security toward mother and father in

children aged between 8 – 12 years. The second study (Chapter 3) includes the short version of the Experiences in Close Relationships-Revised Child version. The questionnaire was originally designed to assess romantic attachment in adults (Fraley, Waller, & Brennan, 2000), and has been recently adapted by Brenning and colleagues (2014) to assess anxiety and avoidance in children and adolescents. The third study (Chapter 4 – Study 1) examines the Preoccupied and Avoidant Coping Questionnaire (PACQ), which was developed by Finnegan and colleagues (1996) to measure preoccupied and avoidant coping in middle childhood and early adolescence. Finally (Chapter 4 – Study 2), a comparative evaluation of the PACQ and ECR-RC to assess attachment insecurity in middle childhood is the subject of the fourth study.

Beyond the paucity of research investigating the psychometric properties of extant self-report measures of attachment in middle childhood, some other critical methodological issues can be identified in common practice. For instance, most of these self-report measures yield ordinal data. Yet, a common practice is to handle such data as continuous, leading to the erroneous use of parametric statistical methods to analyze them and consequently to incorrect inferences, since the assumptions about the distribution of such data divert from those of ordinal data. Overall, this process may cause the conclusions drawn from such studies to be questionable. Another issue is that the majority of studies investigating, for instance, differences in attachment scores between potential groups (e.g., boys vs. girls) have traditionally used analysis of variance based on observed composite scores, a practice which increases the risk of obtaining unreliable results. Indeed, such method rests on the assumption that observed measurements (e.g., item responses) are gained without error, which is quite often improbable in practice (Brown, 2015). To provide an additional example, a common practice is the reliance on Cronbach's Alpha to assess the



reliability and dimensionality of questionnaires despite the well-recognized limitations of this index (Revelle, 2009).

In recent years, alternative statistical methods have been proposed that allow for a more efficient and reliable evaluation of psychometric properties of assessment tools. Thus, from a methodological perspective, the current section provides examples of effective methods as applied to questionnaires which are designed to assess attachment in middle-childhood.

## OUTLINE OF SECTION 1

**General Aim:** To evaluate the psychometric properties of existing self-report questionnaires

Questionnaires	Main aims	Statistical Analyses
SS	To evaluate: - Factor structure - Invariance across mother and father - Concurrent validity	Series of CFAs Ad-hoc bootstrap procedure Pearson correlations
Short ECR-RC	To evaluate: - Factor structure - Invariance across middle-childhood and early adolescence - Difference in anxiety and avoidance scores across age groups - Concurrent validity - Convergent validity	Series of CFAs MG-CFA LMA SEMs
Short PACQ and ECR-RC	To evaluate: - Factor structure - Invariance across middle-childhood and early adolescence - Difference in preoccupation and avoidance scores across age groups - Mutual association between PACQ and ECR-RC - Comparison of convergent validity across tools	Series of CFAs MG-CFA Latent Mean Analyses SEMs

*Note.* CFA = Confirmatory Factor Analysis; MG-CFA = Multigroup Confirmatory factor analyses; LMA = Latent Mean Analyses; SEM = Structural Equation Modelling; SS = Security Scale (SS; Kerns et al., 1996); ECR-RC = Experiences in Close Relationships-Revised Child (ECR-RC; Brenning et al., 2014); Preoccupied and Avoidant Coping Questionnaire (PACQ; Finnegan et al., 1996)

## **CHAPTER 2**

### **Measuring attachment security via the Security Scale: Latent structure, invariance across mothers and fathers and convergent validity**

Tatiana Marci, Francesca Lionetti, Ughetta Moscardino, Massimiliano Pastore, Vincenzo Calvo & Gianmarco Altoé (2018). Measuring attachment security via the Security Scale: Latent structure, invariance across mothers and fathers and convergent validity. *European Journal of Developmental Psychology*, 15(4), 481–49.



**Abstract**

The Security Scale (SS) is a widely used questionnaire measuring attachment towards mother and father in school-aged children. Whilst existing evidence supports concurrent and discriminant validity of the SS, its factorial structure remains largely underexplored. The current study examined the factorial structure of the SS, explored its measurement invariance across mother and father, and evaluated its concurrent validity with the Coping Strategies Questionnaire in a sample of 149 Italian children aged 8 to 10 years. In statistical analyses, we accounted for the ordinal nature of the data and adopted an ad hoc bootstrap procedure for the estimation of measurement invariance. Results supported the factorial validity of the SS and the structural invariance of its underlying construct across parents. Evidence for concurrent validity was also found. Overall, the Italian version of the SS is a promising tool to assess attachment in school-aged children.

**Keywords:** Attachment, Security Scale, Confirmatory Factor Analysis, Psychometric properties, Measurement invariance

Secure attachment is protective for young children's social-emotional development, and its significance for adaptation has been documented also in middle childhood and adolescence. However, there is currently no dominant approach for investigating the quality of attachment in middle-childhood, giving rise to a lively methodological debate (Brenning, van Petegem, Vanhalst, & Soenens, 2014; Kerns, 2008).

One of the most popular instruments to measure attachment in school-age children is the Security Scale (SS; Kerns, Aspelmeier, Gentzler, & Chandra, 2001), a 15-item self-report questionnaire developed to provide a continuous measure of attachment security towards mother and father (Kerns et al., 2001). Previous research reported good internal consistency of the scale (for an overview, see Dwyer, 2005), and a few studies have found the SS to be related with other attachment measures, such as self-reports and the attachment story stem technique (e.g., Brenning, Soenens, Braet, & Bosmans, 2011; Granot & Mayseless, 2001; Kerns, Abraham, Schlegelmilch, & Morgan, 2007; Kerns, Tomich, Aspelmeier, & Contreras, 2000; van Ryzen & Leve, 2012). As indices of concurrent validity, significant correlations between security of the SS and social-emotional adjustment, social competence, children's global self-esteem, and conduct problems have been reported (e.g., Barone et al., 2015; Booth-Laforce et al., 2006; van Ryzen & Leve, 2012).

Surprisingly, however, only a handful of studies have formally explored the SS factor structure, and no published data exploring its psychometric proprieties are available for Italian samples (Bacro; 2011; Verschueren & Marcoen, 2005). Lieberman et al. (1999) hypothesized a two-factor model of the SS including availability and dependency, but this model has never been formally supported by robust psychometric analyses. Recently, Kerns and colleagues proposed two factors named safe haven support (including one item from the original SS plus six ex-novo items) and secure base support (including 14 items from

original SS) (Kerns et al., 2015), but the factor structure of the widely-known original scale has not been further tested.

Beyond the paucity of research formally investigating the factorial structure of the scale, another issue that merits further attention is that extant studies have treated the SS 4-point response scale as continuous rather than ordinal, leading to “a mismatch between the assumptions underlying the statistical model and the empirical characteristics of the data to be analysed” (Flora & Curran, 2004, p. 466). This mismatch increases the risk of non-reliable results due to the assumption that Likert-scale items are continuous rather than distributed as categorically-ordered variables (Lionetti, Keijsers, Dellagiulia, & Pastore, 2016). Also, despite growing awareness about the importance of father-child relationships for psychological adjustment throughout middle childhood, scant research has included attachment scores towards fathers, and little consideration was given to the dependency of observations when the factor structure of the Security Scale was explored. To our knowledge, only Bacro (2011) tested the factorial invariance of the questionnaire providing support for configural invariance across parents.

The current study aimed to fill these gaps. Specifically, we evaluate the SS factorial structure and we propose an innovative bootstrap-based procedure to evaluate measurement invariance of the SS across parents. Finally, concurrent validity with the Preoccupied and Avoidant Coping Questionnaire, Finnegan, Hodges, & Perry, 1996) is also tested.

## **Method**

### **Sample and procedure**

Data were part of a larger research project on attachment and academic performance in Italian school-aged children (Marci & Altoè, 2013). The study was first presented to head-teachers individually at schools, and then study approval was obtained from both the school principal and the class council. Parents received an information sheet under the

Italian Law and were asked to provide written consent. After selecting for participants not reporting intellectual disabilities, certified developmental or learning disorders, the final sample included 157 eligible children attending eleven classes of three public primary schools in Sardinia. Parents provided written informed consent, and children were asked for their verbal assent before starting data collection.

Children completed a socio-demographic form, the Coloured Progressive Matrices (CPM; Raven, 1965), an Italian back-translated version of the SS (Calvo, 1998; Simonelli, & Calvo, 2002), and the PACQ (Finnegan et al., 1996) during school hours. Data from children who scored lower than .80 at the CPM ( $n = 1$ ) or who did not complete SS for both parents ( $n = 7$ ) were not included in statistical analyses. The final sample consisted of 149 children (51% girls;  $M_{age} = 9.53$  years,  $SD = 1.05$ , range = 7.9 – 11.9); of these, three participants did not complete the PACQ but were nonetheless retained except for the concurrent validity analysis. No imputation of missing values on item responses was necessary due to the absence of missing data.

### Measures

The SS consists of 15 items (the same for mother and father, see Appendix A) assessing the extent to which the child believes the attachment figure is responsive and available (Kerns et al., 2001). Each item is rated on a 4-point scale using Harter's (1982) format ("Some kids ... but ... Other kids"), with higher scores indicating perceptions of greater security.

The short form of the PACQ (Finnegan et al., 1996) is a 20-item self-report questionnaire designed to measure dimensions of preoccupied and avoidant coping in relation to a caregiver. Its subscales have been interpreted as measures of ambivalent and avoidant attachment patterns in school aged children (Younger, Corby, & Perry, 2005). The response scale follows Harter's format (1982), and items are scored as 0, 1, or 2. In the



current study, children were asked about how they coped in the relationship with their mother. PACQ reliability indices were good for both the ambivalent and the avoidant subscales (ordinal Cronbach's alphas were .85 and .85, while ordinal omegas were .86 and .87, respectively).

### **Analytic approach**

First, we explored item response distributions for mother and father. Then, we performed a series of Confirmatory Factor Analyses (CFAs) on items relating to mother and father simultaneously, with the same unidimensional construct being hypothesized for each parental figure. Given the ordinal nature of the data, we used the Diagonally Weighted Least Squares (DWLS) robust estimator. The best fitting model was selected considering the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root-Mean-Square Error of Approximation (RMSEA), and Weighted Root Mean Square Residual (WRMR). Cut-off values for fit were considered adequate if CFI and TLI were  $> .90$  and RMSEA less than  $.06$  (Hu & Bentler, 1999). Reliability of the scale based on the selected model was also evaluated by means of ordinal Cronbach's alpha and McDonald's Omega.

To evaluate measurement invariance between mother- and father-related items, a bootstrap approach was used. This approach allows to estimate the sampling distribution of a statistic of interest (e.g., factorial loadings) by resampling with replacement from the original sample without normality assumption (Efron & Tibshirani, 1993). In particular, the idea is to build a sampling distribution for a statistic of interest by resampling with replacement from the original sample. In this study, we used a multivariate approach by resampling each subject with its associated variables (i.e., items selected from our best-fitting model). Thus, the child was the statistical unit. Particularly, we created 4000 bootstrapped replicates sampling from the original data, extracted the empirical distribution of each factor loading. Then, we graphically represented the distributions of factor loadings

and computed the proportion of overlapping across paired items (mother and father). We used the bootstrap Lavaan function of the R package *lavaan* to implement this procedure with our structural equation model (see also commented sample syntax in Appendix A).

Pearson correlations were used to test bivariate associations between the SS and PACQ subscales using mean scores of the respective items. In addition, correlational analysis was conducted using factor scores (see Appendix A). Lastly, to evaluate potential differences in attachment security, we performed a mixed-effects model with child age, grade (3rd vs. 5th) and parental role (mother vs. father) as fixed effects (including all two- and three-way interactions between fixed effects), subject as random effect, and attachment security as dependent variable. Analyses were carried out using the R packages *lavaan* (Rosseel, 2012) and *overlapping* (Pastore, 2016) for CFAs and the evaluation of measurement invariance, respectively.

## Results

Most of the items showed a left-skewed distribution (Figure 1), further supporting the appropriateness of an analytical approach that takes the ordinal nature of the data into account (Flora & Curran, 2004).

An initial model (M1) was tested using all 15 items loading onto a single factor for mother and father (Table 1). Model 1 showed a poor fit; after including residual correlations, the model improved along RMSEA. However, CFI and TLI were still below the threshold of 0.90 (M2). Thus, 3 misfitting items (common to mother and father, see Table A1 in Appendix A) which were unrelated to the latent structure (i.e., not statistically significant at the 5% level and with a negligible effect size,  $< .1$ ) were dropped in models 3 to 5.

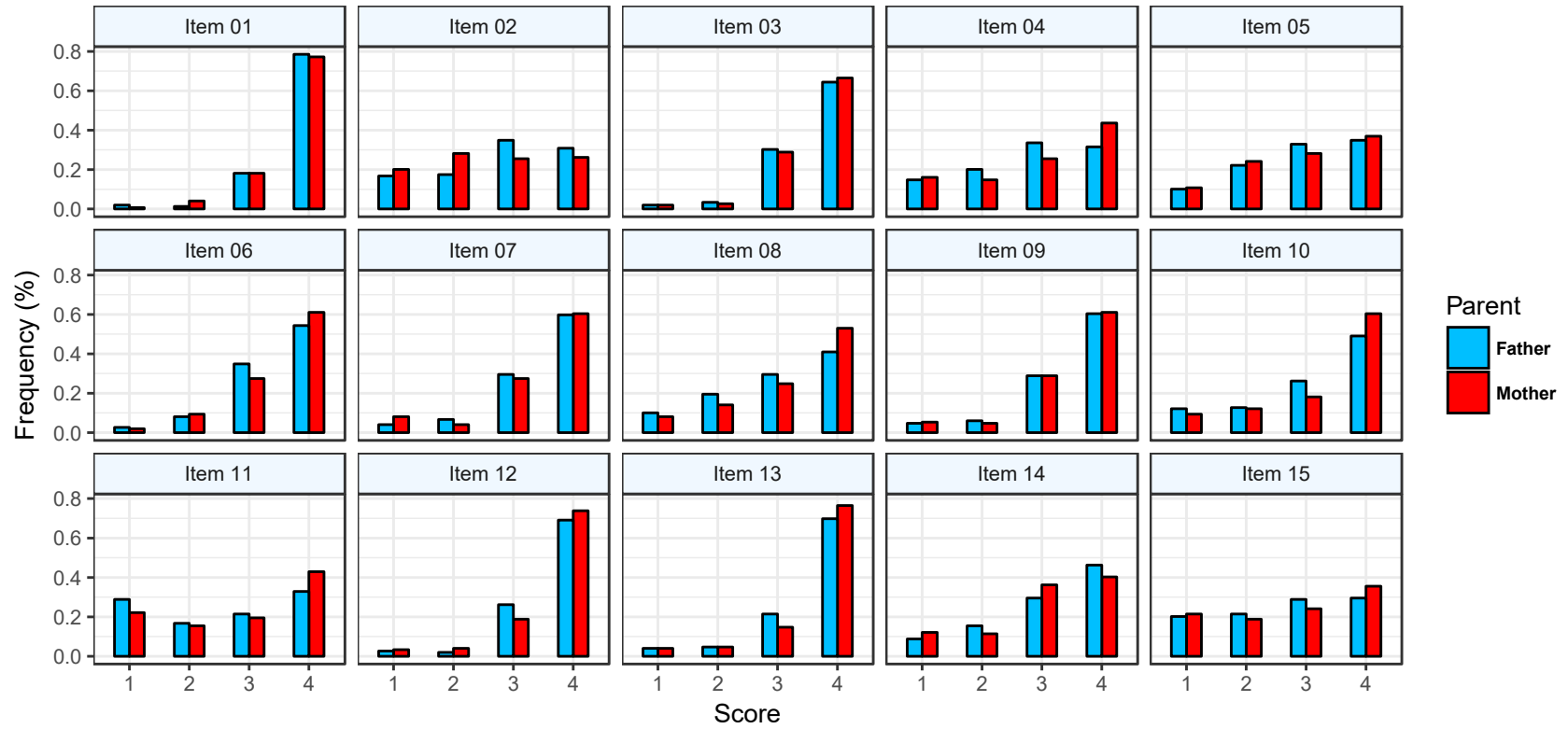


Figure 1. Response distributions of mother and father related items ( $N = 149$ )

Table 1

*Fit indices of the five confirmatory factorial models of the Security Scale*

<i>Model</i>	<i>Item deleted</i>	$\chi^2$	<i>df</i>	<i>p</i>	<i>CFI</i>	<i>TLI</i>	<i>RMSEA [90% CI]</i>	<i>WRMR</i>
1	–	769.077	404	< .001	.794	.778	.078 [.070 – .086]	1.362
2	–	584.635	389	< .001	.890	.876	.068 [.048 – .068]	1.107
3	2	530.507	335	< .001	.892	.878	.063 [.053 – .073]	1.119
4	14	418.939	285	< .001	.924	.913	.056 [.044 – .068]	1.011
5	7	362.069	239	< .001	.930	.919	.059 [.046 – .071]	.994

*Note.*  $N = 149$ . Model 1, Solution without residual covariances; Model 2, solution with residual covariances; Model 3, 14-item solution with residual covariances; Model 4, 13-item solution with residual covariances; Model 5, 12-item solution with residual covariances. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square of Approximation; WRMR = Weighted Root Mean Square Residual

The final model (M5) fitted the data reasonably well ( $\chi^2(239) = 362.069$ , CFI = .93, TLI = .919, RMSEA = .059, WRMR = .994), with only three items (i.e., items 6 and 11 for mother, and item 10 for father) showing relatively low factor loadings (see Figure 2). These items were nonetheless retained, because those fitting poorly in the SS mother version were acceptable for the SS father version and viceversa, as confirmed by the good fit indices of the resulting model. Figure 2 provides a visual representation of the CFA results.

Attachment security to mother and father were significantly and positively correlated,  $r = .64, p < .001$ .

Reliability indices were good for both mother and father (ordinal Cronbach's alphas were .85 and .87, while ordinal omegas were .85 and .88, respectively).

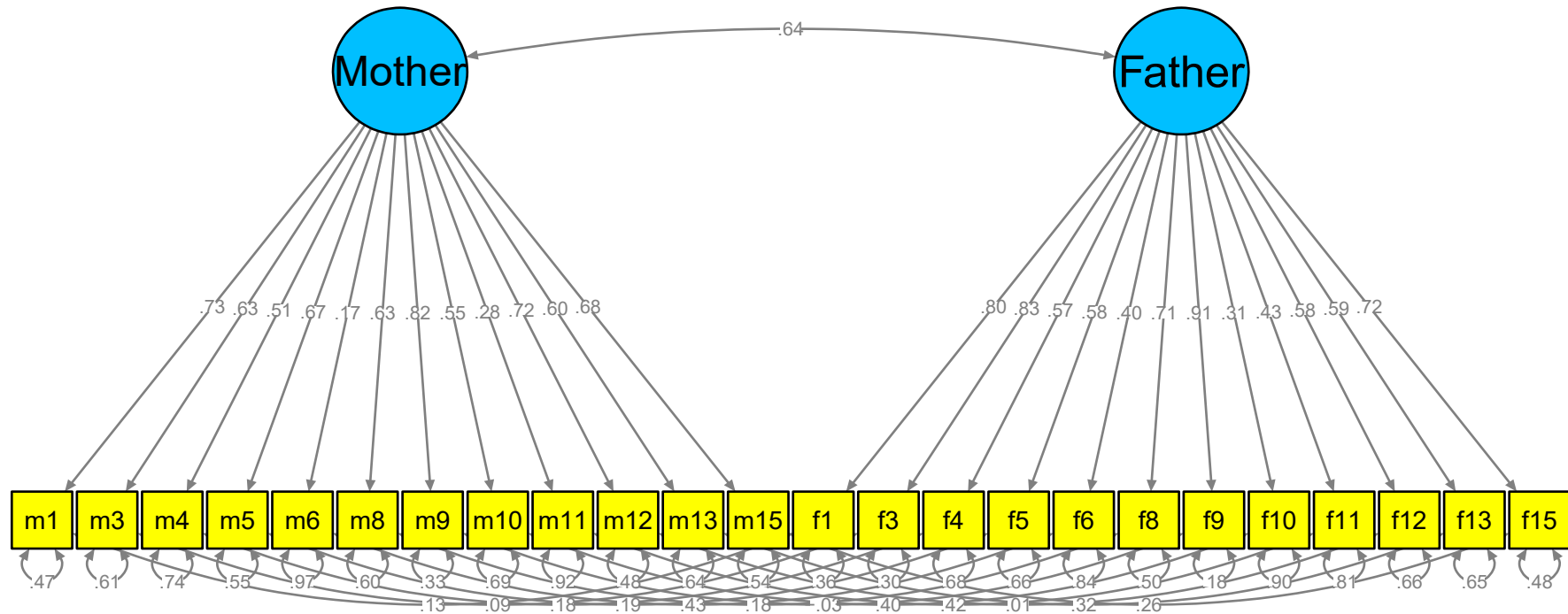


Figure 2. Best-fitting confirmatory factor model of the SS. All structural coefficients are standardized. All factor loadings are significant at the .05 level ( $N = 149$ ).

Based on the selected model, we estimated the empirical distribution of the bootstrapped standardized loadings and calculated the overlapping area for each pair of items (Figure 3). Overall, the bootstrapped distributions were approximately normal. Results suggested that the construct was substantially invariant for all items except # 3, 6, and 10, which overlapped for less than 30% between mothers and fathers. This result was supported by bootstrapped confidence intervals of the difference between loadings of paired items, as only for these items the difference was significantly different from 0 at the 5% level

In terms of concurrent validity, the child's ratings of security toward mother as measured via the SS were negatively related to avoidance ( $r(144) = -.41, p < .001$ ) and positively related to ambivalence ( $r(144) = .30, p < .001$ ) as measured via the PACQ, although the latter correlation was small.

A mixed-effects model did not reveal any significant main or interaction effects of child gender, class, and parental role on perceived attachment security (all  $ps > .182$ ) (see also Table A2 in Appendix A).

## Discussion

Despite increasing evidence suggests that attachment relationships continue to develop well beyond infancy, few studies have evaluated the factor structure of existing self-report measures of attachment, such as the Security Scale, in middle childhood. The current study aimed to address this gap by examining the factor structure of this instrument through the use of a statistical approach that takes the ordinal nature of the data as well as the dependency of observations (mother and father) into account. Furthermore, the measurement invariance of the SS across both parents was evaluated via an ad hoc bootstrap-based procedure, and associations of the SS with another measure of perceived attachment were investigated.

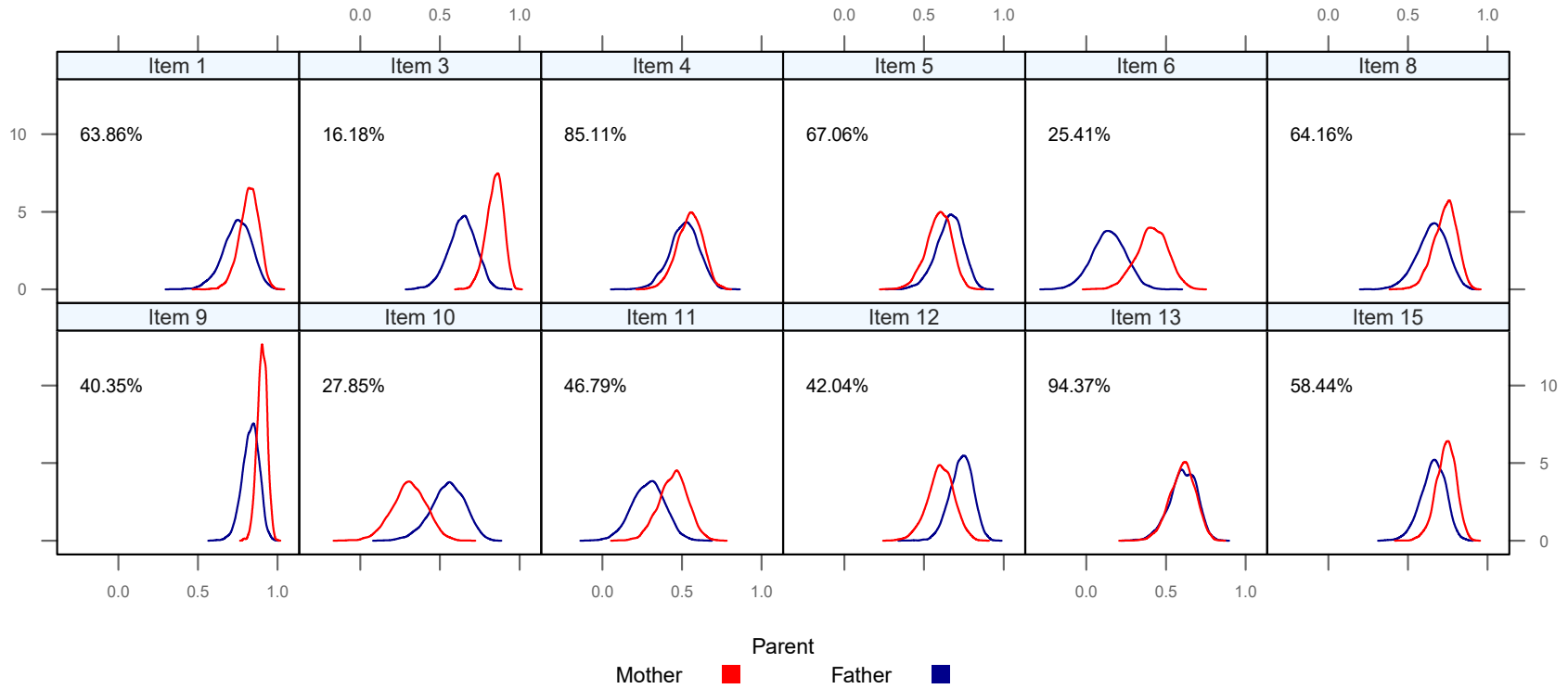


Figure 3. Standardized factor loading distributions of the SS items (mother and father).

Consistent with prior work, our results provided evidence for the unidimensional structure of the scale and structural invariance across mother and father. However, three items common to father and mother (i.e., 2, 7, 14) were unrelated to the latent structure. Notably, one of these items (i.e., item 2, Table A1 in Appendix A) was identified as being unrelated to a general latent security factor also by Bacro (2011); similarly, Kerns (2015) described this item as the only one not semantically referring to the construct of safe haven and secure base. With regard to the remaining two items (i.e., items 7 and 14, Table A1 in Appendix A) for which a poor fit was identified, it is noteworthy that both contain the word “wish” within the text. This wording raises the possibility that, while the other items of the SS assess the quality of the actual relationship, these specific two items reflect a desired quality of the relationship which may not necessarily correspond to the here-and-now parent-child bond. An alternative explanation is that the formulation in hypothetical terms could be more difficult to be comprehend by children at this age. Further studies may contribute to clarify this aspect, providing alternative versions of the two mentioned items.

As reported above, we deleted three items based on the already discussed statistical and theoretical reasons. However, we also retained three items (i.e., 6, 10, and 11, Table A1 in Appendix A) which showed relatively low factor loadings for either mother or father, but not for both. The rationale for this decision was that the final model with these items showed good fit indices. Furthermore, given that the SS is such a widely used instrument, we preferred to adopt a ‘conservative’ approach trying to maintain the original structure as much as possible.

With regard to factor loading invariance, the factorial structure we identified based on the selected 12 items was substantially invariant across mother and father. Yet, our overlapping procedure highlighted the presence of three items (i.e., 3, 6, 10) behaving differently in terms of loadings as a function of the parental attachment figure; of these, two



(i.e., 6 and 10) also had low factor loadings. Thus, these three items deserve further investigation.

With regard to concurrent validity, correlations were in the expected direction (i.e., negative) between the SS and the avoidant subscale of the PACQ. Albeit counterintuitive, the positive correlation between the SS and the ambivalence subscale has been reported in prior studies (e.g., Kerns, 2000) and may be attributed to the specific developmental period under consideration. Indeed, during middle childhood a high degree of dependency on the parent may partially coexist with a medium degree of security. According to Hodges, Finnegan and Perry (1999), the perception of the relationship with the caregiver results from a balance between the excessive need for closeness that threatens independence (i.e., ambivalence), and the excessive need for autonomy that prevents emotional connectedness (e.g., avoidance). This type of balance may therefore involve the experience of both dependence and ambivalence among secure children at this age.

From a methodological perspective, the statistical approach used in this study has been effective in providing a fine-grained analysis of the factorial structure of the SS. In particular, the bootstrap-based procedure allowed us to evaluate measurement invariance across mother and father in a flexible and informative manner. This approach could be usefully employed with other self-report measures involving dependency between observations, as is often the case in the assessment of school-age children who experience multiple significant relationships (e.g., peers, teachers).

Despite remarkable progress in support of the validity of the SS, some limitations of this study should be considered. First, the sample cannot be considered representative of all Italian school-aged children; replication studies on larger samples are needed to allow greater confidence in the generalizability of results. A second limitation is the exclusive reliance on self-report questionnaires and on children's self-evaluations. Future research

may include other attachment-related constructs (e.g., emotion regulation, socioemotional adjustment), assessment methods (e.g., interviews, attachment story stem technique), and sources of information (e.g., parents, teachers) to assess concurrent, convergent and predictive validity of the SS. Third, it would be useful to replicate the study and test concurrent validity of the father SS with the avoidance and ambivalence scales of the PACQ in relation to fathers.

To conclude, the results of this study extend the current literature and provide candidate elements for further validating the SS with mothers and fathers. Specifically, our findings suggest that the Italian 12-item version of the SS can be considered a valid and cost-effective tool to measure perceived attachment security in middle childhood. Future studies involving samples of children from different countries, and exploring other types of validity, could give a significant contribution to the field of attachment and its assessment tools.

## CHAPTER 3

### **The Brief Experience in Close Relationships Scale – Revised Child Version (ECR-RC): Factor structure and Invariance Across Middle Childhood and Early Adolescence**

Marci, T., Moscardino, U., & Altoé, G. (2018). The Brief Experience in Close Relationships Scale – Revised Child Version (ECR-RC): Factor structure and Invariance Across Middle Childhood and Early Adolescence. *International Journal of Behavioral Development*.

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### **Abstract**

The recently developed short form of the Experiences in Close Relationships Scale – Revised Child version (ECR-RC) is a promising tool to assess anxious and avoidant attachment in children and adolescents. Yet, evidence concerning its validity in middle childhood is limited. The current study aimed to test the psychometric properties of the 12-item ECR-RC for both mother and father forms in a sample of 448 Italian children (50.2% girls) aged between 8 and 13 years. The scale was adapted by changing the response format to make it more understandable for young children. Psychometric proprieties of the brief ECR-RC were investigated by testing its factor structure and internal consistency, invariance across middle childhood and early adolescence, and concurrent and convergent validity. A series of confirmatory factor analyses (CFAs) provided support for the two-factor structure (i.e., anxiety and avoidance) of the ECR-RC, and multi-group CFAs supported its invariance across middle childhood and early adolescence. Older children reported significantly higher latent mean values in avoidant attachment to both parents compared to their younger counterparts. Furthermore, the questionnaire showed evidence of concurrent and convergent validity. Our results indicate that the 12-item version of the ECR-RC is a psychometrically robust instrument to assess avoidance and anxiety toward mother and father among Italian children and early adolescents.

**Keywords:** ECR-RC; psychometric properties; attachment; middle childhood; early adolescence

Insecure attachment has been recognized as a risk factor for socio-emotional development across the life span. Indeed, empirical evidence suggests that insecure attachment patterns in infancy predict difficulties in emotion regulation and problem behaviors later in childhood (Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012). Similar findings have been reported for adolescent and adult samples, in which avoidance and anxiety were found to be differentially related to a wide variety of mental and/or personality disorders (Mikulincer & Shaver, 2012). However, less is known about how different patterns of insecurity may influence developmental outcomes in middle childhood, partly because there are few well-validated measures for distinguishing anxiety and avoidance dimensions during this understudied developmental stage (Brenning, Soenens, Braet, & Bosmans, 2011).

Middle childhood (ranging approximately from age 6 to 10) and early adolescence (ranging approximately from age 11 to 14) represent critical developmental periods (Eccles, 1999), since children show a substantial increase in abstract thinking, cognitive flexibility, and metacognitive skills, as well as a progressive improvement in emotion regulation skills (Raikes & Thompson, 2005). Furthermore, they become more independent, self-aware, and involved in social contexts beyond the family, and begin to conceive of relationships in more complex forms (Raikes & Thompson, 2005). Thus, their “attachment representations” become more elaborate and organized (Kerns & Bramariu, 2016), rendering the separation and reunion procedures used in early childhood (e.g., Strange Situation Procedure, Ainsworth, Blehar, Waters, & Wall, 1978) less suitable for use with children at these ages.

Over the past 20 years, several instruments have been developed to assess attachment in middle childhood. Most of these are ‘representational’ attachment measures (Kerns & Brumariu, 2016), such as interviews (e.g., Child Attachment Interview; Shmueli-Goetz, Target, Fonagy, & Datta, 2008), narrative story stem techniques (e.g., Attachment

Doll Story Completion Task; Granot, & Mayseless, 2001), and self-report questionnaires (e.g., Security Scale; Kerns et al., 2001). Although these measures have provided a substantial contribution to the study of attachment, “there is currently no dominant conceptual or methodological approach” (Kerns & Bramariu, 2016, p. 351) regarding the conceptualization and measurement of attachment in middle childhood. Despite the challenges inherent in the use of subjective attachment measures, Bosmans and Kerns (2015) recently advocated the usefulness of this measurement approach in middle childhood. Referring to dual process theory (e.g., Gawronski & Creighton, 2013), they argued that available measures capture specific aspects of the attachment system (Bosmans & Kerns, 2015; Psouni & Apetroaia, 2014) since they tap into different processes, namely strategic (i.e., explicit and/or available for conscious introspection) and automatic (i.e., outside conscious control) processes. As a consequence, they should be conceived of as complementary rather than overlapping and may not necessarily correlate (Moors & De Houwer, 2006). The cognitive and emotional achievements occurring in middle childhood result in a more accurate understanding and management of children’s feelings, internal states, and manifest behaviors. In this perspective, self-report questionnaires can be considered a valid approach to investigate attachment organization as well as attachment-related outcomes. Thus, the use of different measures based on different approaches is recommended to obtain a more detailed understanding about the meaning of attachment in this in-between developmental stage (Bosmans & Kerns, 2015).

Among existing self-report measures of attachment, only a few were specifically designed for use in middle childhood (i.e., Security Scale, SS, Kerns et al., 1996; Preoccupied and Avoidant Coping Questionnaire, PACQ, Finnegan, Hodges, & Perry, 1996). Others were originally developed to measure attachment in older adolescents (e.g., Inventory of Parent and Peer Attachment, IPPA, Armsden, & Greenberg, 1987) and adults

(e.g., Experience in Close Relationships Scale, ECR, Fraley, Waller, & Brennan, 2000), and have been simplified and adapted for use in the context of parent-child relationships. In the current paper, we focus on the Experiences in Close Relationships - Revised Child version (ECR-RC, Brenning, Van Petegem, Vanhalst, & Soenens, 2014). The scale was recently adapted from the widely validated ECR, and measures attachment anxiety and avoidance in children and adolescents. A long and a short version of the ECR-RC are currently available.

The long version (Brenning et al., 2011) includes all 36 items of the original ECR designed for adults. In accordance with the adult version, each question is rated on a 7-point Likert-type scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Exploratory and confirmatory factor analyses (CFAs) among children aged 8–13 years provided support for a two-factor structure, representing attachment anxiety and avoidance. Invariance was established across gender and age groups (8 – 10 vs 11 – 13 years), and both avoidance and anxiety subscales of the mother and father forms showed good internal consistency (Brenning et al., 2011). In addition, significant and positive correlations between the anxious and avoidant subscales and other attachment representational measures (i.e., SS, Kerns et al., 2001; Relationship Questionnaire for Children, Bartholomew & Horowitz, 1991) were found.

More recently, a short version has also been proposed. The brief ECR-RC (Brenning et al., 2014) includes 12 items (the same for mother and father) selected from the original version, in which 6 items refer to anxiety, and 6 items measure the avoidance dimension. Each question is rated on a 7-point Likert-type scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). Concerning its factor structure, a Principal Component Analysis (PCA) provided evidence for a two-dimensional solution (Brenning et al., 2014). CFA was performed in normative and clinical samples, yielding different solutions (Brenning et al., 2014; Lionetti, Mastrotheodoros, & Palladino, 2017). Of concern, Brenning and colleagues



(2014) performed three different CFAs in two normative samples ( $N = 310$ , age range 13 – 20 years;  $N = 110$ , age range 15 – 18 years) and in one clinical sample ( $N = 99$ , age range 10 – 18 years). Results showed a reasonably good fit, corroborating the two-dimensional structure of the 12-item scale. A more recent study among 961 Italian adolescents aged between 12 and 19 years (Lionetti et al., 2017) proposed a third factor labelled “Security”, which included three of the 6 items originally pertaining to the avoidance subscale (i.e., “I usually talk to my father/mother about my problems and worries”; “When I feel bad, it helps to talk to my father/mother”; “I tell my father/mother nearly everything”). A three-factor model solution yielded better fit indices compared to the two-factor model. Internal consistency as measured through Cronbach’s Alpha coefficient reported good values for both the two- and three-factor solutions (Brenning et al., 2014; Lionetti et al., 2017). No information on test-retest reliability is currently available for the 12-item version.

With regard to convergent validity, Brenning and colleagues (2014) found that both attachment-related dimensions (anxiety and avoidance) were positively related to children’s perceptions of parental psychological control, and negatively associated with child reports of parental responsiveness. Furthermore, meaningful associations with emotion regulation strategies emerged, with the anxiety dimension being positively related to dysregulation, and the avoidant subscale being positively correlated with suppression (Brenning, Soenens, Braet, & Bosmans, 2012). The authors explained this finding with reference to Shaver and Mikulincer’s model (2002), which posits that avoidant attachment is characterized by the endorsement of deactivating strategies that lead to the suppression of negative emotion, whereas anxious attachment mostly involves the use of hyperactivating emotion regulation strategies. Conversely, secure attachment is marked by a more flexible thought about emotion-eliciting events and a reframing of the situation in a reality-based manner (Mikulincer & Shaver, 2007).

To summarize, the 12-item ECR-RC is a promising tool to assess attachment anxiety and avoidance in children and adolescents. However, empirical evidence concerning its factor structure is still scarce. Also, to our knowledge, only one study has explored its factor structure using CFA in children aged 8-16 years (Brenning et al., 2014), but invariance across middle childhood and early adolescence was not tested. The present study aimed to address these gaps by assessing the psychometric properties of the short form of the ECR-RC for use with Italian children aged between 8 and 13 years. Specifically, we (1) evaluated the factor structure and internal consistency of the Italian version via CFA, (2) tested its invariance across middle childhood and early adolescence and, in case scalar invariance was established, (3) analyzed group differences in anxiety and avoidance scores, and (4) examined concurrent validity of the scale with a measure of perceived attachment security, and convergent validity by exploring its associations with self-worth and two emotion regulation strategies, namely cognitive reappraisal (CR) and expressive suppression (ES). Specifically, based on extant theory (see Cassidy, 1990), we expected the avoidance and anxious attachment scores to be negatively related to children's self-worth. With regard to emotion regulation strategies, since CR is an antecedent-focused strategy that attempts to reshape an emotionally-eliciting event (Gross & John, 2003), we anticipated that this strategy would be negatively linked to both anxious and avoidant subscale scores. In contrast, because ES is deemed a response-focused strategy involving the inhibition of observable expression triggered by the emotional experience (Gross, 1998), it was reasonable to expect that this emotion regulation strategy would show a positive association with avoidant attachment.

Furthermore, since there is evidence that 7-point Likert scales can be problematic for children (e.g., Borgers, Hox, & Sikkels, 2004), and given that a better quality in responses has been found when every point - rather than only the two extremes - of a response scale is

labelled (Borgers & Hox, 2003), we changed the response format of the brief ECR-RC accordingly to make it more understandable for children.

## Method

### Participants

The study was introduced to 520 children aged between 8 and 13 years recruited from 5 primary schools and 3 middle schools in Northeastern Italy. All children whose parents signed the informed consent form ( $N = 492$ , 94.6%) were involved in the study.

Twenty-six children were absent on the day of data collection. Moreover, questionnaires completed by children with intellectual disabilities or certified developmental/learning disorders (3.4%,  $N = 18$ ) were not included in data analyses.

Hence, the final sample consisted of 448 participants, of whom 259 were primary school children (hereafter labelled ‘younger children’; 51% girls, mean age = 9 years and 2 months,  $SD = 7$  months, range = 8.2 – 10.3) and 189 were middle school children (hereafter labelled ‘older children’; 50%, mean age = 11 years and 8 months,  $SD = 4$  months, range = 11.2 – 12.9). The two groups of children did not differ in terms of gender distribution ( $\chi^2(1,448) = .11$ ,  $p = .744$ , Cramer’s phi = .016) or socio-economic status ( $t(444) = .45$ ,  $p = .650$ , Cohen’s  $d = .044$ ) as assessed via the FAS (Currie et al., 2008; see next section).

In the final sample, 13 children did not fill out the father items, while 4 children did not complete the mother items (see Table A1 and Table A2 for more details concerning missing data).

### Procedure

Ethical approval was obtained from the Ethical Committee of the University of Padova (protocol #1838-2016). After obtaining approval from the school principals, a letter was sent to children’s parents in order to explain the nature of the study. Written consent was obtained from both parents, and verbal assent was obtained from each child before data

collection. Children completed questionnaires in the classroom and in a single session during school hours under the supervision of a research assistant and in the presence of their teacher. Data were collected anonymously to make children feel relaxed and limit social desirability effects. They were explained that they were free to interrupt their participation at any time without any consequences, and that their participation would remain confidential. The items were read aloud by the researcher to ensure comprehension and minimize the possible effect of differences in reading ability. All participants were given a certificate and thanked for taking part in the study.

### **Measures**

Children's socio-economic status (SES) was assessed via the Family Affluence Scale (FAS, Currie et al., 2008), a widely used 4-item measure of family wealth (e.g., "Does your family own a car?"; "How many times did you travel away on holiday with your family during the past 12 months?"). Scores across items are summed to provide an overall score ranging from 0 to 9, in which scores from 0 to 2 indicate low affluence, 3 to 5 indicate medium affluence, and 6 to 9 indicate high affluence. The FAS has reported good validity and reliability across different cultures and countries, including the Italian context (Vieno, Santinello, Lenzi, Baldassari, & Mirandola, 2009). In the current study, the majority of participants were from middle (medium affluence: 24.5%) or upper-income families (high affluence: 71.1%).

The ECR-RC (Brenning et al., 2014) was designed to measure attachment anxiety (e.g., "I worry that my mother/father does not really love me") and attachment avoidance (e.g., "I prefer not to tell my mother/father how I feel deep down") in children and adolescents. The recently developed short form consists of 12 items (6 for anxiety, 6 for avoidance) originally rated on a 7-point scale. Scores across items are averaged to provide an anxiety and an avoidance score, respectively, with higher scores indicating a more

anxious or avoidant attachment. In this study, we used the Italian version of the questionnaire (Lionetti et al., 2017). As mentioned earlier, the response scale of the brief ECR-RC was reduced to a 5-point Likert-scale (from 1 = strongly disagree to 5 = completely agree).

The Security Scale (SS; Kerns et al., 2001) is a self-report measure designed to assess ‘felt-security’ in school age children. It consists of 15 items (the same for mother and father) rated using Harter’s (1982) format, namely “Some kids... other kids...” After choosing the children that best fit them, participants are asked to indicate whether it is “really true” or “sort of true” for them. The two statements are presented as one item, and each item is scored from 1 to 4. Scores across items are averaged to provide a security score on a continuous dimension of security, with higher scores indicating higher levels of perceived attachment security. Previous research reported good psychometric proprieties of the Italian version of the SS, including structural invariance across parents (Marci, Lionetti, Moscardino, Pastore, & Altoè, 2018). For this study, we administered 9 of the 12 items included in the Italian version (Marci et al., 2018), namely those with higher loadings. In the current sample, CFAs of the nine items showed a good fit to the data (see preliminary analyses).

The Self-Perception Profile for Children (SPPC, Harter, 1985; 2012) is a 36-item questionnaire designed to assess children’s perceptions of self-competence and adequacy. For our purpose, children completed the Global Self-Worth subscale. It consists of 6 items rated using the already mentioned Harter (1982) format. Participants are asked to choose the children who best fit them between the two presented, and then indicate whether the description is “really true” or “sort of true” for them. Each item is scored on a 4-point scale ranging from 1 to 4. Scores across items are averaged to provide a global self-worth score. The questionnaire reported good psychometric properties in terms of factor structure,

internal consistency, and convergent validity (Harter, 2012). In the current sample, we used the Italian version of the scale (Pedrabissi, Santinello, & Scarpazza, 1988).

The Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA, Gullone & Taiffe, 2012) is a 10-item revised version of the Emotion Regulation Questionnaire (Gross & John, 2003). It was designed to assess the use of two emotion regulation strategies, namely Cognitive Reappraisal (CR, 6 items, e.g., “When I want to feel happier, I think about something different”) and Expressive Suppression (ES, 4 items, e.g., “I keep my feelings to myself”) in children and adolescents. Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores across items are averaged to provide two different scores (one for each subscale). Higher scores indicate greater use of the corresponding emotion regulation strategy. The ERQ-CA reported good internal consistencies, with alpha coefficients ranging from .82 to .89 for CR and from .69 to .79 for ES (Gullone & Taiffe, 2012).

### **Analytic approach**

All analyses were performed in R (R Development Core team, 2017).

**Preliminary analyses.** In preliminary analyses, we used Confirmatory Factor Analysis (CFA) on the 9 items extracted from the SS to evaluate the internal structure of the scale.

**Descriptive statistics.** For descriptive purposes, we calculated item response distributions of both mother and father forms of the ECR-RC and computed the main descriptive statistics (mean, standard deviation, skewness) separately for younger and older children.

**Factor structure and invariance across middle-childhood and early adolescence.** To test the factor structure and invariance of the ECR-RC between age groups, analyses were conducted following four steps. First, CFAs were performed to evaluate the factor

structure of the mother items of the 12-item ECR-RC separately for each age group. Then, the most plausible model was tested on the father items, and internal consistency was evaluated for both forms. Second, Multi-Group Confirmatory Factor Analysis (MG-CFA) was used to test measurement invariance of the questionnaire across middle childhood and early adolescence. Last, correlations were computed to test concurrent and convergent validity of the scale.

To establish the factor structure of the brief ECR-RC, in each age group (i.e., younger and older children) we separately tested (a) a single-factor model, in which items assessing anxiety and avoidance loaded on a single latent factor to exclude the mono-dimensionality of the scale; then, we tested (b) the originally proposed two-factor solution, in which six items loaded on the anxiety dimension, and six items loaded on the avoidance dimension (Brenning et al., 2014); finally, we evaluated (c) a three factor solution, with 3 items loading on a security factor, 3 items on the avoidance factor, and 6 items on the anxiety factor following previous research (Lionetti et al., 2017). The parameters were estimated using the Robust Diagonally Weighted Least Squares Mean and Variance (WLSMV) estimator (Rhemtulla, Brosseau-Liard, & Savalei, 2012). Contrary to the ML or MLR estimators, this method is specifically designed for ordinal data and provides the best option for modelling categorical or ordered data or when items are not normally distributed (Brown, 2006). Missing data (< 1%) were handled with the pairwise maximum likelihood (PML) estimation method, which was developed for factor analytic models with ordinal data (Myrsini, Moustakib, Yang-Wallentina, & Jöreskog, 2012) and is available in the R package lavaan (Rosseel, 2012). A series of goodness-of-fit indices were computed and used to evaluate model fit: the chi-square to degrees of freedom ratio ( $\chi^2/df$ ), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), the Tucker Lewis index (TLI), and the standardized root mean square residual (SRMR). Cut-off values for fit

were considered acceptable if  $\chi^2/df$  was less than 3, CFI and TLI  $>.95$ , RMSEA was less than .08, SRMR was less than .10, and RMSE was less than .08 (Schermelleh-Engel, Moosbrugger, & Muller, 2003). The most plausible model was selected based on goodness-of-fit, difference between CFIs of the two competitive models, magnitude of correlations across factors, as well as extant theory, and was subsequently tested on the father items. In addition, internal consistency was evaluated for both mother and father items via ordinal Cronbach's alpha computed on the polychoric correlation matrix (Zumbo, Gadermann, & Zeisser, 2007) and McDonald's Omega computed on the CFA.

Based on the selected model, we examined measurement invariance (for both mother and father items) across age groups using MG-CFA. First, we tested configural invariance by allowing all structural parameters to remain free; then, we simultaneously tested metric and scalar invariance by constraining factor loadings and thresholds to be equal across groups (Muthén & Muthén, 2010). If metric and scalar invariance are simultaneously reached, it implies that the meaning of the construct (the factor loadings) and the levels of the underlying items (thresholds) are equal in both groups, which therefore can be compared on their latent variable scores. The difference in CFI ( $\Delta$  CFI) and RMSEA ( $\Delta$  RMSEA) was computed between the two models (i.e., configural vs metric and scalar). In addition, several fit indexes (i.e., CFI, TLI, RMSEA) were inspected.

To evaluate invariance between younger and older children, we considered the general guidelines proposed by Chen (2007), according to which a decrease of CFI less than .01 ( $\Delta$  CFI), a RMSEA less than .015 ( $\Delta$  RMSEA) between models, and acceptable model fit indices are considered evidence for model invariance (Cheung & Rensvold, 2002). All models were estimated using the lavaan package (Rosseel, 2012), and missing data ( $<.01$ ) were handled with the pairwise method for WLSMV available in the R package lavaan (Rosseel, 2012).



**Differences in anxiety and avoidance scores.** Once scalar invariance was supported, potential differences on the anxiety and avoidance scores between younger and older children were evaluated. Because latent means are better indicators of potential differences than observed means (Brown, 2006), latent mean analysis (LMA) using structural equation modelling was performed (separately for mother and father items). Specifically, we constrained loadings, thresholds, and error variances as well as the factor means of the younger group to be zero, while in older group means were allowed to vary. Because the latent means of the younger group were fixed to zero, the latent means of the older group represent the mean differences between the two groups (Finch & French, 2015). Additionally, following the procedure described by Finch and French (2015), to evaluate the effect sizes of the latent mean differences we computed Cohen's  $d$ . According to Cohen (1988), a value of  $d = 0.2$  is considered a small effect,  $d = 0.5$  a medium effect, and  $d = 0.8$  a large effect.

**Concurrent and convergent validity.** To test concurrent validity of the best fitting model, we performed a series of Structural Equation Models (SEM) and evaluated the association of each latent attachment dimension (i.e., anxiety and avoidance) with the latent means of perception of felt security (as assessed via the SS). Using the same procedure, we tested convergent validity by evaluating the association of the brief ECR-RC with global self-worth (measured with the SPPC) and the two emotion regulation strategies (i.e., CR and ES) assessed using the ERQ-CA. Furthermore, a series of SEMs (i.e., one for each outcome variable) were performed to evaluate the degree to which the ECR-RC subscales significantly predicted global self-worth and the two emotion regulation strategies after controlling for child gender and age.

## Results

**Preliminary analyses.** CFAs of the nine items of the Italian SS used in the present study yielded a one-factor solution, which showed a good fit to the data (mother:  $\chi^2(27) = 32.851, p = .202, CFI = .997, RMSEA = .023, 90\% CI [.000 - .047]$ ; father:  $\chi^2(27) = 28.512, p = .385, CFI = 1.00, RMSEA = .012, 90\% CI [.000 - .041]$ ).

**Descriptive statistics.** Item response distributions of the brief ECR-RC by age group are presented in Figure 1 (mother) and Figure 2 (father). In both cases, most of the items showed a right-skewed distribution, further supporting the use of the WLSMV estimator (Rhemtulla et al., 2012). More detailed descriptive statistics for each item are reported in Tables A3 and in Table A4 in Appendix B.

**Factor structure and invariance across middle-childhood and early adolescence.** Initial CFA results for the one-factor model tested on the mother items (i.e., M1) separately for younger and older children yielded a poor fit in both samples (see Table 1). After testing for the two-factor solution (M2, Table 1), the model yielded a good fit in all the considered fit indices both in the younger and in the older sample. Likewise, the three-factor solution (M3, Table 1) fitted the data well in both groups of children. Comparison of the two- and three-factor solutions of the mother items suggested that in the three-factor model, there was only a slight increase of fit indices for younger children ( $\Delta CFI = .011$ ), and equivalent fit indices for older children ( $\Delta CFI = 0$ ). In the two-factor solution, correlations between the anxiety and avoidance sub scale scores were  $r = .40$  and  $r = .48$  for younger and older children, respectively (Figure 3). Noteworthy, extraction of the security factor (three-factor model) did not reduce the correlation between anxiety and avoidance dimensions (younger children:  $r = .41$ ; older children  $r = .50$ ). Furthermore, in the three-factor solution, correlations between avoidance and the security factor were very high ( $r = -.72$  and  $r = -.93$  in younger and older children, respectively), making it difficult to establish the existence

of two separate factors. Therefore, based on extant theory, we considered the two-factor model more adequate in our sample. The two-factor model tested on the father items (i.e., M4) also yielded a good fit in both younger and older children (see Table 1). Similar to the mother model, high correlations between the avoidance and anxiety factors were found (see Figure 4). Table A5 and Table A6 in the Appendix B provides factor loadings of the two-factor model for mother and father items. Anxiety scores in relation to mother and father correlated positively, as did avoidance scores (see Table 5).

In order to test invariance across the two age groups, MG-CFA on the two-factor solution was performed following two steps. In step 1, configural invariance (without parameter restrictions) of the two-factor model revealed a good model fit to the data (Table 2), suggesting that the factor structure was similar between younger and older children for both parents. Since configural invariance was supported, in the subsequent step we held loadings and thresholds invariant across groups. The fit of these models was also good (see Step 2, Table 2). The chi-square difference was not significant, and both  $\Delta$  CFI and  $\Delta$  RMSEA between the constrained and unconstrained models were less than .01 (see Table 2), showing that metric and scalar invariance were supported. Table 2 reports the results of model fits and comparisons.

In both samples, the subscales of the two-factor model showed good internal reliability, with polychoric Cronbach's alphas ranging from .77 to .93 and McDonald's Omegas ranging from .72 to .92, with slightly better estimates for the father items (see Table 3).

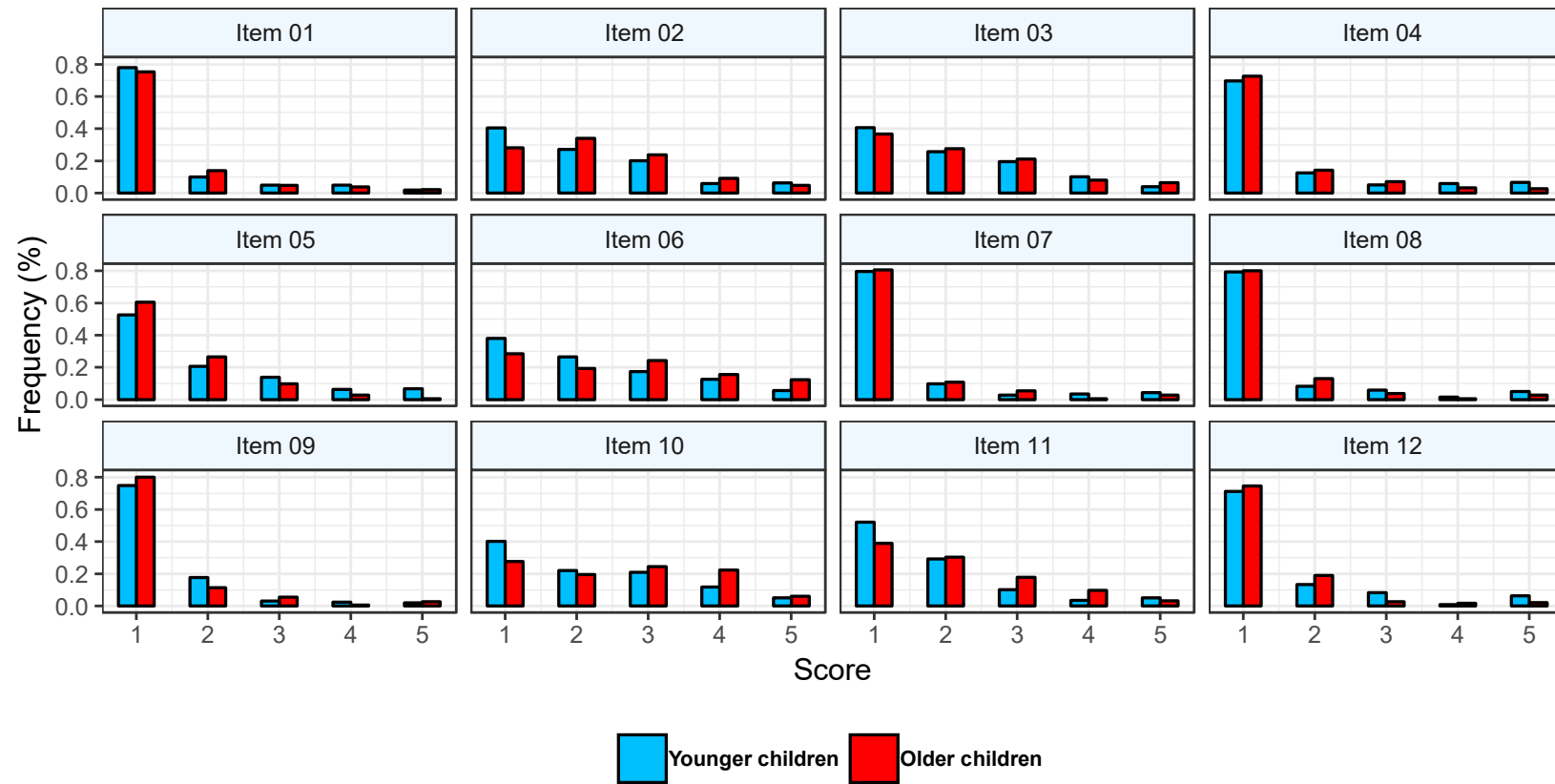


Figure 1. Response distributions of mother items. Note. Younger children,  $n = 259$ ; Older children,  $n = 185$ .

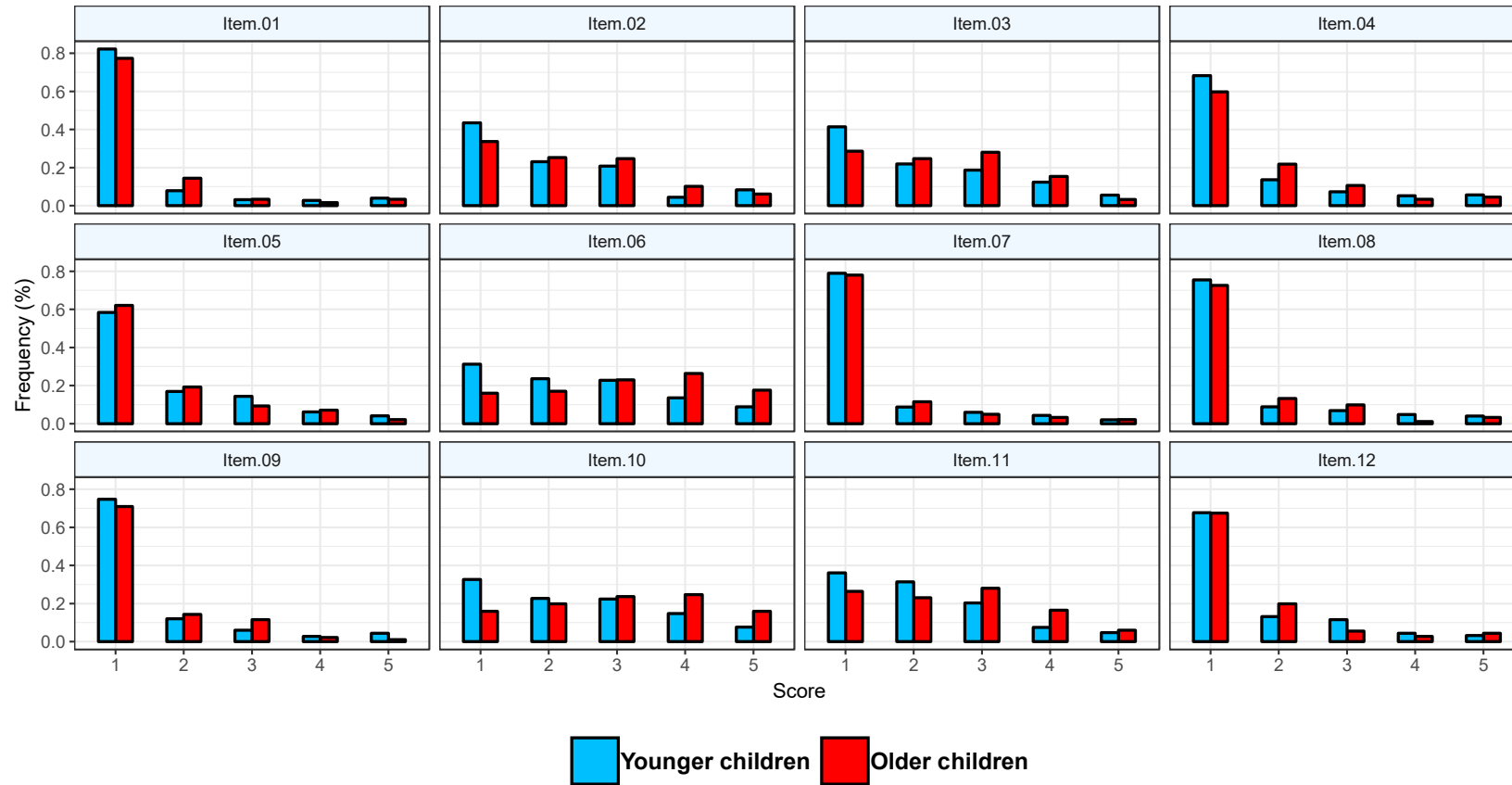


Figure 2. Response distributions of father items. Note. Younger children,  $n = 253$ ; Older children,  $n = 182$ .

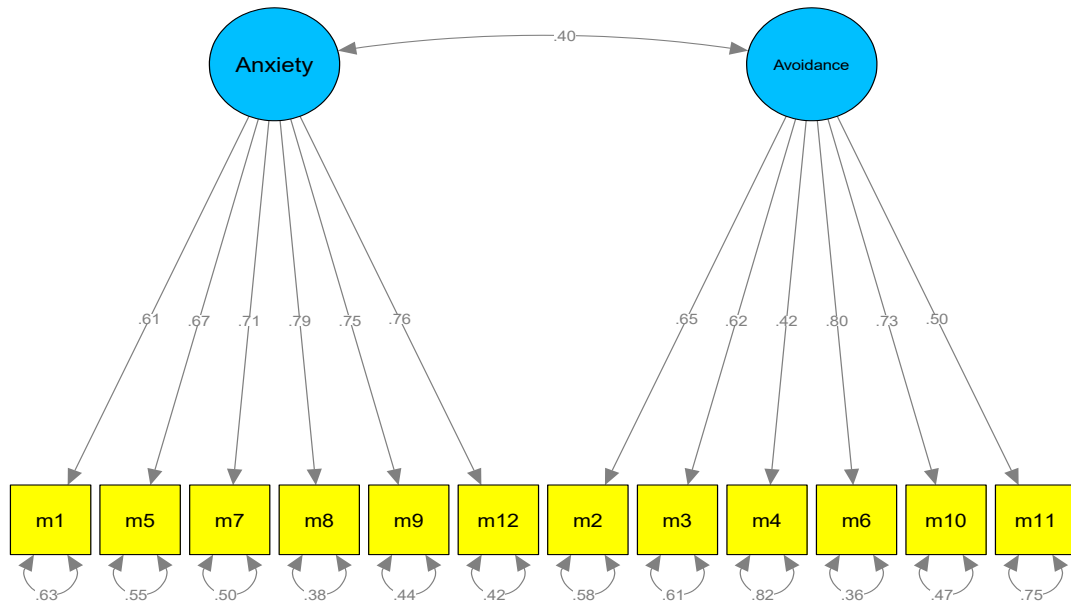
Table 1

*Fit indices of the six confirmatory factorial models of the brief ECR-RC*

	$\chi^2$	<i>df</i>	$\chi^2/df$	<i>p</i> -value	CFI	TLI	SRMR	RMSEA [90% CI]
<i>Mother</i>								
M1: One-factor								
Younger children	289.787	54	5.366	< .001	.850	.817	.152	.130 [.116 – .145]
Older children	310.824	54	5.756	< .001	.938	.924	.189	.161 [.144 – .178]
M2: Two-factor								
Younger children	83.532	53	1.577	.005	.981	.976	.082	.047 [.026 – .066]
Older children	58.114	53	1.096	.293	.999	.998	.078	.023 [.000 – .053]
M3: Three-factor								
Younger children	63.836	51	1.350	< .107	.992	.989	.058	.031 [.000 – .053]
Older children	55.534	51	1.089	< .308	.999	.999	.077	.022 [.000 – .053]
<i>Father</i>								
M4: Two-factor								
Younger children	119.417	53	2.253	< .001	.978	.973	.091	.071 [.054 – .087]
Older children	84.578	53	1.596	.004	.996	.995	.081	.057 [.033 – .080]

*Note.* Mother form: Younger children,  $n = 259$ ; Older children,  $n = 185$ . Father form: Younger children,  $n = 253$ ; Older children,  $n = 182$ . M1, one-factor model; M2, two-factor model (anxiety, avoidance); M3, three-factor model (anxiety, avoidance, security); M4, two-factor model. CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation

**Younger Children**



**Older Children**

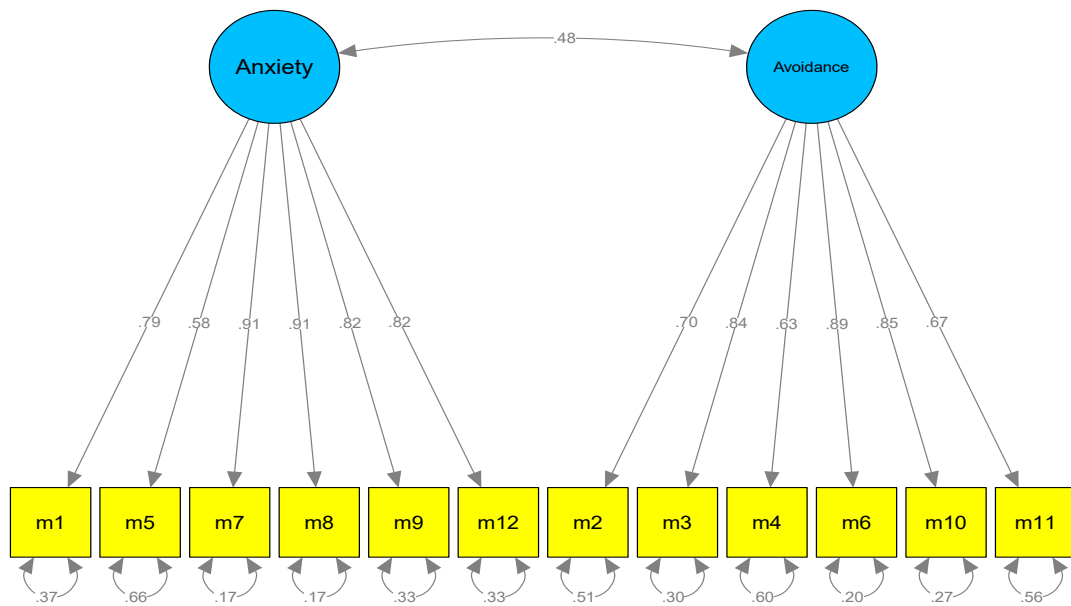
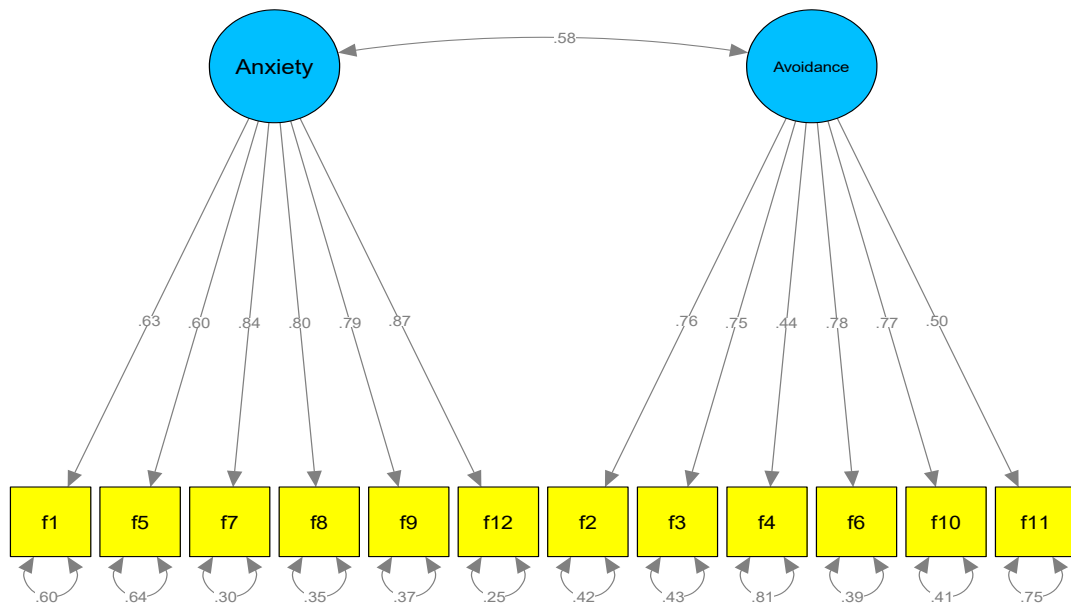


Figure 3. Best-fitting confirmatory factor model of the mother items. Note: Younger children,  $n = 259$ ; Older children,  $n = 185$ . All structural coefficients are standardized. All factor loadings are significant at the .05 level.

**Younger children**



**Older children**

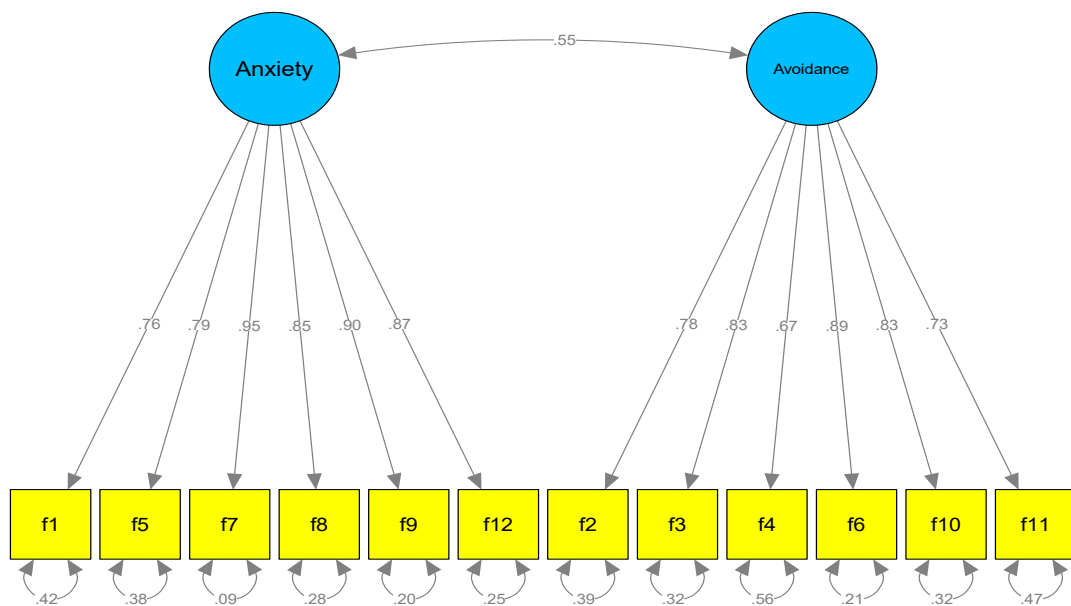


Figure 4. Best-fitting confirmatory factor model of the father items. Note: Younger children,  $n = 253$ ; Older children,  $n = 182$ . All structural coefficients are standardized. All factor loadings are significant at the .05 level.



**Differences in anxiety and avoidance scores.** Since scalar invariance was reached, two latent mean analyses (LMAs) were conducted (i.e., mother and father items separately) to estimate potential differences in anxiety and avoidance scores between the two age groups. Younger children were chosen as a reference group constrained to have a mean of zero, while the older children's mean was allowed to vary. Results indicated that older children reported significantly higher latent mean values in attachment avoidance to mother than their younger counterparts, while no difference in anxiety was found (see Table 4). Similarly, with regard to father items, older children reported significantly higher latent mean values in avoidance compared to younger children. The structured mean differences between groups in anxiety and avoidance scores are presented in Table 4. Cohen's *d* indices indicate that the values of effect size ranged from .06 to .52 (Table 4).

**Concurrent and convergent validity.** In terms of concurrent validity, in each of our SEMs (i.e., younger and older children) we found significant negative correlations between perceived security scores obtained via the SS and the anxiety and avoidance subscales of the brief ECR-RC (see Table 5).

With regard to convergent validity, as shown in Table 5, anxious and avoidant attachment scores toward mother and father were negatively related to self-worth in both younger and older children (all  $ps < .001$ ). Avoidance toward mother and father was positively associated with ES in both younger and older children; anxiety toward parents showed a similar pattern, but only among younger children. Moreover, avoidance toward both mother and father was statistically and negatively related to the use of CR in younger, but not in older children. Correlations among study variables (standardized parameter estimates on latent scores) are summarized in Table 5.

Table 2

*Model fit for the two-factor model tested for invariance across middle childhood and early adolescence*

	$\chi^2$	<i>df</i>	<i>p</i> -value	CFI	TLI	SRMR	RMSEA [90% CI]	$\Delta$ CFI	$\Delta$ RMSEA
<i>Mother form</i>									
STEP 1 – Configural	141.645	106	.012	.994	.992	.081	.039 [.019 – .055]		–
STEP 2 – Metric and scalar	212.214	152	< .001	.989	.991	.087	.042 [.028 – .055]	.004	.003
<i>Father form</i>									
STEP 1 – Configural	203.995	106	< .001	.991	.989	.087	.065 [.052 – .079]		–
STEP 2 – Metric and scalar	263.882	152	< .001	.990	.991	.089	.058 [.046 – .070]	.001	.007

*Note:* Mother form: Younger children,  $n = 259$ ; Older children,  $n = 185$ . Father form: Younger children,  $n = 253$ ; Older children,  $n = 182$ .  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEAs.

Table 3

*Means and Standard Deviations and Polychoric Alphas and Omegas for the two ECR-RC subscales (Anxiety and Avoidance) by age group*

	Younger children						Older children					
	<i>n</i>	Range	Mean	SD	Alpha [95% CI]	Omega [95% CI]	<i>n</i>	Range	Mean	SD	Alpha [95% CI]	Omega [95% CI]
(1) Anxiety (Mother)	259	1–5	1.53	.70	.87 [.84 – .89]	.81 [.75 – .88]	185	1–5	1.40	.63	.91 [.89 – .93]	.72 [.65 – .79]
(2) Avoidance (Mother)	259	1–5	2.02	.75	.77 [.72 – .81]	.91 [.84 – .95]	185	1–5	2.22	.90	.88 [.85 – .91]	.82 [.75 – .88]
(3) Anxiety (Father)	253	1–5	1.52	.73	.89 [.87 – .91]	.86 [.82 – .90]	182	1–5	1.51	.77	.93 [.91 – .95]	.81 [.75 – .89]
(4) Avoidance (Father)	253	1–5	2.16	.83	.79 [.75 – .83]	.92 [.88 – .96]	182	1–5	2.50	.93	.87 [.84 – .90]	.91 [.85 – .98]

Table 4

*Structured mean differences between age groups on the brief ECR-RC subscale scores*

Latent variable	Younger children <sup>a</sup>	Older children	<i>p</i> -value	Effect size
	Latent Mean	Latent Mean		
Anxiety (Mother)	0	-.039	.747	.056
Avoidance (Mother)	0	.259	< .001	.423
Anxiety (Father)	0	.048	.625	.073
Avoidance (Father)	0	.372	< .001	.518

*Note.* <sup>a</sup> Reference group. Mother items: Younger children,  $n = 259$ ; Older children,  $n = 185$ .

Father items: Younger children,  $n = 253$ ; Older children,  $n = 182$ .

Table 5

*Latent score correlations between study variables*

	Younger children						Older children					
	Mother			Father			Mother			Father		
	<i>n</i>	Anxiety	Avoidance	<i>n</i>	Anxiety	Avoidance	<i>n</i>	Anxiety	Avoidance	<i>n</i>	Anxiety	Avoidance
<i>Concurrent validity</i>												
Felt security to mother	253	-.522***	-.749***				185	-.682***	-.880***			
Felt security to father				253	-.389***	-.814***				181	-.646***	-.826***
<i>Convergent validity</i>												
General self-worth	250	-.506***	-.428***	243	-.369***	-.502***	185	-.515***	-.649***	181	-.407***	-.472***
Expressive suppression	229	.370***	.572***	224	.337**	.459***	185	.138	.647***	182	.179	.394***
Cognitive reappraisal	229	-.025	-.350***	222	-.082	-.220**	185	.032	-.116	182	-.019	-.117

Note. \*  $p < .05$ ; \*\*\*  $p < .001$ .

Lastly, three separated SEMs for each parental figure (i.e., mother and father) were performed on the entire sample, with attachment-related dimensions as independent variables, each of the criterion variables (i.e., self-worth, expressive suppression, cognitive reappraisal) as dependent variables, and gender and age as control variables. Anxiety and avoidance toward mother, and avoidance toward father, were significantly and negatively related to global self-worth ( $B = -.314, p = .009$ ;  $B = -.437, p = .022$ , and  $B = -.396, p = .011$ , respectively; see Figure A1 in Appendix B). In relation to emotion regulation strategies, avoidance scores toward mother and father were positively associated with the use of ES ( $B = .528, p = .003$ , and  $B = -.342, p = .047$ , respectively). All patterns of associations are depicted in Figure A2 and Figure A3 in Appendix B.

### Discussion

The study of attachment in middle childhood is a relatively new research field. Although many theoretical advances have been made concerning the main features of attachment in this developmental period, different opinions still exist on how to measure it appropriately. The present study aimed to test the psychometric properties of a short form of the ECR-RC, a recently developed questionnaire designed to assess anxiety and avoidance dimensions by examining the child's relationship with his/her mother and father. To make the scale more understandable for younger children, we reduced the response options from 7 to 5 and labeled all points of the scale.

In terms of factor structure, CFAs were conducted for age subgroups (8–10 years vs. 11–13 years) to examine fit of the two-factor model proposed by Brenning et al. (2014) and the three-factor model proposed by Lionetti et al. (2017). Overall, analyses revealed that both models yielded acceptable fit indices. Yet, comparison of the two- and three factor solutions suggested that there was only a slight increase in fit for the three-factor model (and only in the younger age group), thus lending support to the plausibility of the original two-

factor structure of the ECR-RC (i.e., attachment anxiety and attachment avoidance). In both mother and father items, the scales for anxiety and avoidance showed good internal consistency. Also, consistent with prior work testing the factor structure of the ECR-RC (see Brenning et al., 2014; Skoczeń, Głogowska, Kamza & Włodarczyk, 2018) as well as with the results of studies using the ECR and the ECR-R with adults (see Cameron, Finnegan, Morry, 2012 for an overview), a positive correlation between the two factors emerged in both age groups. Although this result is in contrast with the view of anxiety and avoidance as orthogonal (see Mikulincer, Shaver, Sapir-Lavid, & Avihou-Kanza, 2009), the latter assumption gained less empirical evidence in research even with the ECR (Cameron, et al., 2012). As argued by Fraley and colleagues (2011), a conceptual distinction between constructs does not imply a complete statistical independence between them. Hence, our result might reflect an intercorrelation between avoidance and anxiety dimensions within the attachment regulation system, in which anxiety could be considered a monitoring system and avoidance a behavioral orientation system (Fraley & Shaver, 2000). In this perspective, for example, avoidance of intimacy could be a consequence of anxiety about rejection, and thus the mutual feedback between attachment-related dimensions may translate into a positive intercorrelation (Conradi, Gerlsma, van Duijn, & de Jonge, 2006).

With regard to invariance of the brief ECR-RC across middle childhood and early adolescent samples, MG-CFAs indicated that the questionnaire measured attachment anxiety and avoidance in the same way for younger and older children at the item and at the scale level, thus corroborating the findings reported by Brenning et al. (2011) for the long form of the ECR-RC.

Examination of differences in anxiety and avoidance latent scores for father and mother items revealed lower levels of anxiety and higher levels of avoidance from middle childhood to early adolescence. This pattern may reflect the normative process of increased

adolescent autonomy from parental figures (Ammaniti, Van IJzendoorn, Speranza, & Tambelli, 2000).

Finally, we examined concurrent and convergent validity by correlating scores for each of the brief ECR-RC dimensions with perceived security as assessed via the SS, global self-worth measured via the relevant sub-scale included in the SPPC, and emotion regulation strategies (i.e., ES and CR) assessed by the ERQ-CA. As expected, lower scores in both anxiety and avoidance toward mother and father were associated with higher scores in perceived security. Also, consistent with previous studies (see Brenning, Soenens, & Braet, 2015), higher scores in the self-worth scale were associated with lower levels of anxiety and avoidance toward mother and father. This finding is in line with attachment theory, which posits that attachment has important implications for the development of the self: secure children construct a positive working model of themselves and others, and thus evaluate themselves more favorably than insecurely attached children. Of note, the link between perceived parent attachment and child self-worth was slightly higher for younger than for older children. This result emphasizes the protective role of attachment in this developmental stage, which is characterized by many physical, cognitive, and social changes associated with puberty and often relates to a certain decline in self-esteem (Robins & Trzesniewski, 2005).

In relation to emotion regulation strategies, it is well-known that the attachment bond represents the main context in which children understand and learn from their emotional experiences (Cassidy, 1994). As expected, we found a significant and positive association between avoidant attachment and the suppression of emotional expression, also after controlling for child age and gender. This finding is consistent with the theoretical view that children with an experience of repeated rejection are more likely to develop an insecure, avoidant attachment style and learn to manage their emotions so as to reduce future rejection



by decreasing expressive behavior (Cassidy, 1994). Future research may address how this association develops over time and is modeled by other features of children's social ecology.

With regard to CR, no significant associations emerged with the two attachment-related dimensions. Yet, prior research reported negative correlations between the anxiety and avoidance subscales of the ECR and CR among adults (i.e., Poncy, 2017). Similarly, Gresham and Gullone (2012) found a bivariate association between perceptions of relationships with parents based on the three dimensions of the Inventory of Parent and Peer Attachment (IPPA; Arnsden, & Greenberg, 1987) and the endorsement of CR in children and adolescents. A possible explanation for our findings is that the use of this strategy — which is considered to be highly adaptive — increases with age and experience (John & Gross, 2004). Albeit longitudinal studies are warranted to establish causality, it may be hypothesized that the link between perceived insecure attachment (in terms of anxiety and/or avoidance) and the tendency to cognitively reframe potentially emotion-eliciting events becomes more evident starting from late adolescence due to enhanced cognitive complexity and maturation. Moreover, it should be noted that the use of attachment measures assessing different dimensions (i.e., perceived security with the IPPA, and anxiety and avoidance with the ECR) may result in diverse patterns of associations with emotion regulation strategies. Thus, our data provide support — at least in part — for convergent validity of the brief ECR-RC with the ERQ-CA, but more studies are needed to shed light on the hypothesized link between anxious/avoidant attachment and the CR subscale at different ages.

To summarize, the Italian short form of the ECR-RC appears to be psychometrically sound and shows the expected relationships with variables known to be associated with attachment in middle childhood. Importantly, our analyses indicate that it is an appropriate

tool to assess attachment anxiety and avoidance also in younger children (8-10 yrs). In this regard, the change in response format (from 7 to 5 points) might have reduced the potential bias originating from a different interpretation of the scale, and the labeling of each response option may have facilitated children's comprehension (Borgers et al., 2003). However, it should be noted that in this study, the ECR-RC was not directly compared with the 7-point Likert version previously used in other studies. Such comparison may provide some guidance as to which scale to use in relation to age. A likely outcome of such work might be that the ECR-RC based on 5-points is more appropriate for younger children, whereas the 7-point scale measure is more appropriate in late adolescence. Further studies are needed to clarify this issue.

Although our study provided further evidence for the validity of the brief ECR-RC in its use with 8 to 13-year-old children, we acknowledge some limitations. First, replication studies in other cultures are needed to allow greater confidence in the generalizability of results. Second, examination of test-retest reliability of the brief ECR-RC scale scores in future research will prove valuable in determining the stability of the scale. Third, the present study is limited by the exclusive reliance on self-report measures to test concurrent and convergent validity. Hence, future research should include other assessment methods (e.g., automatic process measures) and sources of information (e.g., parents, teachers) to assess concurrent, convergent, and predictive validity of the ECR-RC. Also, we used only 9 of the 12 items included in the Italian version of the SS to test concurrent validity. Further research should replicate this finding by using the full pool of items. Fourth, the present study assessed emotion regulation strategies based on a specific theoretical framework (i.e., process-oriented model; Gross, 1998). Following previous work (see Brenning et al., 2011), it may be useful to include a measure of hyperactivating emotion regulation strategies (e.g., dysregulated expression) to obtain a more comprehensive picture of

convergent validity between anxious attachment and the endorsement of specific emotion regulation strategies. Lastly, since we recruited our sample in schools, participants represented a ‘normative’ sample. Future studies should administer the ECR-RC to at-risk groups to test its discriminant validity in middle childhood.

Despite these shortcomings, the current findings provide evidence that the short form of the ECR-RC is an age-appropriate measure to assess anxiety and avoidance in Italian children aged between 8 and 13 years. Specifically, the ECR-RC is likely to provide utility in further research interested in examining the features and role of attachment in middle childhood and early adolescence.



**CHAPTER 4**

**Measuring Avoidant and Ambivalent Attachment  
in Middle Childhood: Psychometric Evaluation of the  
Preoccupied and Avoidant Coping Questionnaire**

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*Manuscript in preparation*



### Abstract

The short form of the Preoccupied and Avoidant Coping Questionnaire (PACQ; Younger, Corby, & Perry, 2005) is a widely used self-report questionnaire measuring insecure attachment toward mother and father in middle childhood. However, its factor structure has not yet been examined, and evidence concerning concurrent and convergent validity of the measure is extremely sparse. In Study 1 ( $N = 378$ ,  $M_{\text{age}} = 9.37$  yrs), we evaluated the factorial structure of the Italian version of the PACQ and its measurement invariance across boys and girls. In Study 2 ( $N = 197$ ,  $M_{\text{age}} = 9.27$  yrs), we examined the mutual associations between the Italian versions of the PACQ and the Experiences in Close Relationships—Revised Child version (ECR-RC; Brenning, Van Petegem, & Soenens, 2014), as well their convergent and predictive validity. Results provided evidence for factorial validity of the PACQ, satisfactory internal consistency, and structural invariance across child gender. However, findings lent only partial support to the association between the PACQ and the ECR-RC, and convergent and predictive validity were found only for the avoidance subscale of these questionnaires. Overall, the Italian version of the PACQ is a psychometrically sound instrument to assess insecure attachment in middle childhood, but further research is needed to shed light on the conceptual significance of the preoccupied dimension.

**Keywords:** Preoccupied and Avoidant Coping Questionnaire; psychometric properties; attachment; middle childhood

In his influential theory, Bowlby (1969) conceptualized attachment as an enduring emotional bond which develops during the first years of life and affects how children interact and adapt within social contexts throughout the life span. Differences in parental availability and responsiveness produce individual differences in attachment security (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969). Specifically, interactions with attachment figures who are sensitive and responsive promote a stable sense of attachment security, fostering positive mental representations of the self and others (Mikulincer & Shaver, 2012). Yet, when the attachment figure fails to match the child's needs and is unable to soothe the child's distress, felt security is weakened and insecure attachment may develop (Mikulincer & Shaver, 2012).

Two different coping strategies have been identified in relation to insecure attachment: preoccupation and avoidance. Preoccupied children (also labeled 'ambivalent') tend to engage less in environmental exploration, express hyper-vigilance and anger, and show inconsistent attempts to obtain support from the caregiver. Avoidantly attached children show less effective engagement with the caregiver and tend to avoid seeking care and support from him/her to cope with stressful events (Ainsworth et al., 1978).

Although the impact of attachment relationships on the psychological adjustment of young children and adults has been extensively documented (see Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012), less research has focused on middle childhood and early adolescence. In this paper, we focus on middle childhood - a developmental period comprised between approximately 7/8 to 11/12 years - which is recognized as a critical turning point for human development due to the prominent changes occurring in the cognitive, social, and emotional domains (Raikes & Thompson, 2005). In this period, the quality of attachment relationships is mainly assessed using self-report questionnaires, since children begin to understand and manage their own feelings, internal



states, and manifest behavior in a more proficient way (Bosmans & Kerns, 2015). Thus, several researchers have stressed the importance of capturing consciously accessible aspects of attachment in middle childhood (Main, 1999; Bosmans & Kerns, 2015). Among the existing questionnaires, some provide a broad assessment of attachment security versus insecurity (e.g., the Security Scale; Kerns, Klepac, & Cole, 1996), while others differentiate among the specific dimensions of insecure attachment style (e.g., Experiences in Close Relationships Scale, Fraley, Waller, & Brennan, 2000; Brenning, Soenens, Braet, & Bosmans, 2012).

The Security Scale (SS; Kerns et al., 1996) is the first self-report tool designed to assess attachment in children aged between 8 and 12 years. The SS has provided an invaluable contribution to the study of attachment in this specific age group, and is one of the most frequently analyzed self-reports in terms of psychometric properties. For instance, a recent meta-analysis of 57 studies (Brumariu, Madigan, Giuseppone, Movahed Abtahi, & Kerns, 2018) provided evidence for its concurrent validity, given the meaningful associations of this questionnaire with other attachment measures (i.e., self-reports and story stem techniques, Kerns, Tomich, Aspelmeier, & Contreras, 2000; Marci, Moscardino, & Altoè, 2018). Furthermore, its convergent validity has been supported, since perceived security towards the caregiver has been found to be significantly related to several theoretically-related outcomes, such as children's emotional and social competence, self-esteem, and behavioral problems (Brumariu et al., 2018).

Despite the utility of the SS for assessing secure attachment, several scholars have emphasized the need to also evaluate dimensions of insecure attachment, as these are linked to a host of maladaptive outcomes later in life (Groh, et al, 2012) and tend to increase the vulnerability to a number of psychopathological disorders (see Mikulincer & Shaver, 2007). However, little attention has been devoted to investigating the psychometric properties of

self-reports assessing anxious/preoccupied and avoidant attachment in middle childhood.

Among existing self-report instruments, the Preoccupied and Avoidant Coping Questionnaire (PACQ; Finnegan et al., 1996) and the Experiences in Close Relationships–Revised Child version (ECR-RC; Brenning et al., 2014) are specifically designed to assess insecure attachment in school-age children. The former was developed to measure preoccupied and avoidant attachment specifically in middle childhood; the latter was originally designed to measure attachment anxiety and avoidance in adults (Fraley, et al., 2000), and was subsequently adapted for use with children and adolescents (Brenning et al., 2014). Compared to the SS, both instruments have the advantage of explicitly distinguishing between anxiety, preoccupation, and avoidance in attachment relationships toward mother and father.

While the ECR-RC has been previously analyzed for its reliability and validity (Brenning et al., 2014; Brenning, Soenens, Braet, & Bosmans, 2011; Marci, et al, 2018), empirical evidence supporting the validity of the PACQ as a measure of insecure attachment in middle childhood is still scarce. In addition, the factorial validity of the PACQ has never been tested via confirmatory factor analysis (CFA), and concerns have been raised concerning its external validity (Karavasilis, Doyle, & Markiewicz, 2003). To address the aforementioned issues, we conducted two studies. In Study 1, we systematically analyzed the factor structure and invariance across child gender of the PACQ in a sample of Italian school- age children using Structural Equation Modeling (SEM). In Study 2, we examined the mutual association between the PACQ and the ECR-RC and evaluated convergent and predictive validity of the two questionnaires in a subsample of Italian children who participated in Study 1.

### **The Preoccupied and Avoidant Coping Questionnaire**

The PACQ (Finnegan et al., 1996) was originally designed to measure preoccupied and avoidant coping within child-parent relationships and was subsequently proposed as a direct measure of ambivalent/preoccupied and avoidant attachment in children and early adolescents (Younger, Corby, & Perry, 2005). The preoccupied dimension includes a series of statements reflecting children's strong need for parents during upsetting circumstances, difficulty with separation and continued distress following reunion, excessive concern with parents' whereabouts, and reluctance to explore. The avoidance dimension captures the lack of proximity-seeking when upset and the failure to use parents as a relevant resource during stressful situations (Hodges, Finnegan, & Perry, 1999).

The first version of the PACQ (Finnegan et al., 1996) consisted of 36 items (18 for preoccupation, 18 for avoidance) followed by a shorter, 20-item version which consists of 10 items for each dimension (Younger et al., 2005). Each item describes a specific attachment-related event (e.g., the mother has been away for a few days, but she is coming home later that day), and children are asked to choose one of two statements which more likely fits them based on Harter's (1985) format (i.e., "*Some kids... other kids...*"). Of these statements, one is a preoccupied/avoidant response, and the other a nonpreoccupied/nonavoidant response. Regarding scale reliability, the PACQ has not yet been subject to factor analyses. With regard to inter-factor correlation, the two subscales have been shown to be negatively intercorrelated (Finnegan et al., 1996; Hodges et al., 1999). Internal consistency as assessed via Cronbach's alpha coefficients was .83 and .76 for the preoccupied and avoidant subscales, respectively (Finnegan et al., 1996), and good coefficients of 1-year test-retest stability were reported (i.e., .67 for the preoccupied and .53 for the avoidant scales; Finnegan et al., 1996).

In relation to concurrent validity, Brenning and colleagues (2011) found a meaningful and positive correlation between the avoidance subscales of the PACQ and the ECR-RC. In contrast, no association emerged between the PACQ preoccupied and the ECR-RC anxiety subscales (Brenning et al., 2011). The same pattern of results was found when the PACQ was compared with the Separation Anxiety Test (see Kerns, et al, 2000), a projective interview (Resnick, 1993). Some studies (e.g., Kerns et al., 2000; Marci et al., 2018) found the expected negative and meaningful association between the PACQ avoidant coping subscale and felt security as assessed via the SS, whereas a counterintuitive positive association between the PACQ preoccupied coping subscale and felt security scores emerged across several studies (Kerns, et al., 2000; Marci, Lionetti, Moscardino, Calvo, & Altoè, 2018).

In terms of convergent validity, meaningful associations of the PACQ with attachment-related theoretical constructs, such as parenting style and children's internalizing and externalizing problems, have also been reported (Finnegan et al., 1996; Hodges, et al. 1999; Kerns et al., 2000; Younger et al., 2005). For instance, highly preoccupied children perceived their mothers as being overprotective by discouraging autonomy and exploration, whereas avoidant children perceived their mothers as being unavailable in times of need, not loving, and uninterested (Younger et al., 2005).

Overall, due to the partly contrasting findings emerging from previous studies, some scholars recommended caution against interpreting results obtained via the PACQ until its validity has been ascertained (e.g., Karavasilis et al., 2003).

### **The Experiences in Close Relationships Scale–Revised Child Version**

The ECR-RC (Brenning et al., 2014) is a self-report questionnaire assessing children's anxiety and avoidance toward mother and father. The measure was adapted for use with children and adolescents from the original Experiences in Close Relationships Scale (ECR;

Fraley et al., 2000), which is broadly used to assess romantic attachment in adults. The anxiety dimension includes items revealing concern about social support and fear of abandonment and rejection (e.g., “I worry that my father/mother does not really love me”), while the avoidance dimension captures avoidance of intimacy, discomfort with closeness, and self-reliance (e.g., “I prefer not to tell my father/mother how I feel deep down”) (Brenning et al., 2014).

Consistent with the ECR for adults (Fraley et al., 2000), the ECR-RC includes 36 items, 18 for each dimension. A shorter 12-item version was thought to reduce the cognitive burden for younger children (Brenning et al., 2014). In this short version, each subscale comprises 6 items rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Principal Component Analysis (PCA) and Confirmatory Factor Analyses (CFAs) performed on Belgian, Polish, and Italian children and adolescents provided support for the two-factor structure of both mother and father forms (see Brenning et al., 2014; Marci et al., 2018; Skoczen, Głogowska, Kamza, & Włodarczyk, 2018). Furthermore, the two scales have been shown to be positively intercorrelated across several studies (e.g., Brenning et al., 2014; Marci et al., 2018). Invariance across middle childhood and early adolescence was also demonstrated (Marci et al., 2018). Yet, no data on test-retest reliability are available to date.

In terms of concurrent validity, significant negative correlations between the ECR-RC subscales and felt security scores (as measured by the SS), as well as a positive association with the Relationship Questionnaire for Children (Bartholomew & Horowitz, 1991) were found.

With regard to convergent validity, a few studies reported meaningful associations of the ECR-RC with emotion-regulation strategies; more specifically, attachment anxiety was positively linked to dysregulation (Brenning et al., 2012), and avoidance was positively associated with emotional suppression (Brenning et al., 2012; Marci et al., 2018). Using a

different framework of emotion regulation (see Gross & John, 2003), in our own work we tested the association of avoidance and preoccupation/anxiety to cognitive reappraisal (CR), an adaptive strategy that attempts to reshape an emotionally-eliciting event and to regulate the emotional impact of such event (Gross & John, 2003). Consistent with previous adult research (Poncy, 2017), our findings indicated that less use of CR in school age children was associated with more attachment avoidance. Furthermore, Brenning et al. (2014) reported that both attachment-related dimensions (anxiety and avoidance) were positively related to children's perceptions of parental psychological control, and negatively related to parental responsiveness.

### **The current study**

To summarize, despite its widespread use in the study of attachment in middle childhood, empirical evidence concerning the reliability and validity of the PACQ is extremely limited. In particular, no previous research has tested the factor structure of the questionnaire, and inconsistent results have been reported in relation to its external validity. Also, the positive association between the PACQ preoccupied coping scale and the SS felt security score observed in previous studies (Kerns et al., 2000; Marci et al., 2018) has contributed to raising concerns about the reliability and validity of the PACQ, which therefore merits further investigation.

The current work aimed to address these issues in two separate studies conducted in Italy. In Study 1, we tested the factor structure of the PACQ by performing a CFA, evaluated invariance across gender, and assessed differences between girls and boys on latent avoidant and preoccupied attachment scores. Based on extant research, we expected our data to support the theoretical two-dimensional model proposed by Finnegan et al., (1996), and to reveal invariance in factor structure across boys and girls. With regard to differences in avoidance and anxiety scores, we anticipated to find higher levels of

preoccupation and lower levels of avoidance among girls compared to boys (Finnegan et al., 1996).

In Study 2, we evaluated the PACQ and the ECR-RC by examining mutual associations between questionnaire subscales across the hypothesized concurrent dimensions (e.g., PACQ avoidance and ECR-RC avoidance; PACQ preoccupation and ECR-RC anxiety). In addition, we tested the extent to which each dimension was related to a series of relevant criterion-validity variables by adopting a cross-sectional (convergent validity) and a longitudinal (predictive validity) approach. During middle childhood school opens up new social contexts beyond the family and represents a privileged context in which observe children adjustment. Thus, convergent validity was tested by analyzing associations with behavioral problems at school (e.g., internalizing and externalizing) as reported by teachers. Predictive validity was assessed in relation to positive outcomes, i.e. general self-worth and the use of CR as an emotion regulation strategy.

In line with the literature reviewed above, we expected to replicate the positive association between avoidance subscales of the two questionnaires (see Brenning et al., 2012), whereas no hypothesis was put forward for the preoccupied/anxiety subscales due to previous conflicting findings. Furthermore, consistent with Finnegan's (1996) study, we expected preoccupied/anxious children to exhibit more internalizing problems, and avoidant children to show more externalizing problems. With regard to predictive validity, we anticipated higher avoidance and preoccupation/anxiety scores at baseline to be predictive of lower self-worth and of lower CR at follow-up.

### **Study 1**

In Study 1, we aimed to evaluate the factor structure and internal consistency of the Italian version of the PACQ via CFA, and analyzed its invariance across girls and boys. We also

explored differences in terms of preoccupied and avoidant attachment between boys and girls.

## **Method**

### **Participants and procedure**

For the purpose of Study 1, participants were children attending 3<sup>th</sup>, 4<sup>th</sup> and 5<sup>th</sup> grades from two primary schools located in South Italy (S1,  $n = 203$ ) and three primary schools in northeastern Italy (S2,  $n = 222$ ).

After receiving approval from school principals, the study was presented to head teachers individually, and a letter was sent to children's parents in order to explain the nature of the study and ask for written consent. Only children with written consent obtained from both parents ( $N = 415$ , 97.5%) were involved in the study. Of these, 9 were absent on the day of data collection. Questionnaires completed by children with intellectual disabilities or certified developmental/learning disorders ( $n = 32$ ) or outside the target age range of 8–12 years ( $n = 3$ ) were not included in data analyses. Hence, the final sample consisted of 371 native-born Italian children aged 7.6 – 11.7 years (53% girls,  $M_{age} = 9.37$ ,  $SD = 0.86$ ). Children completed the questionnaires in the classroom during school hours. All items were read aloud by the researcher to reduce possible cognitive overload as well as the potential effect of differences in reading ability. All participants completed the PACQ in relation to their mother and provided basic demographic information including age, gender, and place of birth.

## **Materials**

**Preoccupied and Avoidant Coping Questionnaire – short form (PACQ).** The short form of the PACQ (Finnegan et al., 1996; Younger et al., 2005) consists of 20 items (10 pertaining to each dimension) assessing preoccupied and avoidant attachment toward mother and father (Younger et al., 2005). Each item describes a specific attachment-related



event, followed by two statements based on Harter's (1985) format. Children are asked to imagine the possible attachment-related experience; after choosing the statement they feel fits best, they are asked to indicate whether it is "really true" or "sort of true" for them. Each item is scored as 0, 1, or 2. A score of 0 corresponds to nonpreoccupied/nonavoidant options, while a score of 1 or 2 is assigned to less or more preoccupied/avoidant responses, respectively. Scores across items are averaged to provide two different scores (i.e., one for preoccupation, one for avoidance). Higher scores reflect more parent-child attachment insecurity. In the present study, children completed the questionnaire in relation to their mothers.

### **Analytic approach**

All analyses were carried out with R (R Development Core team, 2018).

Item response distributions for the 20 items were explored.

**Factor structure invariance across gender.** To test the factor structure of the PACQ, a series of CFAs were conducted. All models were estimated using the lavaan package (Rosseel, 2012) and were performed using the weighted least squares mean and variance (WLSMV) estimator, which is appropriate for ordinal data (Flora & Curran, 2004). Due to the absence of missing data, no imputation of missing values on item responses was necessary.

To test the factor structure of the PACQ, we first ran a unidimensional model (used as baseline model) separately for girls (M1) and boys (M2), and compared it with the theoretical two-dimensional model (boys: M3; girls: M4).

To evaluate model fit, we computed and examined a series of goodness-of-fit indices, including the degrees of freedom ratio ( $\chi^2/df$ ), the root mean square error of approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker Lewis Index (TLI). We also followed the guidelines proposed by Schermelleh-Engel and Moosbrugger

(2003), with a  $\chi^2/df$  was lower than 3, CFI and TLI higher than 0.95, RMSEA lower than 0.08, and standardized root mean square residual (SRMR) lower than 0.10 considered acceptable. Given the limitations inherent in Cronbach's alpha coefficient (see Sijtsma, 2009), internal consistency was evaluated via McDonald's omega computed on CFA parameter estimates (Brown, 2006). Specifically, the function reliability of the R package *semTools* was used (*semTools Contributors*, 2016).

To evaluate invariance across gender, multigroup confirmatory factor analysis (MG-CFA) was performed following a step-by-step procedure (Muthén & Muthén, 2010). First, we tested configural invariance by allowing all structural parameters to remain free across groups. Second, we simultaneously tested metric and scalar invariance by constraining factor loadings and thresholds to be equal across groups. Results were evaluated following the general guidelines suggested by Chen (2007). Particularly, several fit indexes (i.e., CFI, TLI, RMSEA) were considered, and the difference in CFI ( $\Delta$  CFI) and RMSEA ( $\Delta$  RMSEA) was computed between the two proximal models (i.e., configural vs. metric and scalar). Acceptable model fit indices, a difference in CFI less than 0.01 ( $\Delta$  CFI), and an RMSEA less than 0.015 ( $\Delta$  RMSEA) are considered evidence for model invariance. When metric and scalar invariance are simultaneously reached, the meaning of the construct (factor loadings) and the levels of the underlying items (thresholds) are equal in both groups; therefore, their latent scores can be compared.

**Differences in preoccupation and avoidance latent scores.** Differences in terms of preoccupation and avoidance latent scores between groups (i.e., boys and girls) were evaluated by latent mean analysis (LMA) following Finch & French's (2015) guidelines. We chose boys as the reference group and constrained loadings, thresholds, and error variances to be equal across groups, while the means were allowed to vary only for the girls' group. Since latent means of the reference group were fixed to zero, the latent means of the

comparison group (i.e., girls) represented the mean differences between the two groups (Finch & French, 2015). Cohen's  $d$  was computed, and the effect sizes of the latent mean differences were evaluated. Following Cohen's guidelines (1988), we considered a value of  $d = 0.2$  to be a small effect,  $d = 0.5$  a medium effect, and  $d = 0.8$  a large effect.

## Results

Item response distributions are depicted in Figure 1.

**Factor structure invariance across gender.** To assess the factor structure of the PACQ, we first tested a one-dimensional 20-item model via CFA (see Table 1) separately for boys (M1) and girls (M2). Based on cut-off values, the boys' model reached good fit in the majority of indices, whereas the girls' model obtained a poor fit. A subsequent CFA was performed on items specified to load onto the two factors (i.e., avoidance and preoccupation), and both models improved along all fit indices (see M3 and M4 in Table 1). However, the girls' model showed fit indices that were under the recommended cut off values. After inspection of the main loadings, cross-loadings, and modification indices, we removed five items that were problematic (i.e., item 2, 4, 12, 15, 20) in a step-by-step manner (i.e., one item at a time). A further CFA based on the remaining 15 items was performed in both groups, yielding an excellent fit of both models in the considered indices (see M5 and M6 in Table 1). Hence, the two-dimensional structure of the scale was corroborated. As expected, in both models (i.e., girls and boys) the inter-factor correlation was negative and significant (see Figure 2). As can be seen in Figure 2, the majority of standardized factor loadings was higher than .40. Internal consistency of the avoidance subscale suggested acceptable indices of reliability for boys ( $\omega = .77$ ) and girls ( $\omega = .81$ ). In contrast, values of the preoccupied scale were acceptable for boys ( $\omega = .75$ ), but relatively low for girls ( $\omega = .66$ ).

The two-factor model with 15 items was considered to test invariance across boys and girls by adopting a MG-CFA approach. In the first step, a model was estimated that allowed all parameters to be freely estimated in both girls and boys (configural model). As shown in Table 1, this model revealed a good fit. In the second step, we kept the loadings and thresholds invariant across groups (weak model). This model showed a good fit, and both  $\Delta$  CFI and  $\Delta$  RMSEA between constrained and unconstrained models were below the recommended cut-off values; therefore, scalar invariance across gender was established (see Table 1).

**Differences in preoccupation and avoidance latent scores.** To estimate differences in latent scores of preoccupied and avoidant attachment between boys and girls, LMAs were conducted. Results suggested that girls reported significantly higher latent mean values in preoccupied attachment than boys ( $z = 2.713, p = .007$ ), with a moderate effect size (Cohen's  $d = .346$ ). For avoidant attachment, boys reported higher scores than girls, although this difference did not reach statistical significance at the .05 level ( $z = -1.858, p = .063$ ; Cohen's  $d = .337$ ).

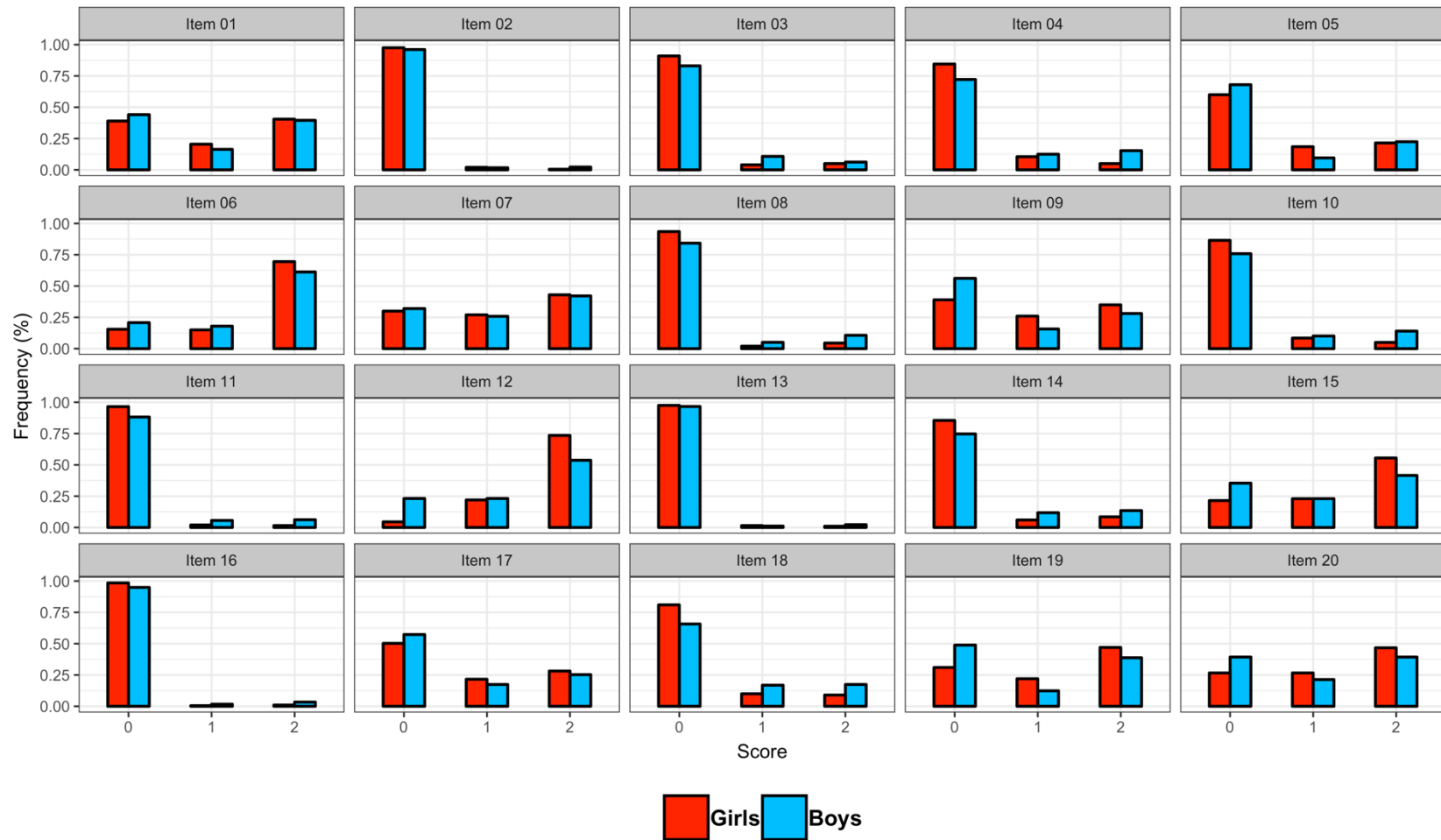


Figure 1. Item response distribution of the PACQ by gender (boys:  $n = 174$ ; girls:  $n = 197$ )

Table 1

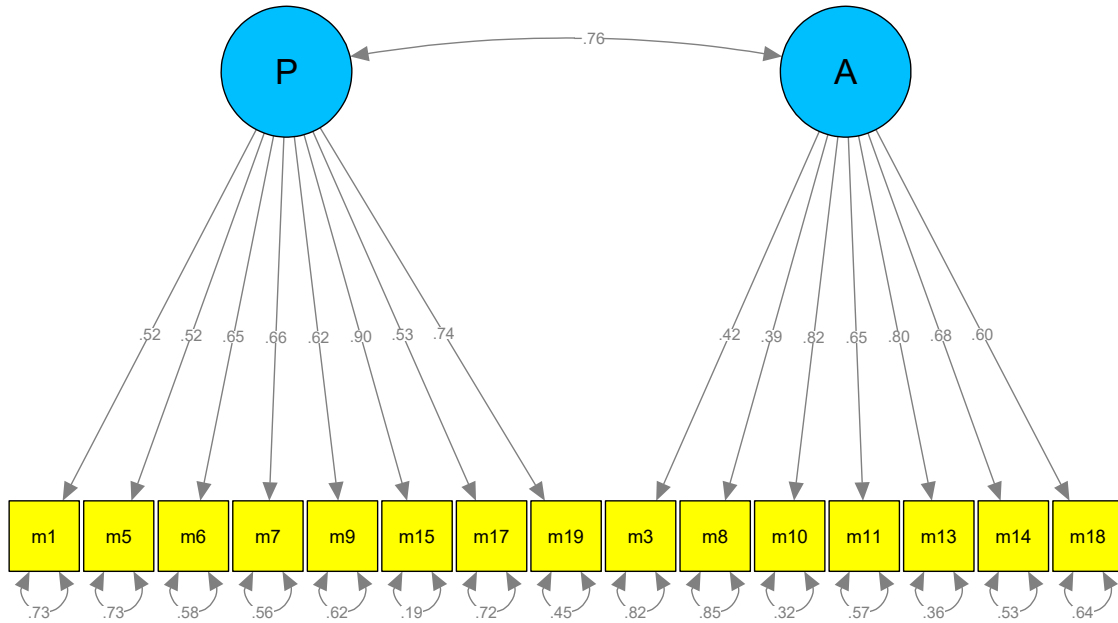
*Model fit for the short PACQ and invariance across boys and girls*

	$\chi^2/df$	<i>p-value</i>	CFI	TLI	RMSEA [90% CI]	$\Delta$ CFI	$\Delta$ RMSEA
<i>Baseline: one-factor model</i>							
Boys (M1)	1.332	.002	.977	.974	.044 [.027 – .058]		
Girls (M2)	2.68	< .001	.840	.821	.093 [.082 – .103]		
<i>Two-factor model (20 items)</i>							
Boys (M3)	1.297	.006	.980	.977	.041 [.023 – .056]		
Girls (M4)	2.062	< .001	.887	.899	.074 [.063 – .085]		
<i>Two-factor model (15 items)</i>							
Boys (M5)	1.169	.103	.989	.987	.031 [.000 – .052]		
Girls (M6)	1.179	.116	.987	.982	.030 [.000 – .050]		
<i>Invariance</i>							
STEP 1 – Configural	1.08	< .000	.971	.966	.044 [.030 – .057]		
STEP 2 – Metric and scalar	1.36	< .000	.964	.963	.046 [.033 – .058]	– .005	.003

*Note.* Boys:  $n = 174$ ; girls:  $n = 197$ .  $\chi^2/df$  = chi-square/degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index;

RMSEA = Root Mean Square of Approximation.  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEA

Boys



Girls

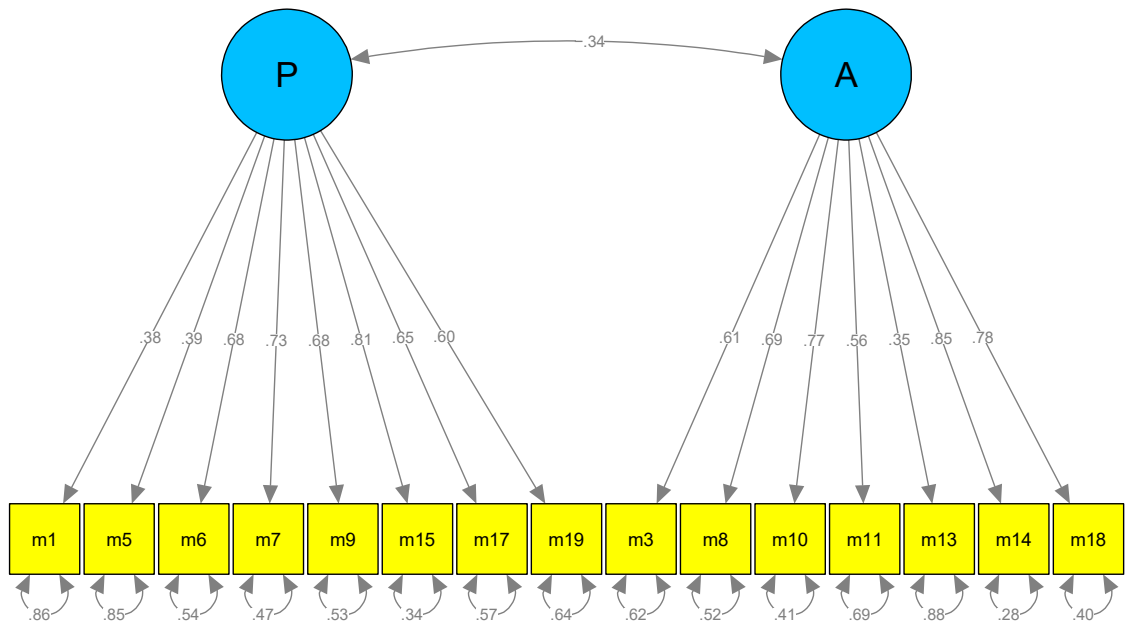


Figure 2. Confirmatory factor model of the 15-item PACQ (boys:  $n = 174$ ; girls:  $n = 197$ ). All structural coefficients are standardized. All factor loadings are significant at the .05 level.

## Study 2

In Study 2, we aimed to perform a concurrent evaluation of the short versions of the PACQ and ECR-RC. Specifically, we examined (1) the mutual association between the two questionnaires, (2) convergent validity by analyzing their associations with internalizing and externalizing behavioral problems, and (3) predictive validity by exploring the extent to which each self-report measure predicted levels of general self-worth and the use of CR as an emotion regulation strategy after 2 years.

### Method

#### Participants and Procedure

Participants of Study 2 comprised a sub-sample of children (S2) involved in Study 1, who completed together with the PACQ appropriate measures to test external validity of the questionnaire. Procedures were the same as those reported in Study 1.

Children were assessed at two time points (T1 and T2), approximately 2 years apart. At T1, all children with written consent obtained from both parents ( $n = 215$ , 98.6%) were involved in the study. However, children whose teachers reported intellectual disabilities or certified developmental/learning disorders ( $n = 14$ ) were not considered in subsequent data analyses. Furthermore, 4 children were absent on the day of data collection. Hence, the final sample consisted of 197 native-born Italian children aged 7.83–10.80 years (50.7% girls,  $M_{\text{age}} = 9.27$ ,  $SD = 0.58$ ). Participants completed a form to provide demographic information, including age, gender, and place of birth. In addition to the mother-related short form of the PACQ, children also completed an Italian version of the brief ECR-RC (Brenning et al., 2014; Marci et al., 2018) and the Family Affluence Scale (FAS; Boyce, Torsheim, Currie, & Zambon, 2006). The main teacher reported on children's problem behavior at school (i.e., internalizing and externalizing behavior) by completing the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Most children came from medium (29%) or higher-



income (70%) families as assessed by the FAS (Boyce et al., 2006; more details are provided in the Measures section).

After 2 years, children were invited to take part in a second wave. All families of the initial sample ( $n = 215$  third- and fourth-graders) were given a new consent form. However, 21 children had moved to other schools, and 8 children were absent on the day of data collection. Also, consistent with the procedure adopted during the first wave, children with certified disorders were not considered in data analyses ( $n = 11$ ). Hence, the final sample included 175 children attending fifth and sixth grades. Children filled out the general self-worth scale included in the Self-Perception Profile for Children (Harter, 2012) and the CR subscale included in the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taaffe, 2012). Children were assessed in the classroom during school hours.

### **Materials**

A description of the PACQ is provided in Study 1.

**Experience in Close Relationships - Revised Child version (ECR-RC).** The ECR-RC (Brenning et al., 2014) is a 12-item self-report measure designed to capture attachment anxiety and avoidance in children and adolescents. Each item is rated on a 7-point scale, and scores across items are averaged to provide anxiety and avoidance scores, with higher scores indicating a more anxious or avoidant attachment. In this study, we used the adapted Italian version (see Marci et al., 2018). CFA performed on the current sample showed a good fit to the data ( $\chi^2/df = 1.26$ ,  $p = .098$ , CFI = .987, TLI = .983, RMSEA = .036 [.000 – .061]).

**Family Affluence Scale (FAS).** The FAS (Boyce et al., 2006) is a 4-item measure of family wealth (e.g., “Does your family own a car?”). Scores across items are computed to provide an overall score ranging from 0 to 9 (0–2 indicates low affluence; 3–5, medium affluence; 6–9, high affluence). The questionnaire has demonstrated good validity and

reliability across several countries, including Italy (Vieno, Santinello, Lenzi, Baldassari, & Mirandola, 2009).

**Strengths and Difficulties Questionnaire (SDQ).** The SDQ (Goodman, 1997) is a 25-item questionnaire designed for screening emotional and behavioral problems in children and adolescents. It consists of 5 scales (i.e., Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, Peer Problems, and Prosocial Behaviors), each composed of 5 items. Items are rated on a 3-point-Likert scale and are summed to provide 5 component scores. An overall total difficulties score is obtained by adding the scores of all items, except for those assessing prosocial behavior (Goodman, 1999). For this study, we calculated scores for internalizing (i.e., Emotional Symptoms and Peer Problems) and externalizing (i.e., Conduct Problems and Hyperactivity-Inattention) problems following the procedure described by Goodman, Lamping, and Ploubidis (2010). The questionnaire has been widely used in many countries, including Italy (Tobia & Marzocchi, 2017).

**Self-Perception Profile for Children (SPPC).** The SPPC (Harter, 1985; 2012) is a 36-item questionnaire used to assess children's perceptions of self-competence and adequacy. For this study, participants completed the Global Self-Worth subscale, which consists of 6 items rated using Harter's (1985) format. Children are asked to choose one of two statements which best fits them, and then indicate whether the statement is "really true" or "sort of true" for them. Each item is rated on a 4-point scale, and scores across items are averaged to provide a global self-worth score, with a higher score reflecting higher self-worth. The questionnaire provided evidence of good psychometric properties in terms of factor structure, internal consistency, and convergent validity (Harter, 2012). In the current sample, we used the Italian version of the scale (Pedrabissi, Santinello, & Scarpazza, 1988).

**Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA).** The ERQ-CA (Gross & John, 2003; Gullone & Taaffe, 2012) is a 10-item revised version of

the Emotion Regulation Questionnaire (Gross & John, 2003) for use with children and adolescents. It was designed to assess the use of two emotion regulation strategies, namely Cognitive Reappraisal (CR, 6 item) and Expressive Suppression (ES, 4 item). Each item is rated on a 5-point-Likert scale. Scores across items are averaged to provide two different scores (one for each emotion regulation strategy), with higher scores indicating more use of the specific strategy. For the purpose of our study, children completed the CR subscale. The ERQ-CA has shown good psychometric properties in terms of factor structure, internal consistency, and external validity (Gullone & Taaffe, 2012).

### **Analytic approach**

All analyses were performed with R (R Development Core team, 2018).

**Preliminary analyses.** As a preliminary step, MG-CFA between S1 (the sub-sample included only in Study 1) and S2 (children included in both studies) was performed and invariance of the PACQ across sub-sample was ascertained. At the descriptive level, we computed the mean, standard deviation, and range for each measure.

**Concurrent and convergent.** Concurrent and convergent validity were evaluated using a structural equation modeling (SEM) approach. All models were estimated using the Mean and Variance Adjusted Weighted Least Squares Estimation (WLSMV), which is appropriate for ordinal data (Flora & Curran, 2004). Missing data (< 1%) were imputed based upon each subject's mean score rounded off to the closest integer (to respect the metric of each measure) on each subscale of a given measure.

To determine concurrent validity, a SEM was performed, and we calculated the latent correlation between preoccupation and avoidance (as assessed via the PACQ) and anxiety and avoidance (as assessed via the ECR-RC).

To test convergent validity, we first ran a series of SEMs and evaluated the latent bivariate correlations between questionnaire dimensions (i.e., PACQ: preoccupation and

avoidance; ECR-RC: anxiety and avoidance) with internalizing and externalizing latent scores. Next, another series of SEMs was implemented to take the correlation between the two attachment-related dimensions within each questionnaire into account. Specifically, for both the PACQ and the ECR-RC, we conducted two SEMs and tested the extent to which each factor (i.e., exogenous variable) was associated with the external measure (i.e., endogenous variable). Furthermore, since previous research found age- and gender-related effects on problem behaviors, these variables were used as controls.

**Predictive validity.** Likewise, to test predictive validity, we performed a series of SEMs to evaluate the extent to which avoidance and preoccupation (as assessed via the PACQ) and anxiety and avoidance (measured via the ECR-RC) at T1 predicted general self-worth and the use of CR 2 years later. Again, because previous research has found gender- and age-related effects on some of the considered criterion measures (e.g., John & Gross, 2004; Robins & Trzesniewski, 2005), each model was implemented by including age and gender as control variables.

## Results

**Preliminary analyses.** We first established metric and scalar invariance between S2 and S1 (see Table A7 in the Appendix C). Means and standard deviations for study variables are reported in Table 2.

**Concurrent and convergent.** With regard to the mutual association between attachment measures, good concurrent validity was found for the avoidance subscales ( $r = .83, p < .001$ ). However, there was no association between the PACQ preoccupied dimension and the ECR-RC anxiety subscale ( $r = -.05, p = .621$ ).

In terms of convergent validity, we first calculated latent bivariate correlations which indicated that attachment anxiety (assessed via the ECR-RC) was significantly and positively associated with externalizing problems. No other significant associations with this

variable emerged. With regard to internalizing problems, we did not find any significant latent correlation (see Table 3).

Table 2

*Descriptive statistics for study variables*

<b>Construct (instrument)</b>	<b><i>N</i></b>	<b>Mean</b>	<b><i>SD</i></b>	<b>range</b>
Preoccupation (PACQ)	197	1.15	0.48	0.00 – 2.00
Avoidance (PACQ)	197	0.17	0.25	0.00 – 1.50
Anxiety (ECR-RC)	197	1.59	0.60	1.00 – 3.83
Avoidance (ECR-RC)	197	1.70	0.57	1.00 – 3.67
Internalizing (SDQ)	197	0.31	0.29	0.00 – 1.40
Externalizing (SDQ)	197	0.38	0.39	0.00 – 1.78
Prosocial behavior (SDQ)	197	1.57	0.42	0.25 – 2.00
General self-worth (SPPC)	175	3.06	0.75	1.00 – 4.00
Cognitive reappraisal (ERQ-CA)	175	2.85	0.88	1.00 – 5.00

*Note.* PACQ = short form of the Preoccupied and Avoidant Coping Questionnaire

(Younger, Corby, & Perry, 2005); ECR-RC = Brief Experience in Close Relationships Scale

– Revised Child Version (Brenning et al., 2014); SDQ = Strengths & Difficulties

Questionnaire (Goodman, 2001); SPPC = Self-Perception Profile for Children (Harter,

2012); ERQ-CA = Emotion Regulation Questionnaire for Children and Adolescents

(Gullone & Taaffe, 2012).

Table 3

*Latent bivariate correlations between the PACQ (Finnegan et al., 1996), the ECR-RC, Brenning et al., 2014), and teacher-reported externalizing and internalizing behavior*

	<i>PACQ</i>	<i>PACQ</i>	<i>ECR-RC</i>	<i>ECR-RC</i>
	<i>Avoidance</i>	<i>Preoccupation</i>	<i>Avoidance</i>	<i>Anxiety</i>
Internalizing behavior	.037	– .021	– .025	.155
Externalizing behavior	– .109	.127	.083	.232**

Note. \*\*  $p < .01$ .  $N = 197$ .

Next, a series of SEMs were performed by considering the correlations across attachment-related dimensions (i.e., PACQ: preoccupied and avoidant; ECR-RC: anxious and avoidant), controlling for gender and age. Results confirmed that higher levels of preoccupation and anxiety (assessed via the PACQ and ECR-RC, respectively) were linked to more externalizing problems ( $B = .256, p = .050$ ;  $B = .248, p = .012$ ). In contrast, no associations were found with the avoidance subscales (PACQ:  $B = .060, p = .634$ ; ECR:  $B = -.081, p = .440$ ). In terms of internalizing problems, no significant latent correlations emerged. These null findings were confirmed when controlling for shared variance and age and gender (PACQ, preoccupation:  $B = .012, p = .925$ ; avoidance:  $B = .060, p = .634$ . ECR, anxiety:  $B = .188, p = .098$ ; avoidance:  $B = -.129, p = .244$ ).

**Predictive validity.** With regard to predictive validity, results of SEMs indicated that only the avoidant coping style assessed via the PACQ was significantly and negatively associated with self-worth ( $\beta = -.438, p = .001$ ). In relation to emotion regulation strategies, both questionnaires reported similar results. In particular, avoidance measured via both the PACQ and the ECR-RC at T1 predicted less use of CR at T2 ( $B = -.284, p = .010$ ;  $B = -$

397,  $p = .001$ , respectively). In contrast, no association of preoccupation (PACQ) and anxiety (ECR-RC) to CR emerged ( $B = .041, p = .721$  and  $B = .061, p = .589$ , respectively).

### General discussion

The aim of this work was twofold: (1) to test the factor structure of the short form of the PACQ and its invariance across boys and girls, and (2) to examine the association between the PACQ and the ECR-RC by testing their concurrent, convergent, and predictive validity in Italian school-age children. Indeed, empirical information about the factor structure and psychometric properties of this instrument assessing dimensions of insecure attachment in middle childhood is extremely limited.

In relation to the first aim, CFAs were performed to test factorial validity of the short PACQ, followed by MG-CFA to evaluate invariance between boys and girls. With regard to factor structure, results demonstrated a good model fit of the bidimensional model proposed by Finnegan and colleagues (1996), with almost all factor loadings being moderate to high. Yet, five items (avoidance: 3 items; preoccupation: 2 items) were removed after the analysis of modification indices. A possible explanation may be related to item content. For example, item 4 (i.e., “Your mother takes you to a dentist or doctor’s office. While you are sitting in the waiting room, she says she is going to run an errand and will be back to pick you up later.”) is designed to assess avoidant vs. secure attachment, and children are required to choose between the two alternatives “Some kids would be glad their mother left them alone to wait” and “Other kids would prefer that their mother wait with them”. The second scenario (representing secure children) is likely to occur also among anxious children, therefore possibly leading to cross-loading of this item onto both subscales. Interestingly, cross-loading items emerged mostly in girls’ responses, probably because girls score higher in preoccupation than boys (Finnegan, 1999). Future research should replicate these results

in other countries to test this hypothesis and evaluate other possible effects (e.g., language, culture).

Internal consistency (evaluated for the 15-item scale) was supported for the avoidance-related dimension in both boys and girls, whereas it was relatively low for the preoccupation subscale in the female group.

As expected (Finnegan et al., 1999), the avoidance and preoccupation subscales were negatively correlated in both boys and girls. This result is consistent with previous research reporting a negative association between ambivalence and avoidance assessed via the PACQ (Finnegan et al., 1999), and is in line with the assumption that different coping strategies characterize different attachment styles. While preoccupied/anxious people are more likely to use coping strategies that involve a hyperactivation of emotional responses, avoidant individuals are more likely to cope with distress by using deactivation strategies and avoiding awareness of difficulties.

Regarding invariance across gender, results showed that the PACQ was invariant at the metric and configural levels. Thus, the instrument assessed attachment avoidance and preoccupation in the same way for both boys and girls, allowing a direct comparison of these dimensions. In terms of gender differences, our results indicated that girls were significantly more preoccupied than boys, and that the latter reported more avoidance than girls (although this difference was not statistically significant), with effect sizes being relatively small. These findings are in line with Bowlby's (1969) observation that, even though boys and girls equally tend to develop a secure attachment, girls are more likely to show ambivalent attachment, whereas boys more frequently report avoidant attachment. From an evolutionary adaptation perspective (Simpson & Belsky, 2016), a sex-dependent reorganization of the attachment system during middle childhood is normative (Del Giudice,



2009) and manifests itself in a tendency of to shift toward avoidant strategies among insecure males, and toward ambivalent attachment styles among insecure females.

In relation to the second aim, we evaluated external validity of the PACQ and its association with the ECR-RC. First, we examined the mutual association between questionnaire subscales (i.e., PACQ: preoccupied and avoidant; ECR-RC: anxious and avoidant). In line with expectations and previous studies (Brenning et al., 2011), the avoidance subscales were positively and significantly intercorrelated, whereas no association between the PACQ preoccupied and the ECR-RC anxiety scales emerged. This pattern was found in previous research (Brenning et al., 2011) and may reflect — at least in part — different item contents of the scales. Indeed, while the ECR-RC items feature general statements regarding the child-mother relationship and how children feel in their relation with the attachment figure (e.g., “I’m worried that my mother doesn’t really love me”), the PACQ includes items with age-specific content (Brenning et al., 2011; Karavasilis, et al., 2003) and describe how children act in a specific situation (i.e., “You are going out with your mother, but the two of you get separated. Some kids would stay calm until their mother got there BUT Other kids would be very upset and worried about her”). This discrepancy is more evident for preoccupied than for avoidant items. Hence, the two subscales might reflect different insecurity aspects (general vs. related to age-specific situations), making the two scales not comparable.

Convergent validity was examined by correlating avoidant and preoccupied/anxious dimensions (as assessed via the PACQ and the ECR-RC, respectively) with teacher-reported externalizing and internalizing problems. At the bivariate level, attachment avoidance (PACQ) and anxiety (ECR-RC) were significantly and positively related to externalizing problems. However, after controlling for correlations across subscales and demographic variables, only the result concerning anxiety remained significant. This pattern was

somewhat unexpected, since previous research has found significant associations between avoidant attachment and externalizing problems, and between preoccupied/anxious attachment and internalizing problems (Finnegan et al., 1996). Yet, some studies also reported a relationship between preoccupied attachment and several indicators of externalizing problems (Allen et al., 2002; Allen, Moore, Kuperminc, & Bell, 1998). Allen and colleagues (2002) suggested that the increase in autonomy during middle childhood may be particularly threatening for preoccupied children, who therefore tend to exhibit more behavioral problems at this age. The lack of associations between dimensions of insecure attachment and internalizing problems may be explained by the fact that externalizing problems are more recognizable in overt behavior compared to internalizing problems. Indeed, some researchers have shown that adult reports of children's internalizing behavior may underestimate children's symptomatology (Lagattuta, Sayfan, & Bamford, 2012). Furthermore, our findings show consistency with prior studies using the ECR-RC with early adolescents, which failed to detect direct links between insecure attachment and parent-reported maladjustment (Heylen et al., 2015), and support meta-analytic data showing a stronger association between insecurity and externalizing rather than internalizing symptoms in children (see Groth et al., 2012).

Finally, this research examined predictive validity of the PACQ and ECR-RC by testing their association with global self-worth (SPPC) and CR (ERQ-CA) two years after baseline assessment. Results showed that higher avoidance assessed using the PACQ (but not via the ECR-RC) was associated with lower self-worth after two years. From a methodological perspective, because the PACQ questionnaire was developed following Harter's response format ('some kids...but other kids...') which specifically intends to limit social desirability responses, it might be more effective in eliciting children's internal feelings, therefore resulting in stronger long-term associations with related constructs. From

a theoretical perspective, the PACQ questionnaire findings are in line with attachment theory suggesting that children with positive mental models of the self (i.e., secure children) have a positive view of themselves and others (Mikulincer & Shaver, 2012), whereas insecure children tend to internalize negative mental models of the self and significant others, which might represent a critical risk factor for low self-worth development (Collins, 1996; Mikulincer, 1998). The lack of association between preoccupation/anxiety and self-worth may reflect the instability of self-esteem associated to attachment anxiety (but not attachment avoidance) (see Forster, Kernis, & Goldman, 2007). It is possible that hyperactivating strategies, together with hypervigilance associated with anxious attachment (Mikulincer & Shaver, 2007), may increase the effect of social feedback (e.g., peers' acceptance/rejection) on self-evaluations, therefore affecting the stability of self-worth. Future studies may investigate how attachment style modulates the effect of other factors (i.e., peer relationships, class climate) on children's self-worth during the transition from middle (8-10 years) to late childhood (10-12 years).

With regard to emotion regulation, as expected, the PACQ and ECR-RC avoidance dimensions were both significantly and negatively associated with CR. This finding is consistent with prior research on adults (e.g., Poncy, 2017), and can be explained in light of attachment theory. Specifically, since secure children have no need for defensive strategies, their thought processes become more flexible and allow them to reframe stressful events in ways which reduce the relevance for subjective well-being (Mikulincer & Shaver, 2007). Thus, following Gross's (1998, 2001) theoretical model, highly secure individuals are more likely to use CR compared to insecure people. Given the more frequent use of deactivating strategies in avoidant children, the suppression of thoughts related to distressing events may lead to a reduced tendency to reframe a stressful emotional event based on cognitive efforts (i.e., CR). Contrary to our expectations, however, we did not find any significant association

between preoccupied/anxious attachment and CR. This result has been reported in previous research (e.g., Marci et al., 2018) and is overall consistent with the theoretical view that attachment-related dimensions are linked to a differential endorsement of different emotion-regulation strategies (Cassidy, 1994). Further studies may examine the association between preoccupation/anxiety and other negative appraisal strategies (e.g., rumination) or hyperactivating strategies (e.g., dysregulated expression) to yield a more in-depth evaluation of predictive validity of the two instruments.

Although our research provides new insights into the psychometric properties of the short form of the PACQ to assess insecure attachment in middle childhood, some limitations should be noted when interpreting the results. First, our study exclusively focused on Italian samples of school-age children. Given that culture plays an important role in the development and manifestation of attachment patterns in both children and adults (see Cassibba, Sette, Bakermans-Kranenburg, & van Ijzendoorn, 2013), further studies may use samples from other countries or perform cross-cultural comparisons to address the generalizability of findings. Second, our participants represented “normative” samples, therefore not allowing to ascertain whether the types of validity addressed in this study may also be found in clinical populations. Research involving at-risk groups would be helpful to test discriminant validity across questionnaires. Third, we exclusively relied on self-reported measures to assess convergent, concurrent, and predictive validity. Future studies may use other assessment methods (e.g., Middle Childhood Attachment Strategies Coding System, MCAS; Brumariu, Giuseppone, Kerns, Van de Walle, Bureau, Bosmans, & Lyons-Ruth, 2018), which could also help to clarify the meaning and construct validity of the anxious/preoccupied dimension. Relatedly, additional (or alternative) measures of emotion regulation strategies (e.g., dysregulated expression; see Brenning et al., 2011) may be used to shed light on the validity of the anxious/preoccupied scale. Last, given the relatively

small sample size of Study 2, further exploration of convergent and discriminant validity as well as replication with larger samples is warranted.

Despite these shortcomings, our study is the first to evaluate the factor structure of the short form of the PACQ through confirmatory factor analysis and to examine mutual associations between the PACQ and the ECR-RC using a systematic approach as well as a comparative evaluation of external validity. Overall, our results indicate that the Italian version of the short PACQ has good psychometric properties and is invariant between school-aged girls and boys. Yet, only partial support for the mutual association between the PACQ and the ECR-RC as well as for external validity of both questionnaires was found. While our results raise questions about the validity of the preoccupied coping subscale of the PACQ, the avoidant coping subscale of both questionnaires seems to reliably capture a component of insecure attachment. Further research may focus on the preoccupied subscale to examine its similarities and differences in relation to the ECR-RC anxiety subscale or to other measures to better understand the different subcomponents of insecure attachment in middle childhood.



## **SECTION 2**

### **DEVELOPMENT OF A NEW SELF-REPORT QUESTIONNAIRE**

The measurement of attachment in middle childhood remains an important challenge in the attachment field. As introduced earlier, self-report measures have been widely applied to assess attachment in children and adolescents, and these measures have substantially contributed to increase our understanding of attachment security in middle childhood - an area in which little research has been done compared to other developmental periods (i.e., infancy and adulthood).

Nonetheless, a wide range of differences exist across instruments. For instance, only a few (e.g., the SS and the PACQ) were developed specifically for middle childhood, while others were originally developed to assess attachment in late adolescence and adulthood (e.g., the IPPA and the ECR-RC).

A further difference lies in the constructs assessed by these instruments. The SS and IPPA are designed to provide continuous measures of felt security versus insecurity, whereas the ECR-RC and PACQ are designed to capture specific aspects of insecurity in the attachment relationship with mother and father, namely ambivalence/anxiety and avoidance. The most recent version of the PACQ (Younger et al., 2005) provides a third explicit subscale of secure attachment, which includes 10 of the 15 items derived from the SS (Kerns et al., 2001). In contrast, the ECR-RC assumes that secure attachment is reflected by

low scores in both attachment anxiety and avoidance; no separate scale is used to measure secure attachment. Fraley et al. (2000) raised concerns about the ability of this instrument to sufficiently capture the security region of attachment in adults, as only one study has focused on this concern (Brenning et al., 2011). Furthermore, there are important differences in the response formats used in these instruments. For example, questionnaires designed for middle childhood use the “some/other” format (Harter, 2012), whereas questionnaires designed for other developmental periods (i.e., adolescence and adulthood) follow the Likert format, which is in line with the original instruments. Yet, existing empirical evidence suggests that the choice of a particular response format plays a prominent role in obtaining reliable and valid data (e.g., Borgers et al., 2004; Borgers et al., 2000; Marsh, 1986; Pantell & Lewis, 1987). Thus, more attention needs to be devoted to determining the response format that best fits children’s linguistic and cognitive characteristics in this developmental phase.

In this section, we attempt to address a few of these issues.

The first study (Chapter 5) compares the Harter and Likert formats as used in current measures of attachment in middle childhood. In particular, the original ERC-RC (with Likert response options) was adapted using Harter’s response format; in a similar vein, the original SS answer format (‘some kids...other kids’) was modified into the Likert-type answer format. The two competitive answer formats were compared via a multigroup approach that allowed us to examine whether latent constructs may be operationalized in the same way across the same items with different types of response formats. This analysis represented a preliminary phase paving the way for the development of the new self-report questionnaire.

In Chapter 6, across three interrelated studies, we describe the development of the Attachment in Middle Childhood Questionnaire (Study 1 and Study 2) and tested its



psychometric properties. Importantly, in developing the new measure we addressed various conceptual issues, such as the theoretical structure of attachment representations in middle-to-late childhood.

## OUTLINE OF SECTION 2

**General Aims:** To develop and test Attachment in Middle Childhood Questionnaire

Specific Aims	Main Analyses
CHAPTER 5 - To test and compare the psychometric properties of two response formats (Harter vs. Liker)	CFAs; MG-CFA;
CHAPTER 6 - Study 1: To select a first pool of items - Study 2: To define the dimensionality of the new instrument - Study 3: To evaluate the psychometric properties	EFA; CFAs; MG-CFA; LMAs; SEMs

*Note.* CFAs= Confirmatory Factor Analyses; MG-CFA: multigroup Confirmatory factor analyses; EFA: Exploratory Factor Analyses; LMA Latent Mean Analyses; SEM = Structural Equation Modelling

**CHAPTER 5**

**Using Harter and Likert Response Formats**

**in Middle Childhood:**

**A Comparison of Attachment Measures**

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(2018). *Assessment, under review.*



**Abstract**

Although self-report questionnaires based on Harter's response format ('Some kids...but other kids...') are commonly used in developmental research, the reliability and validity of this format are still under debate. The current study examined the psychometric proprieties of Harter versus Likert response formats as applied to two attachment questionnaires in a sample of 410 Italian children aged 8–10 years. Participants completed the Experiences in Close Relationships-Revised Child version ( $n = 102$ , 4-point Likert scale;  $n = 104$ , adapted Harter version) and the Security Scale ( $n = 95$ , Harter's format;  $n = 109$  adapted 4-point Likert version). Multi-group confirmatory factor analyses evidenced comparable reliability of the two response formats; external validity was also supported. Implications for developmental theory and practice are discussed.

**Keywords:** middle childhood, item response format, psychometric properties

Self-report measures are among the most widely used assessment tools in the social sciences, as they allow to involve large samples and measure constructs that would be difficult to detect with other kinds of procedures (e.g., behavioral measures). In the last years, there has been a substantial increase in the development of self-report questionnaires designed for children with both clinical and research purposes. Such increase is consistent with the evidence that children's opinions represent a useful and valid source of knowledge (Achenbach, McConaughy, & Howell, 1987; Sturgess, Rodger, & Ozanne, 2002; Sturgess & Ziviani 1996). Indeed, children may be the best informants especially with regard to their emotions, since they have better access to their internal states than do teachers or parents (Lagattuta, Sayfan, & Bamford, 2012; Madigan, Brumariu, Villani, Atkinson, & Lyons-Ruth, 2016).

Much attention has been devoted to investigating how item characteristics (e.g., complexity of questions, number of items, item format, presence or absence of neutral points, wording and direction of scale items) may affect the response quality and reliability of questionnaires in adult populations (for an overview see Hartley & Betts, 2010; Shulruf, Hattie, & Dixon, 2008). Yet, only a handful of studies have investigated these issues in the assessment of children. Albeit informative, results from extant research conducted with adults cannot be generalized to children due to substantial differences in their cognitive, linguistic, communicative, and social skills.

The present study aimed to examine the reliability and psychometric proprieties of Harter's (1982) response format as compared to the most popular and widely used Likert format. The former asks children to choose between two opposite statements (i.e., Some kids...but other kids...), and was introduced by Harter within the Self-Perception Profile for Children (SPPC; Harter, 1985, 2012) to offset children's tendency to give socially desirable responses. In the developmental literature, this format has been used less

frequently than the Likert format presumably because it is time consuming and more demanding in terms of cognitive resources. Although it has been introduced to limit social desirability bias, its validity and differences with respect to other, more direct answer formats such as Likert scales have not yet been investigated with school age children. Here, we used two self-report tools designed to assess attachment in middle childhood, namely the Security Scale (SS; Kerns, Aspelmeier, Gentzler, & Grabill, 2001) and the Experiences in Close Relationships- Revised Child version (ECR-RC; Brenning, Van Petegem, Vanhalst, & Soenens, 2014). These questionnaires are widely used to measure perceived quality of attachment relationships in children aged between 8 and 12 years. Specifically, the SS uses a ‘some/other’ format (Harter, 2012), while the ECR-RC employs a Likert response format. For the purpose of this study, we developed two additional versions of both questionnaires by 1) adapting the original answer format of the SS into a Likert response scale, and 2) adapting the original answer format of the ECR-RC into Harter’s response format. These versions were compared using a Multi-Group Confirmatory Factor Analysis (MG-CFA) approach.

### **Using self-reports in middle childhood**

The developmental period of middle childhood (ranging from 7/8 to 11/12 years) overlaps with Piaget’s operational stage (Piaget, 1958). The latter represents a crucial phase in human development, as it is characterized by prominent changes in cognitive, social, and emotion regulation abilities. During this stage, together with the improvement of language and reading skills, children begin to understand different points of view and temporal relations, and there is a considerable stride in memory retention, abstract thinking, cognitive flexibility, as well as metacognitive skills (Raikes & Thompson, 2005). Despite these advancements, many children still have difficulties with logical forms of sentences (i.e., negative wordings/sentences) and tend to be very literal in the interpretation of items. It is

only after entering the formal operational stage (from 11/12 years onwards) that children develop the ability to think about abstract concepts, and logical negation becomes well-developed. This entails that the child is able to understand a statement and to simultaneously construct its negation. Thus, both stages play a critical role in the ability to understand questions or respond to items involving the choice among more alternatives which, in turn, may impact on children's accuracy of responses (Borgers & Hox, 2000).

Self-reports used in research with school-age children generally employ several types of response formats, including a dichotomous, two-choice format (e.g., yes – no), the Likert scale format (e.g., Not at all like me – Very much like me), Visual analog scales (VAS), Faces Scales, and Harter's format (i.e., 'Some kids...but...Other kids'). However, studies investigating potential differences in the reliability of data obtained using these response formats with children are still scarce. Empirical evidence suggests that item wording, educational level, and cognitive development can result in different levels of reliability (e.g., Borgers et al., 2000; Borgers et al., 2004; Borgers, Leeuw, & Hox, 1999; Marsh, 1986; Pantell & Lewis, 1987). For instance, younger children and children with poor reading skills are less able to respond to negatively worded items (Borgers et al., 2000; Marsh, 1986). To reduce the effect of reading skills, some investigators read the entire questionnaire aloud (Danielson & Phelps, 2003).

Missing data are another common occurrence that deserves attention in the assessment of children through self-reports. Indeed, previous research suggest that younger children produce fewer non-responses to ambiguous response scales compared to older children (e.g., Borgers & Hox, 2001). Although this finding could be interpreted in terms of better data quality, "this counterintuitive effect is likely to be related to children's cognitive-developmental stage. It is assumed that younger children do not recognize the ambiguity of



the response scale, which leads to more, however less reliable, responses” (Fuchs, 2009, p. 1).

Taken together, these studies suggest that although children are valuable informants in referring their own opinion and internal states, the choice of an age-appropriate response format is key to obtain reliable and valid data.

### **Likert versus Harter response format**

In the context of survey research with school age children, Likert scales are the most widely used format. They were introduced to measure attitudes (Likert, 1932), and allow to quantify participants’ choices as opposed to, for example, dichotomous responses. People are asked to report their level of agreement with a series of statements on an ordinal scale, with item response options usually varying between 3 to 7 points. Compared to the abovementioned dichotomous format, this type of scale has the advantage of providing more response options, thereby increasing variability in item distribution. However, mixed opinions coexist concerning the number of scale points to be used in Likert scales when respondents are children. Some studies suggest that scale reliability increases from 2 to 5-points (Lissitz & Green, 1975), although offering too many response options may result in a cognitive overload for young children (Borgers & Hox, 2000). Studies involving school age children have shown that they respond in a similar way to 3- and 5-point scales (Chambers & Johnston, 2002). Borgers and associates recommend offering no more than four to five response options (Borgers, Hox, & Sikkel, 2004; Borgers et al., 2005). It has also been observed that the effect of response order decreases with age (Fuchs, 2004; 2005), that verbal labels are more easily understood than numerical ones (Borgers & Hox, 2000), and that reliability is higher when all points - rather than only the two extremes - are labelled (Borgers & Hox, 2000; Krosnick & Berent, 1993). Moreover, younger children have a stronger tendency to respond by selecting the extreme values of the scale than do older

children and adults (Chambers & Craig, 1998; Chambers & Johnstone, 2002). Despite some investigators have adjusted their scales by reducing the number of response options to facilitate children's comprehension (e.g., Gullone & Taaffe, 2012; Lau & Lee, 2008; Wright & Asmundson, 2003), this tendency does not necessarily depend on the number of choices included in the response array, but rather on the construct that is being measured (Borgers et al., 2004).

Harter's format, also known as the 'some/other' format (Harter, 1982), has been designed to offset children's tendency to give socially desirable responses. This format requires children to read two opposing statements, such as "Some kids worry that their mom does not really love them BUT Other kids are really sure that their mom loves them" (Kerns et al., 1996). After choosing the child that best fits them, participants are asked to indicate whether the description is 'really true' or 'sort of true' for them. Since this response format is less intuitive, it requires more time to explain children how it works and entails them to process more words, therefore potentially increasing the total cognitive burden of the questionnaire. Harter (1982) argues that administration time and cognitive burden involved in this type of answer format are worthwhile, because this format is likely to elicit more accurate self- descriptions on issues in which social desirability pressures might be present: "The effectiveness of this question format lies in the implication that half of the adolescents in the world (or one's reference group) view themselves in one way, whereas the other half view themselves in the opposite manner" (Harter, 2012, p. 5). Therefore, this type of question legitimizes both choices (i.e., 'some/other'), and simultaneously increases the number of response options (i.e., 4-point scale) provided by the typical dichotomous format (Harter, 2012).

Since the SPPC (Harter, 1985, 2012) was introduced, it has been used in many studies of self-concept, including many national surveys that involved adolescents (e.g.,

National Longitudinal Survey of Youth, 1997 Cohort, NLSY:97, Bureau of Labor Statistics, 2005; the 4-H Study of Positive Youth Development, Lerner, von Eye, Lerner, Lewin-Bizan, & Bowers, 2010). Furthermore, Harter's response format was applied to questionnaires assessing other relevant developmental constructs in middle childhood, such as attachment (e.g., Preoccupied and Avoidant Coping Questionnaire, Finnegan, Hodges, & Perry, 1996; Security Scale, Kerns et al., 2001), reporting good psychometric proprieties (e.g., Authors). Yet, the literature on the validity of this format in comparison with the more widely used, 'direct' format (i.e., Likert scale) is extremely sparse. As far as we know, such information is limited to two studies by Yeager and Krosnick (2011, 2012) involving adolescents and adults. Results of both studies suggested that the Harter-type format failed to increase validity and reliability. Indeed, answers to Harter questions reported lower indices in criterion validity than did answers to Likert questions. Thus, the authors concluded that its use should be avoided. However, it should be noted that the studies were conducted with adolescents and adults, thereby questioning the generalizability of their findings to children. Moreover, despite the target items used by the authors covered different constructs (i.e., social relationships, self-esteem, deviant behavior, and academic achievement), they focused their attention on testing differences in terms of criterion validity. Hence, the extent to which this response format may differ from more 'direct' formats (e.g., Likert scale, dichotomous questions) in terms of factor structure in middle childhood is still unclear.

### **The present study**

The current study aimed to examine the reliability of the 'some/other' response format in comparison with the Likert-type format in questionnaires assessing attachment in middle childhood. Within the attachment field, self-reports specifically designed for school age children have been developed following Harter's format (1982), while tools originally

designed for use with adolescents and adults and subsequently adapted for younger children use the Likert format. Here, we focused on two widely used questionnaires designed to measure attachment in middle childhood, namely the Italian versions of the ECR-RC (Authors) and the SS (Authors). The former has a Likert-scale response format, in line with the original scale used with adults (ECR, Fraley, Waller, & Brennan, 2000), whereas the latter has Harter's format (1982). For the purposes of this study, in addition to the existing versions, we developed adapted versions of a) the ERC-RC, by applying Harter's response format, b) the SS, by applying a Likert-type answer format. To compare the two competitive answer formats of both questionnaires, we evaluated the factor structure and internal consistency of the four scales via CFAs, tested factor structure invariance across formats via MG-CFAs, and finally examined the equivalence between the two questionnaires in terms of convergent and concurrent validity.

Because Harter's format is supposed to involve a higher cognitive load, we hypothesized that it would result in less optimal psychometric properties of the adapted ERC-RC and original SS than the two questionnaires in Likert-type format. With regard to convergent validity, since empirical evidence suggests that the quality of attachment relationships in middle childhood is positively related to children's social competence (Groh et al., 2014), this type of validity was examined by testing the associations of the ECR-RC and SS (both original and adapted) with prosocial behavior as reported by teachers using the Strength and Difficulties Questionnaire (SDQ; Goodman, 1997). Specifically, based on previous research on adolescents (see Yeager & Krosnick, 2011), we expected that the Likert-type questionnaires would be more strongly associated with the external measure considered in this study compared to the Harter-type questionnaires.

## Methods

### Participants

Participants attending 3rd and 4th grades were recruited from 22 classrooms of 6 public primary schools in [blinded]. Written informed consent was obtained from 466 families (95.5% of total sample). Eight children were absent on the day of data collection. In addition, children who reported intellectual disabilities or certificated developmental or learning disorders ( $n = 37$ ) and those who were classified as having borderline IQ or lower ( $< 85$ , DSM-IV-TR,  $n = 9$ ) were excluded from subsequent analyses. Two children did not fill out one of the target instruments (i.e., ECR-RC) and thus were not included in statistical analyses. Thus, the final sample consisted of 410 children who were native speakers of Italian (55.3% girls) aged between 8 and 10 years ( $M = 8.8$ ,  $SD = .56$ ). Most children came from high (75.1%) or medium income (23.4%) families as measured via the Family Affluence Scale (FAS, Boyce, Torsheim, Currie, & Zambon, 2006, see measures section for more details).

### Procedure

**Scale adaptation process.** In the adaptation of the ECR-RC (from Likert to Harter format), an opposite statement for each item was formulated following Harter's method (i.e., 'Some kids...but ...Other kids...'). Both statements were then independently evaluated by the three authors to ensure that they reflected the original meaning of the Likert format. Any disagreements were resolved through discussion. Children received the following instructions: "The following statements describe two kinds of kids and the way they feel about themselves in relation to their mom. We are interested in knowing which of these kids is most similar to you. First, choose the child that best fit with you, and then mark the response that corresponds to how you evaluate yourself using 'Somewhat True for Me' or 'Really True for Me'. Please remember that there are no right or wrong answers".

An adapted version of the SS (from Harter to Likert response format) was created by including only one of the two statements used in each of the original Harter-type questions (i.e., Some kids...But Other kids...). This statement was selected independently by the three authors. After checking for agreement, each statement was adapted to a first-person form (e.g., 'I find it easy to trust my mom'). Instructions for the participants were as follows: "Below you find a series of statements concerning your feelings in the relationship with your mom. Please indicate how much each statement is true for you using the following scale: 'Not true at all for me', 'A little true for me', 'Somewhat True for Me' or 'Really True for Me'. Remember there are no right or wrong answers". The adapted versions of both questionnaires (ECR-RC, SS) are included within the Appendix D.

**Data collection.** Data collection took place between April and November 2017. The study is part of a larger project on the socioemotional development of school-age children, which was approved by the Ethics Committee of the School of Psychology at the University of [blinded] (protocol #[blinded]). After receiving approval from the Principal of the participating schools, a letter was sent to children's parents in order to explain the nature of the study and ask for written consent. All children whose parents signed the informed consent form were involved in the study. The latter was obtained from both parents, while verbal assent was obtained from each child prior to data collection. Children completed questionnaires in the classroom and in a single morning session during school hours.

Before the questionnaire booklet was delivered, children were explained that they were free to stop their participation at any time, and that their answers would remain anonymous. The items were read aloud by the researcher to minimize the effect due to differences in reading ability, and the children followed and filled in their responses. Given that children completed the questionnaires collectively, we randomly assigned classes to one of the following four groups: Group 1 (G1;  $n = 102$ ): children who completed the mother

scales of the Italian version of the ECR-RC; Group 2 (G2;  $n = 104$ ): children who completed an ad-hoc Harter-type adapted version of the ECR-RC; Group 3 (G3;  $n = 95$ ): children who completed an Italian version of the SS with Harter's format and the original Likert-type ECR-RC; Group 4 (G4;  $n = 109$ ): children who completed an ad-hoc Likert-type adapted version of the SS and the original ECR-RC.

Children also completed a socio-demographic form asking about their age, gender, and socio-economic status (SES), and the Italian version of the Cattell Culture Free Intelligence Test - Scale 2a (CFIT; Cattell, 1981). Furthermore, the main teacher reported on children's prosocial behavior at school by completing the corresponding subscale included in the Strengths and Difficulties Questionnaire (SDQ, Goodman, 1997; Tobia & Marzocchi, 2017).

All children were thanked for their participation with a certificate of attendance.

### **Measures**

The ECR-RC (Brenning et al., 2014) was originally designed to assess romantic attachment in adults (Busonera, San Martini, Zavattini, & Santona, 2014; Fraley et al., 2000) and has been recently adapted for use with children and adolescents in the context of parent-child relationships. It allows to measure attachment-related anxiety in terms of concern about social support and fear of abandonment and rejection (e.g., 'I worry that my father/ mother does not really love me'), as well as attachment-related avoidance defined as avoidance of intimacy, discomfort with closeness, and self-reliance (e.g., 'I prefer not to tell my father/mother how I feel deep down') separately for mother and father (Brenning et al., 2014). The short version consists of 12 items (6 for anxiety and 6 for avoidance) originally rated on a 7-point scale, ranging from 'completely untrue' to 'completely true'. For each dimension (i.e., anxiety and avoidance), scores across items are averaged to yield an anxiety and an avoidance score, with higher scores indicating a more anxious and avoidant

attachment. Good psychometric proprieties in terms of factor structure, internal consistency, and external validity have been evidenced in the few available studies with school age children (e.g., Brenning et al., 2014), including an Italian sample (Authors). In this study, we focused on the mother form. Given the age of our participants, the Likert version was reduced from 7 to 4 points following recommended guidelines (Borgers et al., 2004).

The SS (Kerns et al., 1996) is the most widely used tool for assessing attachment during late childhood (Bosmans et al., 2015). It was developed to measure perception of security towards mother and father in children aged between 8 and 12 years and provides a continuous dimensional score of 'felt security'. This score reflects the degree to which a child feels that an attachment figure is responsive and available, the child's tendency to rely on this figure in times of stress, and the ease in communicating with this figure (Kerns et al., 1996). The Italian version (Authors) consist of 12 items (the same for mother and father) rated using the above-mentioned Harter (1982) format 'Some kids...but other kids...'. Children are asked to choose the statement that best fits them between the two alternatives, and then to indicate whether it is 'really true' or 'sort of true' for them. Each item is scored on a 4-point scale. Scores across items are averaged to provide a continuous security score, with higher scores indicating a higher level of perceived secure attachment. A recent meta-analytic study (see Brumariu, Madigan, Giuseppone, Abtahi, & Kerns, 2018) found support for its validity in middle childhood and reported good psychometric proprieties in terms of factor structure, internal consistency, external validity, and structural invariance across mother and father items across different countries, including the Italian context (Authors). In this study, children completed the mother-related items of the questionnaire.

The Family Affluence Scale (FAS, Boyce et al., 2006) is a 4-item measure of family wealth (e.g., 'Does your family own a car?'). The sum across items is computed to provide an overall score ranging from 0 to 9, in which scores from 0 to 2 denote low affluence, 3 to



5 medium affluence, and 6 to 9 high affluence. The FAS has provided evidence of validity and reliability across different cultures and countries, including Italy (Vieno, Santinello, Lenzi, Baldassari, & Mirandola, 2009).

The CFIT-Form A (Cattell & Cattell, 1981) is a paper-and-pencil test designed for measuring fluid intelligence in children aged between 8 and 13 years. It consists of 46 multiple-choice items divided into four timed subsets (series – 12 items, classification – 14 items, matrices – 12 items, and topology – 8 items). Each subtest has a specific time constraint (from 2 to 4 minutes). One point was assigned for each correct response. Scores across items are summed to provide a total raw score ranging from 1 to 46, which is subsequently computed in a standardized IQ score. The CFIT has been shown to have a good internal consistency and test-retest reliability (Cattell & Cattell, 1987).

The SDQ (Goodman, 1997) is a widely used screening questionnaire designed to measure emotional and behavioral problems in children and adolescents. It consists of 25 items distributed across five scales: Emotional Symptoms, Conduct Problems, Hyperactivity-Inattention, Peer Problems, and Prosocial Behavior. Items are rated on a three-point Likert scale and are summed to yield five component scores (one for each subscale). Higher scores on the Prosocial Behavior subscale indicate a strength, while high scores on the other four subscales indicate difficulties. For this study, the Prosocial Behavior subscale was considered. The questionnaire has been widely used across different societies, including Italy (Tobia & Marzocchi, 2017), and in both clinical and non-clinical settings.

### **Analytic approach**

All analyses were performed in R (R Development Core team, 2017). The following procedure was used.

**Preliminary analyses.** First, we conducted preliminary analyses to evaluate differences in terms of gender and grade distribution between groups who completed the

same questionnaire (G1 vs G2 and G3 vs G4) using the Chi-square test. Furthermore, we tested differences in SES and IQ using independent sample *t*-tests.

**Descriptive statistics.** Item response distributions and descriptive statistics (mean, standard deviation, skewness) of the target questionnaires (i.e., ECR-RC and SS) were presented and analyzed separately for the two response formats (i.e., Harter vs. Likert).

**Factor structure and invariance across format.** To test the psychometric proprieties of the two response formats (factor structure, invariance and external validity), data analyses were carried out following three steps.

In the first step, the factor structure of the two competitive formats (Harter vs Likert: ECR-RC, G1 and G2; SS, G3 and G4) was tested separately for each group by performing CFAs (see Beaujean, 2014 for the procedure in R). The Robust Diagonally Weighted Least Squares Mean and Variance (WLSMV) estimator specifically designed for ordinal data was used (Brown, 2006; Rhemtulla, Brosseau-Liard, & Savalei, 2012), and missing data (which were less than 1%) were handled with the pairwise maximum likelihood (PML) estimation method for factor analytic models with ordinal data available in the R package lavaan (Rosseel, 2012).

A series of goodness-of-fit indices were computed in order to evaluate model fit: the chi-square to degrees of freedom ratio ( $\chi^2/df$ ), the Comparative Fit Index (CFI), the Tucker Lewis index (TLI), the Root Mean Square Error of Approximation (RMSEA) and the standardized root mean square residual (SRMR). Cut-off values for fit were considered acceptable if  $\chi^2/df$  was less than 3, CFI and TLI were higher than .95, RMSEA was less than .08, and SRMR was less than .10 (Schermelleh-Engel, Moosbrugger, & Muller, 2003).

Additionally, we evaluated the weight of the factor loadings as well as its statistical significance ( $p < .05$ ). Internal consistency was evaluated for both formats by computing Polychoric Cronbach alphas and McDonald's Omegas.

In the second step, we tested measurement invariance of the two formats by performing MG-CFAs (i.e., G1 vs G2 and G3 vs G4). First, we tested configural invariance by allowing all structural parameters to remain free; then, we simultaneously tested metric and scalar invariance by constraining factor loadings and thresholds to be equal across groups (Muthén & Muthén, 2010). If metric and scalar invariance hold, it implies that the meaning of the constructs (the factor loadings) and the levels of the underlying items (thresholds) can be assumed to be equal in both groups. In our specific metric and scalar invariance, this would lend support to the hypothesis that the latent constructs may be operationalized the same way across the same items, despite the latter are based on different types of response formats. Delta CFI was computed between the two most proximal models (i.e., configural vs. strong). Cut-off values of CFI ( $\Delta$ CFI) should be less than or equal to 0.01, and RMSEA ( $\Delta$ RMSEA) less than or equal to .015 (Cheung & Resvold, 2002). Internal consistency reliability was inspected by calculating polychoric alpha coefficients.

Third, we assessed external validity (i.e., convergent and concurrent validity) of the two response formats by adopting a Structural Equation Model (SEM) approach. In particular, convergent validity of the two questionnaires (ECR-RC, G1: Harter format, G2: Likert format; SS, G3: Harter format, G4: Likert format) was assessed by performing two Structural Equation Models (SEM) to evaluate the extent to which each latent attachment dimension (i.e., ECR-RC: anxiety and avoidance; SS: felt security) was linked to the latent prosocial behavior score (as measured via the SDQ). Using the same procedure, we tested concurrent validity by evaluating the pattern of associations of the latent SS scores (i.e., G3: Harter format; G4: Likert format) and the latent anxiety and avoidance scores as assessed via the original ECR-RC.

## Results

**Preliminary analyses.** Chi-square tests supported the assumption that G1 and G2 did not differ with respect to gender distribution ( $\chi^2(1, 206) = .016, p = .90$ , Cramer's phi = .009) or grade composition ( $\chi^2(1, 206) = 2.4232, p = .120$ , Cramer's phi = .108). Additionally, independent samples *t*-tests showed that the two groups did not differ in terms of IQ ( $t(204) = .477, p = .634$  Cohen's  $d = .067$ ) or SES ( $t(203) = -1.350, p = .179$ , Cohen's  $d = .189$ ).

Similarly, preliminary analyses comparing G3 and G4 supported homogeneity in terms of gender distribution ( $\chi^2(1, 204) = 1.548, p = .213$ , Cramer's phi = .087) and grade composition ( $\chi^2(1, 204) = .995, p = .319$ , Cramer's phi = .069). Independent-samples *t*-tests also indicated that the two groups of children did not differ in terms of IQ ( $t(202) = -1.855, p = .065$ , Cohen's  $d = .260$ ). However, children who completed the adapted SS Likert-questionnaire (G4) reported lower SES scores ( $t(201) = -2.1789, p = .031$ , Cohen's  $d = .307$ ) than their Harter-type counterparts (G3).

**Descriptive statistics.** Figure 1 shows the item response distributions for the ECR-RC by response format (i.e., Likert vs. Harter). Overall, in both questionnaires there was a high percentage of children who consistently scored in the first category of response (i.e., '1- not agree'), resulting in a positive skew. Item response distributions by response format for the SS are depicted in Figure 2. The majority of items in both formats showed a negative skew.

The percentage of non-responses per item was very low in both questionnaires and formats (< .01%). Thus, none of the ECR-RC or SS items were problematic with respect to each response format. Further descriptive statistics for both questionnaires by format are reported in Table A8 and Table A9 in the Appendix D.

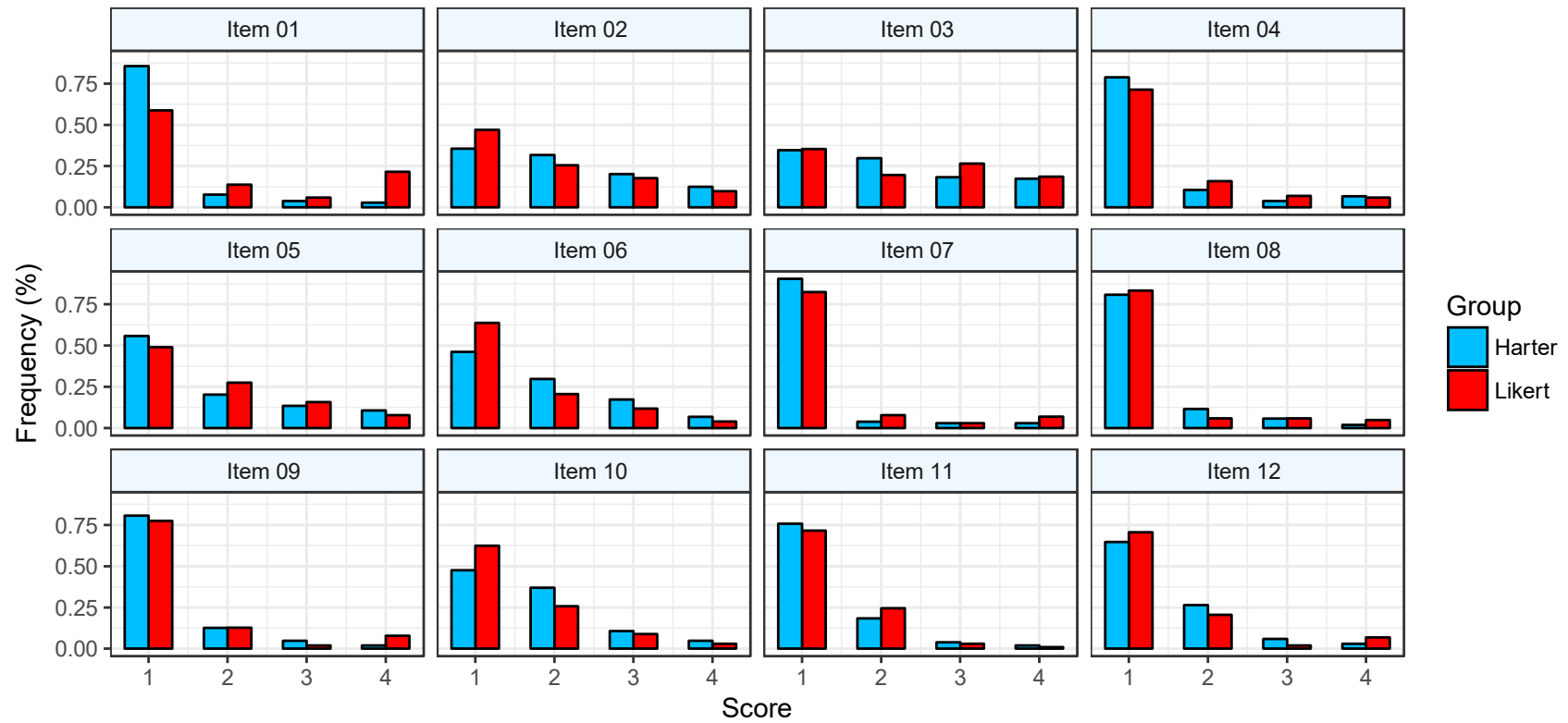


Figure 1. Response distributions of Experience of Close Relationships Revised Child version SS for response formats. Note. Harter (G1):  $n = 104$ ; Likert (G2):  $n = 102$ .

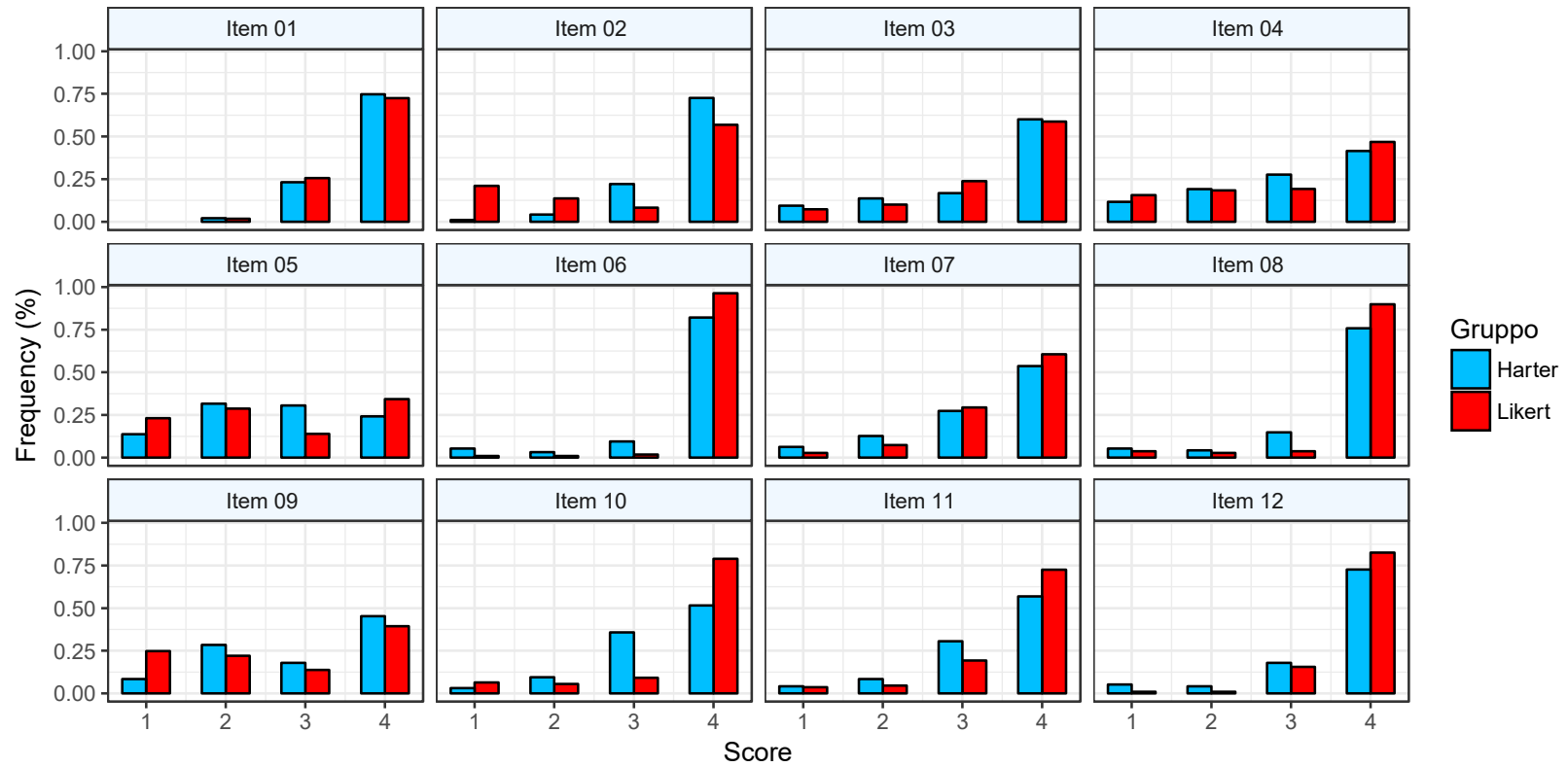


Figure 2. Response distributions of Security Scale for response formats. Note. Harter (G1):  $n = 95$ ; Likert (G2):  $n = 109$

**Factor structure and invariance across format.** The goodness of fit of the models estimated on the ECR-RC (i.e., G1 and G2) yielded good fit indices for both Likert and Harter-type versions (see Table 1). However, while all paths across items were significant in Harter's format (all  $p$ s < .001), one item (item 1) was marginally extraneous to the factor structure ( $p = .052$ ) in the Likert format. Factor loadings along with the two-competitive response formats appear in Table 2. Polychoric Cronbach's alphas for anxiety-related attachment dimensions were .78 (95% CI [.85 – .92]) and .79 (95% CI [.85 – .92]) for Likert and Harter's format, whereas McDonald's Omegas were .78 (95% CI [.64 – .90]) and .64 (95% CI [.57 – .77]) for Likert and Harter formats, respectively. With regard to the avoidant attachment dimension, polychoric Alphas reached the same coefficient for both Likert ( $\alpha = .69$ , 95% CI [.68 – .82]) and Harter formats ( $\alpha = .69$  [95% CI .68 – .83]), while McDonald's Omegas were .69 (95% CI [.57 – .77]) and .66 (95% CI [.53 – .77]) for Likert and Harter's format, respectively. With regard to the SS (G3 and G4), the goodness of-fit indices of the models are presented in Table 1. With the exception of RMSEA, the majority of considered indices for the Likert model ranged from acceptable to good. However, findings pointed to a slightly better fit to the data for Harter's format, with an excellent fit in all of the considered indices. Of interest, the factor analytic results were quite similar for the two response formats, and all paths were significant in both models. Table 3 shows the factor loadings by response format. Polychoric alpha coefficients (Harter: .83, 95% CI [.77 – .88]; Likert: .84, 95% CI [.79 – .88]) as well as Omega coefficients (Likert:  $\omega = .73$ , 95% CI [.61 – .80] and Harter:  $\omega = .72$ , 95% CI [.63 – .81]) were quite similar across formats. To evaluate the degree of measurement invariance (e.g., equal factor loadings, thresholds) between answer formats, we used MG-CFAs. Results for the ECR-RC supported configural invariance (without parameter restrictions) of the two competitive formats, suggesting that the factor structure was similar between the Likert and Harter forms.

Table 1

*Fit indices of the confirmatory factor models of the ECR-RC and SS for both response formats*

	$\chi^2$	<i>df</i>	<i>p</i>	$\chi^2/df$	<i>CFI</i>	<i>TLI</i>	<i>SRMR</i>	<i>RMSEA [90% CI]</i>	$\Delta$ CFI	$\Delta$ RMSEAI
<b>ECR-RC (from Likert to Harter)</b>										
G1 (Harter)	74.484	53	.027	1.405	.981	.977	.147	.063 [.000 – .075]		
G2 (Likert)	60.108	53	.234	1.134	.983	.978	.120	.036 [.000 – .075]		
<i>Multi-group Confirmatory Factor Analyses</i>										
Configural invariance	134.592	106	.032	1.270	.982	.977	.134	.051 [.016 – .076]		
Metric and scalar invariance	172.912	140	.031	1.235	.979	.980	.140	.048 [.016 – .070]	– .003	– .003
<b>SS (from Harter to Likert)</b>										
G3 (Harter)	45.288	54	.795	0.837	1.00	1.024	.097	.000 [.000 – .044]		
G4 (Likert)	57.432	54	.349	1.064	.992	.990	.142	.024 [.000 – .067]		
<i>Multi-group Confirmatory Factor Analyses</i>										
Configural invariance	102.720	108	.625	0.951	1.00	1.008	.121	.000 [.000 – .045]		
Metric and scalar invariance	158.218	142	.167	1.114	.981	.982	.132	.034 [.000 – .060]	– .019	.034

*Note.* G1:  $n = 104$ ; G2:  $n = 102$ ; G3,  $n = 95$ ; G4,  $n = 109$ .  $\chi^2$  = chi-square; CFI = Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation;  $\Delta$  CFI = difference among CFIs.



Table 2

*Standardized factor loadings of the ECR-RC across response formats (Harter vs Likert)*

	Harter*		Likert	
	Standardized Loading	SE	Standardized Loading	SE
<i>Anxiety</i>				
Item 1	.809	.086	.261	.135
Item 5	.628	.088	.352	.105
Item 7	.752	.100	.795	.081
Item 8	.789	.063	.788	.107
Item 9	.868	.049	.693	.111
Item 12	.861	.048	.737	.078
<i>Avoidance</i>				
Item 2	.823	.062	.594	.106
Item 3	.536	.089	.545	.108
Item 4	.451	.140	.628	.119
Item 6	.782	.058	.725	.093
Item 10	.661	.081	.642	.084
Item 11	.379	.106	.424	.138

*Note.* Harter's format,  $n = 104$ ; Likert format,  $n = 102$ . All factor loadings were significant at the 5% level, except for item 1 in Likert format ( $p = .052$ ).

\* Adapted version

Table 3

*Standardized factor loadings of the SS across response formats (Harter vs Likert)*

	Harter		Likert*	
	Standardized Loading	SE	Standardized Loading	SE
Item 1	.631	.108	.619	.098
Item 2	.574	.126	.619	.117
Item 3	.564	.105	.526	.101
Item 4	.617	.076	.616	.107
Item 5	.270	.121	.485	.097
Item 6	.597	.123	.915	.168
Item 7	.807	.059	.764	.087
Item 8	.286	.144	.244	.188
Item 9	.670	.084	.206	.114
Item 10	.623	.076	.646	.091
Item 11	.328	.131	.683	.063
Item 12	.463	.125	.815	.110

*Note.* Harter's format,  $n = 95$ ; Likert format,  $n = 109$ . All factor loadings were significant at the 5% level.

\* Adapted version

Hence, in the subsequent step we held loadings and thresholds invariant across G1 and G2. Results showed that all the considered fit indexes achieved a good fit, and both  $\Delta$ RMSEA and  $\Delta$ CFI were lower than the recommended cut-off values (.003), suggesting that metric and scalar invariance were supported.

MG analyses also supported configural invariance between the two forms of the SS (i.e., Harter and Likert), yielding a good fit in all the considered indexes. Nevertheless, when loadings and thresholds were constrained to be equal across formats (i.e., metric and scalar invariance), although all fit indexes reached an acceptable fit,  $\Delta$ RMSEA and  $\Delta$ CFI slightly exceeded the recommended values (see Table 1). Thus, the results failed to provide evidence for metric and scalar invariance.

Convergent validity of the two answers format was evaluated by testing the extent to which each latent attachment dimension (G1 and G2: anxiety and avoidance; G3 and G4: felt security) was associated with the latent prosocial behavior score.

As can be seen in Table 4, no significant associations were found between the two attachment-related dimensions assessed via the ECR-RC forms (G1: Harter; G2: Likert) and teacher-reported prosocial behavior (see Table 4). Regarding the SS, a similar pattern of associations was found in the two groups (i.e., G3: Harter; G4: Likert). Specifically, in both Harter and Likert-type formats, felt security toward mother was significantly and positively associated with prosocial behavior as reported by teachers (see Table 4).

With regard to concurrent validity, felt security (measured via the Harter- and Likert-type versions of the SS) was negatively associated with attachment avoidance (i.e., G3, Harter =  $-.653$  and G4, Likert =  $-.997$ , respectively) and anxiety (i.e., G3, Harter =  $-.560$  and G4, Likert =  $-.680$ , respectively) as assessed via the original ECR-RC.

Table 4

*Associations of anxiety, avoidance, and felt security to prosocial behavior*

	Response format	
	Harter	Likert
Anxiety (ECR-RC)	– .067	– .168
Avoidance (ECR-RC)	– .043	– .121
Felt security (SS)	.495***	.277**

\*\* $p < .01$ ; \*\*\* $p < .001$ . ECR-RC = Experience of Close Relationships Revised Child version. Harter:  $n = 104$ , Likert:  $n = 102$ ; SS = Security Scale, Harter:  $n = 95$ ; Likert:  $n = 109$ .

### Discussion

Over the last 20 years, the development and use of self-report measures with young children has greatly increased in both research and clinical contexts. Indeed, children have been recognized as reliable informants who are able to provide valid information about themselves. This conclusion is corroborated by research demonstrating that exclusive reliance on adult reports may, for example, underestimate children's feelings of worry and anxiety (Lagattuta, Sayfan, & Bamford, 2012). Furthermore, knowledge of children's point of view is essential because young participants "have a right to be intimately involved in the decisions being made about them" (Sturgess, Rodger, & Ozanne, 2002, p. 109). In this perspective, the choice of a specific answer format (e.g., number of scale points, response format) plays a critical role in ensuring the quality of collected data to accurately reflect children's attitudes, feelings, or behaviors. The present study is among the first to directly compare the validity of Harter versus Likert response formats as applied to the same questionnaires designed for school-aged children. Indeed, although previous research has

explored the validity of Harter's format and differences between the two competitive answer formats, these studies were based on adolescent and adult samples and can therefore not be generalized to younger children. Another important contribution of this study is the use of MG-CFA to examine whether latent constructs may be operationalized in the same way across the same items with different types of response formats, thereby allowing a fine-grained comparison from a multivariate perspective. Here, we used two well-known questionnaires for measuring attachment in middle childhood, namely the SS (original version with Harter's format, adapted version with Likert scale) and the ECR-RC (original version with Likert scale, adapted version with Harter's format).

With regard to the factor structure of both questionnaires, CFAs were conducted separately for each response format. Overall, the results supported good psychometric properties for both Likert and Harter formats of the two questionnaires. Yet, when we tested for equivalence, the results of MG-CFAs suggested that scalar invariance was supported only for the ECR-RC. With regard to the SS, contrary to our expectations, Harter's format reached slightly better fit indices than the competitive Likert format. Subsequent MG-CFAs provided support only for configural invariance, while evidence for strong invariance (i.e., metric and scalar) was not found. Indeed, differences in RMSEA and CFI values between proximal models (configural vs strong) exceeded the recommended values. Thus, it appears that the validity of response formats depends — at least in part — on the type of questions asked to measure attachment in children. In particular, this pattern of results suggests that there is no 'gold standard' in terms of answer format to be used in attachment questionnaires for school-age children; rather, it depends on the conceptualization of the construct to be assessed, and on the types of questions/items used to evaluate such construct. However, further investigations are needed to ascertain whether the validity of response formats depends on content-related aspects (e.g., operationalization of underlying attachment

dimensions), or if it is affected by the adaptation process itself (i.e., conversion from Likert to Harter format, and viceversa).

In terms of convergent validity, our findings indicated that both formats met the theoretical expectation that the parent-child relationship represents the foundation for children's social development (Bretherton, 1987). Specifically, secure children are more socially competent, more accepted by peers, and report higher levels of positive and trustful interactions with others when compared with insecure children (Kerns, Klepac, & Cole, 1996; Sroufe, 2005). Consistent with this well-recognized pattern, a significant and positive association between perceived attachment security and teacher-rated prosocial behavior was found for both forms of the SS (G3 and G4). Secure children have internalized a model in which distress is being met with care ("secure base script", Waters & Waters, 2006), and others are expected to be responsive and generally well-intentioned (Waters & Waters, 2006). These representations likely support children's prosocial behavior by providing a bearing for how others' needs might be addressed, and by promoting the motivation to meet their needs as individuals worthy of care (Gross, Stern, Brett, & Cassidy, 2017).

We did not find, however, any significant association between the avoidance and anxiety dimensions as assessed via the two ECR-RC forms (i.e., Harter and Likert) and prosocial behavior. This finding can be interpreted in light of the concerns raised by Fraley et al. (2000) about the capability of the ECR-R for adults to sufficiently capture the security region of attachment and does not seem to be related to response format. Thus, further studies are warranted to evaluate whether the measurement of security in association with the assessment of anxiety and avoidance might be of particular added value to capture the construct of attachment in middle childhood, especially in relation to positive outcomes. Furthermore, it may be useful to sample children at risk for developing insecure attachment

to evaluate whether one of the two response formats is more sensitive in capturing insecurity in middle-childhood (i.e., discriminant validity).

In relation to concurrent validity, in line with previous studies (e.g., Brenning et al., 2011), latent correlations showed strong negative correlations between felt security (as measured by the SS) and the avoidance and anxiety dimensions (as assessed via the ECR-RC) in both response formats. This finding is consistent with a continuous-dimensional approach (Brennan, Clark, & Shaver, 1998), which suggests that individual differences in attachment can be represented along two fundamental attachment-related dimensions, namely anxiety and avoidance. In line with this approach, secure attachment is the result of low anxiety and low avoidance in the child's relationship with parents. Of interest, these associations were more evident for the Likert format, especially in relation to the avoidance subscale. Future investigations may address whether this finding is due to an increased validity of response for the Likert-type format, or rather to the homogeneity of answer formats (i.e., both questionnaires with Likert scales).

Taken together, our findings support the use of both Harter and Likert answer formats in terms of psychometric properties, convergent validity with another self-report measure assessing attachment-related dimensions, and concurrent validity. Contrary to previous studies with adolescent and adult samples (Yeager & Krosnick, 2011, 2012), the results do not allow to establish the prominence of one of the two competitive answer types in middle childhood. Perhaps Harter's format might be particularly suitable for young children for whom it was specifically designed. Indeed, based on the cognitive development literature, younger children primarily think in a dichotomous way (Gelman & Baillargeon, 1983). Thus, responding to Harter's format - which basically consists of two dichotomous questions - may facilitate the answer process without compromising the reliability of the questionnaire. Furthermore, the absence of a negative form (e.g., 'false' or 'not like me')

could be an advantage in this regard. Indeed, younger children may find it difficult to understand and respond to negatively worded items (Marsh, 1986). However, since Harter's format might induce higher cognitive load, following the author's suggestion it is advisable to read all items aloud to younger children (3rd and 4th graders) or to children with particular reading or comprehension difficulties.

Despite its relevant contribution to the literature on the use of self-reports with children, our study has limitations that need to be acknowledged. First, our comparison was limited to attachment questionnaires. Future studies might use a broader range of items assessing other psychological constructs to evaluate if these results are limited to the attachment field, or if they can be generalized to the measurement of other constructs in middle childhood. Second, given the relatively small sample size in each group of children, replication with larger samples is warranted to allow greater confidence in the generalizability of results and to test invariance across response formats and ages. A third limitation is the exclusive reliance on self-report questionnaires to establish concurrent and convergent validity. Further research may include other assessment methods (e.g., interviews, behavior observations) to obtain a more comprehensive picture of children's consistency of responses across direct and indirect measurement tools. Lastly, further studies might consider other domains (e.g., academic achievement, externalizing behavior) for which the reliability and accuracy of children's answers can be verified by means of additional informants (e.g., parents, teachers).

To conclude, our data indicate that Likert and Harter-type response formats exhibit comparable reliability and validity across the two most widely used attachment questionnaires in school-age children, although a slight superiority of Harter's format was found for the SS. From an applied perspective, the current study suggests that the same measures might be used in both formats based on the context. Given the relatively lower



cognitive load required to answer Likert-type items, the latter may be more appropriate in research contexts in which the questionnaire is part of a larger assessment battery to minimize children's fatigue. In clinical settings, where social desirability is recognized as a relevant issue within the professional-child relationship, the Harter-type format might be more suitable to reduce this potential source of bias by making children feel more comfortable in expressing their own emotional experience. Because Harter's format carries an 'impersonal structure', it might facilitate children's sharing of their internal states, which are particularly difficult to report during this developmental period.



## **CHAPTER 6**

**Development and psychometric properties of a new self-report**

**measure of attachment for school age children:**

**The Attachment in Middle Childhood Questionnaire (AMCQ)**

*Manuscript in preparation*



### Abstract

Although the quality of attachment relationships is essential for psychological adjustment across the life-span, few self-report measures exist to assess attachment in middle childhood. In three separate, but interrelated studies, we describe the development and psychometric properties of the Attachment in Middle Childhood Questionnaire (AMCQ), a new tool designed to measure perceived attachment toward mother and father in Italian children aged between 8 and 12 years. Using a pool of 30 items drawn from extant self-report questionnaires, in Study 1 ( $N = 111$ ;  $M_{age} = 8.93$  yrs, 55% girls) we performed Exploratory Factor Analysis to assess item dimensionality, and retained 21 items. In Study 2 ( $N = 234$ ;  $M_{age} = 9.2$  yrs, 50 % girls), a series of Confirmatory Factor Analyses were used to further define the dimensionality of the instrument and reduce the number of items. In Study 3 ( $N = 727$ ;  $M_{age} = 10.5$  yrs, 50.6 % girls), we investigated the psychometric properties of the resulting measure in terms of factor structure, invariance across age and gender, and concurrent and convergent validity. The questionnaire comprised two dimensions, i.e., anxiety (5 items) and avoidance (5 items), as well as a supplementary scale assessing perceived security (5 items). Results provided evidence for the factorial validity and invariance of the AMCQ across gender and age; concurrent and convergent validity were also supported. Overall, the AMCQ is a promising tool to assess attachment in school aged children in the Italian context. Future research may explore its psychometric properties in other countries to establish cross-cultural invariance and increase the generalizability of results.

**Keywords:** Attachment in Middle Childhood Questionnaire; psychometric properties; invariance; middle childhood

Bowlby (1969) conceptualized the attachment tie as an enduring emotional bond that children develop during the first years of life. According to his theory, individual differences in the quality of parent-child attachment relationships likely affect how children interact and adapt within social contexts throughout the life span (Bowlby, 1969, 1982). Although early research on attachment primarily focused on infancy and early childhood, subsequent studies underscored the importance of other developmental periods, such as adolescence and adulthood, emphasizing the protective role of secure attachment for socio-emotional adjustment beyond infancy (see Cassidy & Shaver, 2016).

In this paper we focus on middle childhood, an important, but still overlooked developmental period which involves substantial changes in the cognitive, social, and emotional domains (Raikes & Thompson, 2005), rendering attachment representations more elaborate and organized (Kerns & Brumariu, 2016). In this period, the emphasis of the attachment system shifts from proximity to psychological availability, and the perception of security is mostly maintained by the accessibility of the attachment figure and his or her responsiveness to the child's needs (Kerns et al., 2006; Lieberman, Doyle, & Markiewicz, 1999). As children become increasingly independent and self-aware, and as they begin to be involved in new social contexts outside the family, the attachment system is tested by longer separations. Although parents remain the preferred figures for assistance in coping with significant stressful events, children begin to partially withdraw their investment in their primary caregivers and direct their attachment-related behaviors to new figures beyond parents, such as friends (Mayseless, 2005).

Despite there is evidence that attachment in middle childhood is related to a number of positive and negative developmental outcomes (Madigan, Brumariu, Villani, Atkinson, Lyons-Ruth, 2016; Kerns, 2017) relative few studies investigated how the quality of attachment affects developmental outcomes in this in-between developmental phase. This

lack of data is partially due to the challenge of measuring attachment beyond infancy when multiple figures, together with the maternal primary caregiver (e.g. father and friends), may become of relevance, thus resulting in a limited availability of extensively validated and reliable measures to assess attachment in late childhood (Kerns, Schlegelmilch, Morgan, Abraham, 2005; Steele, Steele, 2005). Furthermore, inconsistent results are often reported regarding the validity and reliability of the existing measure and concerns has been raised concerning their ability to sufficiently capture the security dimension of attachment.

Building on extant self-report measures, the current study aimed to develop a more comprehensive and lower time-consuming tool to assess the quality of child-mother and child-father relationships in middle childhood, and to test its psychometric properties in Italian school-age children.

### **Attachment and socio-emotional adjustment in middle childhood**

Compared to infancy and adulthood, the study of attachment in middle childhood is a relatively new field in attachment research. However, there is broad consensus that the quality of attachment plays a key role in children's social and emotional adjustment beyond infancy (Groh et al., 2014; Booth-Laforce et al., 2006; Boldt, Kochanska, Grekin, & Brock, 2016). Secure children are more socially competent, show more prosocial behaviors (Waters & Waters, 2006), are more accepted by peers, and are more likely to seek support from others (Kerns, 2008). For instance, a study by Ziv and colleagues (2004) found that the main feature distinguishing secure from insecure-ambivalent children was the degree of expectation that others were available both emotionally and instrumentally (Ziv et al., 2004). Other studies (e.g., Brenning et al., 2012) also found that the dimensions of anxiety and avoidance were differentially related to the predominant emotion regulation (ER) strategies used by school-age children. Secure attachment is marked by flexible thought about emotion-eliciting events and a greater ability to reframe situations in a reality-based

manner (Mikulincer, 1998). In contrast, hyperactivating ER strategies, such as hypervigilance are more likely to be observed in ambivalent/anxious children whereas attachment-avoidant children are more likely to deactivate (minimize) ER strategies by suppressing emotion-related thoughts and the expression of emotions (Cassidy, 1994; Mikulincer & Shaver, 2007). Importantly, such strategies may lead individuals to become more vulnerable to several emotional problems (Mikulincer, Shaver, & Pereg, 2003). In particular, while hyperactivation may be harmful because it involves a selective and narrow focus on specific emotions (e.g., sadness), deactivation may be disabling because the frequent reliance on this strategy may impair the capacity to form consistent processes for regulating emotions when deactivation is not an option (Cicchetti et al., 1995).

In recent research, Gross's (1998) process-oriented model was applied in relation to attachment style in middle childhood. Among antecedent-focused strategies, cognitive reappraisal (CR) involves reinterpreting an emotion-eliciting event in order to change its emotional impact, while among response-focused strategies, expressive suppression (ES) involves actively inhibiting the expression of an emotion (Gross & Thompson, 2007). Less use of CR is observed with higher levels of avoidance in adults (Poncy, 2017) and in school-age children (Marci et al., manuscript in preparation), whereas an increase of such strategies was observed in association with a higher level of security in adolescents (Gresham & Gullone, 2012). Furthermore, consistent with Shaver and Mikulincer's (2002) model, avoidant children have been found to use more ES strategies.

In relation to problem behaviors, studies have been conducted to investigate the quality of attachment and its association with internalizing and externalizing behaviors in middle childhood (e.g., Fearon, et al., 2010; Groh, et al., 2012). Meta-analytic data (e.g., Fearon et al., 2010) revealed that insecure attachment was more strongly associated with problem behavior than secure attachment. Particularly, a few studies found that



preoccupied/anxious children tend to internalize problems, while avoidant children are more prone to externalize problems. However, this association seems to be more marked in boys than in girls. Furthermore, recent research on middle childhood and adolescence found that high scores in attachment anxiety were associated with several indicators of externalizing problems and preoccupied attachment toward the mother (Allen et al., 2002; Marci, et al., 2018, manuscript in preparation). Allen and colleagues interpreted these results as related to the increase in autonomy, which may be particularly threatening for preoccupied adolescents, who therefore may exhibit increased behavioral problems at this age.

The few studies investigating the relationship between quality of attachment toward father and problematic behavior showed that the quality of child-father attachment is particularly salient in predicting children's internalizing problems (Brumariu & Kerns, 2010; Desjardins & Leadbeater, 2011).

Although increasing research efforts have been directed to filling the knowledge gap concerning the correlates of attachment in middle childhood, studies mostly rely on different measures with diverse theoretical frameworks. Therefore, the results of these studies are often not comparable, and the associations among attachment, contextual vulnerability factors, and later behavior remain a prominent challenge in the field.

### **Measuring Attachment in Middle Childhood**

The growing interest in attachment representations in middle childhood has stimulated the development of several instruments that rely on different theoretical and methodological approaches, such as self-report questionnaires, semi-structured interviews, and projective techniques (Dwyer, 2005; Kerns et al., 2017). Self-reports represent an easy-to-administer, relatively inexpensive, and efficient tool to capture the consciously accessible aspects of attachment, and are the most commonly used measures with children and adolescents. Table 1 provides an overview of the four questionnaires currently available to

measure perceived quality of attachment relationships in children aged between 8 and 12 years, as well as the factors they are designed to assess.

Table 1

*Self-report questionnaires available to measure attachment representation in children aged between 8 and 12 years.*

<b>Questionnaires</b>	<b>Factors</b>	<b>Number of items</b>
Security Scale	Security	15 items
Experiences in Close Relationships Scale – Revised Child version (CR-RC; Brenning et al., 2014; Marci et al., 2018)	Avoidance Anxiety	36 items 12 items (short-form)
Preoccupied and Avoidant Coping Questionnaire (PACQ; Finnegan, et al., 1996)	Avoidance Preoccupation	36 items 20 items (short-form)
Inventory of Parent and Peer Attachment (IPPA, Armsden & Greenberg, 1989; Gullone & Robinson, 2005)	Trust Communication Alienation	25 items

Briefly, the Security Scale (SS; Kerns et al., 1996) and the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987; Pace, San Martini, & Zavattini, 2011) provide continuous measures of felt security versus insecurity, whereas the Experiences in Close Relationships–Revised Child version (ECR-RC; Brenning et al., 2014, Marci et al., 2018) and the Preoccupied and Avoidant Coping Questionnaire (PACQ; Finnegan, et al., 1996) tap specific insecurity dimensions, namely preoccupation and avoidance and anxiety and avoidance, respectively.

Despite their widespread use in both developmental and clinical research, information concerning the psychometric properties of these questionnaires is extremely limited. Furthermore, some of these measures exhibit modest intercorrelations (Kerns et al., 1996). For example, previous studies found moderate to high associations between the

avoidance subscales of the PACQ and the ECR-RC, but no associations between the preoccupied and anxious subscales (Brenning et al., 2011; Marci et al., manuscript in preparation). Some studies also reported a counterintuitive positive association between the PACQ preoccupied coping subscale and the SS felt security score (Kerns, et al., 2000; Marci, Lionetti, Moscardino, Calvo, & Altoè, 2018). The most recent version of the PACQ (Younger et al., 2005) contains a third explicit subscale of secure attachment, which includes 10 of the 15 items derived from the SS (Kerns et al., 2001). In contrast, the ECR-RC assumes that secure attachment is revealed by low scores in both attachment anxiety and avoidance, and therefore does not include a separate scale for secure attachment. Yet, whether the measurement of security in association with the assessment of anxiety and avoidance could be of value in capturing the construct of attachment in middle childhood is still under debate. To our knowledge, only one previous study has focused on this issue (Brenning et al., 2011), indicating that the assessment of security via the SS — in combination with anxiety and avoidance measured using the ECR-RC — did not provide an additional contribution to the assessment of child attachment.

In sum, the assessment of attachment in middle childhood remains a challenge in the field. Given the crucial role of perceived attachment security and insecurity toward mother and father in this particular developmental stage, which paves the way for subsequent adaptation, developing a high-quality measure to assess and monitor attachment representations in middle childhood is paramount to inform both theory and practice.

### **The present study**

The current study builds on existing measures of attachment to develop a new questionnaire for the assessment of perceived quality of attachment toward mother and father in middle childhood. Specifically, we were interested in including items able to

capture children's perceptions of the responsiveness and availability of attachment figures, as well as anxiety and avoidance within child-mother and child-father relationships. In doing so, we also addressed conceptual issues related to the theoretical structure of attachment representations in middle-to-late childhood.

We conducted three interrelated studies involving three independent samples of children attending primary schools in Italy. In Study 1, we explored the dimensionality of the first pool of 30 items selected from existing self-report measures by performing an exploratory factor analysis (EFA). Among redundant items in terms of content, those with higher factor loading were selected for use in the subsequent step.

In Study 2, through a semi-confirmatory approach, we defined the dimensionality of the instrument by performing confirmatory factor analysis (CFA) on the remaining items. In particular, we specified a measurement model that included the factors derived from Study 1 and in which the items were loaded on their respective factors. The selection of items was based on a step-by-step procedure in which the items were selected based on factor loadings on their respective factors and weak cross-loadings. The conceptual questions in Study 1 and Study 2 were focused on the dimensionality of perceived relationships. In particular, we started by testing a global dimension (i.e., one-dimensional model) with the assumption that attachment is best represented by a single factor (i.e., one-factor measure, namely security versus insecurity). The second model differentiated between two dimensions of attachment. This model assumed that attachment is best represented by two separate factors, namely anxiety and avoidance (Brenning et al., 2014). The third model included a third factor, "felt security," assumed consistent improvement in the assessment of attachment in middle childhood as happens with other questionnaires (Younger et al., 2005).

In Study 3, we adopted a confirmatory approach to examine the psychometric properties of the final pool of items by testing its factor structure, internal consistency,

invariance across age and gender, as well as concurrent and convergent validity using an independent sample of children. Consistent with previous research, we expected that the new questionnaire would be three-dimensional (Finnegan et al., 1999; Lionetti et al., 2017). With regard to invariance, we anticipated that the questionnaire would assess aspects of attachment in the context of child-mother and child-father relationships similarly in both boys and girls (Marci et al., manuscript in preparation), and in younger and older children (Brenning et al., 2014; Marci et al., 2018). In terms of latent mean scores, we hypothesized that girls would score higher in anxiety and lower in avoidance than boys (Del Giudice, 2011). With regard to concurrent validity, we expected to find a high positive correlation between anxiety and avoidance as assessed via the new self-report and the conceptually corresponding dimensions of the ECR-RC, and a negative association between the latter and felt security. With regard to convergent validity, attachment anxiety and avoidance were anticipated to be negatively related to perceptions of social support, parent connectedness, and global self-worth, and to be positively related to security. In terms of ER strategies, based on Shaver and Mikulincer's (2002) framework, we expected that avoidance, but not anxiety, would be related to an increased use of Expressive suppression (ES) and less engagement in Cognitive reappraisal (CR). Conversely, higher levels of perceived security were hypothesized to be linked to less ES and more CR. Finally, we anticipated anxiously attached children to exhibit more internalizing and externalizing problems, and avoidant children to show more externalizing behaviors. For secure children, negative associations with problem behaviors were expected.

### **Study 1: First item selection**

In Study 1, we aimed to: (a) examine the dimensionality of the first pool of 30 items (selected from existing self-report measures of attachment in middle childhood), and (b) reduce the number of items from 30 to 21. Despite our goal was to yield a 15-item tool,

given the exploratory nature of this first study as well as the low sample size, we adopted a 'conservative' approach and decided a priori to keep two more items from each instrument (i.e., ECR-RC and SS).

## **Method**

### **Participants**

The study was introduced to 133 children attending third and fourth grades within a primary school located in Northeast Italy. All children who provided both parents' consent ( $n = 124$ ) were involved in the study, and verbal assent was required from each participant before data collection took place. Four children were absent on the day of data collection, and children with intellectual disabilities or developmental disorders were not included in data analyses ( $n = 9$ ). Thus, the final sample comprised 111 children (55% girls) aged between 7.92 and 9.92 years ( $M_{age} = 8.93$ ,  $SD = .57$ ). Most children lived in intact families (86.5%), a small number lived in divorced families ( $n = 13$ , 11.7%), and two lived in families in which one parent was deceased (1.8%). Five participants completed only the questionnaire concerning the mother, and one child filled in only the questionnaire concerning the father.

Participants were tested in their classroom during a single collective session lasting approximately 90 minutes. The children were asked to complete the attachment pool of items for both mother and father, as well as a sociodemographic form.

### **Procedure**

**Preliminary step.** Prior to data collection, we evaluated a pool of 51 items selected from existing questionnaires for content and sentence formulation. Of these, 30 items were retained in an initial pool of items. Twelve of these items were taken from the SS (Kerns et al., 1996), and 18 items were drawn from the ECR-RC (Brenning et al., 2011). Items selected from the ECR-RC were originally developed using the Likert format, whereas

items selected from the SS were based on the “Some/Other” format (Harter, 1982). Because the latter was introduced by Harter (1982) to limit socially desirable responses and based on our own research (see Marci et al., 2018, *manuscript submitted for publication*), we selected Harter’s format for the new scale; consistently, the original Likert-type items of the ECR-RC were changed into the “same/other” response type.

**Data collection.** The study protocol and procedures were approved by the Ethics Committee of the School of Psychology at the University of Padova, Italy (protocol #1838-2016). After obtaining approval from the school principal, a letter was sent to children’s parents to explain the nature and purpose of the study. Prior to data collection, written consent was obtained from both parents, and verbal assent was obtained from each child. Children completed questionnaires in the classroom during school hours in a single session and in the presence of their teacher. They were informed that they were free to end their participation at any time without any consequences, and that their participation would remain confidential. The items were read aloud by the researcher to ensure children’s comprehension and to minimize possible effects of differences in reading ability. After the session, participants were given a certificate and were thanked for taking part in the study.

### **Measures**

**Attachment questionnaire.** The questionnaire included 30 items (the same for mother and father) assessing anxiety, avoidance, and security in child-parent relationships. Specifically, the preoccupation/anxiety and avoidance factors each included nine items from the short form of the ECR-RC (Brenning et al., 2011). The former factor was conceived to assess concerns about social support and fear of abandonment and rejection, while the latter was designed to evaluate discomfort with closeness. The security factor, which included 12 items from the SS, was designed to assess the degree to which a child feels that an attachment figure is responsive and available, the child’s tendency to rely on this figure in

times of stress, and the child's ease in communicating with this figure (Kerns et al., 1996). Each item was scored on a four-point scale following Harter's format. Children received the following instructions: "The following statements describe two kinds of kids and the way they feel about themselves in relation to their mom/dad. We are interested in knowing which of these kids is most similar to you. First, choose the child that best fits with you, and then mark the response that corresponds to how you evaluate yourself using 'Somewhat True for Me' or 'Really True for Me.' Please remember that there are no right or wrong answers."

**Socioeconomic status (SES).** Children's SES was assessed via the Italian version of the Family Affluence Scale (FAS; Currie et al., 2008; Vieno, Santinello, Lenzi, Baldassari, & Mirandola, 2009), which consist of four items (e.g., "Does your family own a car?"). Scores across items are computed to provide an overall score ranging from 0 to 9, with scores from 0 to 2 denoting low affluence, 3 to 5 medium affluence, and 6 to 9 high affluence. The FAS has provided evidence of validity and reliability across different cultures and countries, including Italy (Vieno, Santinello, Lenzi, Baldassari, & Mirandola, 2009).

### **Analytic approach**

All analyses were carried out in R (R Development Core Team, 2017). First, an EFA was undertaken on both mother and father-related items using the polychoric correlation matrix. Based on extant research showing that anxiety and avoidance are not orthogonal in middle childhood (e.g., Brenning et al., 2011; Marci et al., 2018) and due to the high correlation between anxiety and avoidance with security (assessed via the SS) observed in previous studies (Brenning et al., 2011; Marci et al., 2018; Skoczeń, Głogowska, Kamza & Włodarczyk, 2018). Therefore, we used Oblimin as the rotation criterion, and Ordinary Least Squares factoring as suggested for multivariate non-normal distributions (Schmitt &



Sass, 2011; Zygmunt, & Smith, 2014). Because our objective was to develop a three-dimensional measure, we considered one- to three-factor solutions.

First, we selected the most plausible model in a model comparison perspective using the Bayesian information criterion (BIC), where lower values of BIC indicate better fit (Raftery, 1995). Then, we evaluated the variance explained by the best fitting model to ensure that it reached a satisfactory level (i.e., at least 40%, in line with suggested values in the current literature). After examining the meaning of each factor, we closely inspected the factor loadings of the 30 items to derive a 21-item pool. As part of the selection criteria, items were allocated to the factor for which they demonstrated strong primary loadings (.50) and very weak secondary loadings (.20) (Comrey & Lee, 1992). EFAs were performed using the PSYCH package (Revelle, 2018) available in R statistical software (R Development Core Team, 2018).

## Results

As a starting point, an EFA was performed on the mother form. Inspection of the BIC values of the three estimated models ( $BIC_{one\ factor} = 3639$ ,  $BIC_{two\ factors} = 3513$ , and  $BIC_{three\ factors} = 3516$ ) indicated that the two- and three-factor solutions were substantially better and equally plausible compared to the one-factor model (see Raftery, 1995). In particular, the three factors solution explained a satisfactory proportion of variance (46%), with the first, second, and third factor explaining 22%, 13%, and 11% of the variance, respectively.

A subsequent EFA was run on the father form and considered from one- to three-factor solutions. A comparison among BIC values suggested that the third-model solution was substantially more plausible compared to the one- and two-factor models ( $BIC_{one\ factor} = 2943$ ,  $BIC_{two\ factors} = 2812$ ,  $BIC_{three\ factors} = 2783$ ). The three-factor solution explained a

satisfactory proportion of variance (53%), with factors one, two, and three explaining 28%, 17%, and 8% of the variance, respectively.

Overall, these results supported the three-factor solution for both mother and father forms. A close examination of the factor loadings suggested that the three factors had substantially the same meaning across the two forms, and were labelled avoidance, anxiety and security, respectively. Yet, it should be noted that avoidance and anxiety were strongly linked to their associated observed items, whereas the third factor (i.e., felt security) was characterized by the presence of items with low primary loadings and several cross-loadings. Furthermore, not all items behaved the same way across the two forms. Thus, to select items in the anxiety and avoidance subscales, we included seven items for each dimension with heavy primary loadings ( $> .50$ ) and very weak secondary loadings ( $< .20$ ) in at least one of the two questionnaires (i.e., mother or father). In addition, to include a seven-item security subscale, items of the security factor were selected by evaluating primary loadings and content meaning.

### **Study 2: Final item selection**

The second study aimed to: (a) reduce the number of items from 21 to 15, and (b) define the dimensionality of the instrument (three-factor scale vs. two-factor scale, plus a supplementary security scale). Our goal was to yield a number of items able to ensure good levels of reliability while at the same time resulting in a parsimonious, easy-to-administer measure.

#### **Method**

##### **Participants**

Study participants were recruited from 12 classrooms within three public primary schools in northeastern Italy. Written informed consent was obtained from 262 families (97% of the total sample), but 22 children were absent on the day of data collection. In

addition, children with intellectual disabilities (as reported by their teachers) or who had certificated developmental or learning disorders ( $n = 6$ ) were excluded from subsequent analyses. Thus, the final sample comprised 234 children (50% girls) ages 8 to 12.5 years ( $M_{age} = 8.8$  years,  $SD = .56$ ), who spoke Italian as their native language. Of these, three completed only the questionnaire concerning mothers, and two completed only the questionnaire concerning fathers. Most children belonged to high- (73.7%) or medium-income (24.4%) families, as reflected by FAS responses (Boyce et al., 2006; see Measures section of Study 1 for more details).

### **Procedure**

The same procedure as the one described in Study 1 was followed.

### **Measures**

In addition to the 21-item assessment of attachment representations, children were assessed for their general self-worth and ER strategies. Furthermore, the main teachers reported on children's behavioral problems (i.e., internalizing and externalizing).

**General self-worth.** General self-worth was assessed by the relevant subscale of the Self Perception Profile for Children (SPPC; Harter, 2012), which consists of six items that are rated using the Harter (1982) format. Participants were instructed to choose the statement that best fitted them out of two presented, and then to indicate whether the statement they chose was “really true” or “sort of true.” Each item is rated on a 4-point scale, and scores across items are averaged to yield a global self-worth score—with higher scores reflecting higher self-worth. The questionnaire provided evidence for good psychometric properties in terms of factor structure, internal consistency, and convergent validity (Harter, 2012), also in the Italian population (Pedrabissi, Santinello, & Scarpazza, 1988).

**Emotion regulation strategies (ER).** ER strategies were assessed by the Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA) (Gullone & Taaffe, 2012). The ERQ-CA is a 10-item version of the Emotion Regulation Questionnaire (Gross & John, 2003) revised for children and adolescents to capture the use of two ER strategies, namely CR (6 items) and ES (4 items). Each item is rated on a 5-point Likert scale (from 1 = strongly disagree to 5 = completely agree). Scores across items are averaged to provide one score for each ER strategy. Higher scores indicate greater use of a specific strategy. The questionnaire has good psychometric properties in terms of factor structure, internal consistency, and external validity (Gullone & Taaffe, 2012).

**Children's psychological adjustment.** Teachers completed the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997; Tobia & Marzocchi, 2017), which is a 25-item screening questionnaire designed to assess emotional and behavioral problems in children and adolescents. It consists of five scales (i.e., emotional symptoms, conduct problems, hyperactivity-inattention, peer problems, and prosocial behaviors), and each scale comprises five items that are rated on a 3-point Likert scale. Items are summed up to provide five component scores; an overall total difficulties score is obtained by adding the scores of four behavioral-problem components (Goodman, 1999). For this study, we considered a broader range of scores for internalizing (as provided by the Emotional Symptoms and Peer Problems scales) and externalizing behavior (as provided by the Conduct Problems and Hyperactivity-Inattention scales) (Goodman, Lamping, & Ploubidis, 2010).

### **Data Analyses**

To obtain a 15-item scale (five items for each subscale), a series of confirmatory factor analyses (CFAs) were conducted. Specifically, using a semi-confirmative approach, we removed step-by-step items that showed high cross-loadings by inspecting modification

indexes. All models were estimated using the weighted least squares mean and variance (WLSMV) estimation, which is appropriate for ordinal data (Flora & Curran, 2004). Missing data (<1%) were handled with the pairwise maximum likelihood (PML) estimation method, suitable for factor-analytic models with ordinal data (Myrsini, Moustakib, Yang-Wallentina, & Jöreskog, 2012) and available in the R package lavaan (Rosseel, 2012). To evaluate model fit, several fit indexes were computed, including the chi-square-to-degrees-of-freedom ratio ( $\chi^2/df$ ), root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis Index (TLI), and standardized root mean square residual (SRMR). Cut-off values for fit were considered acceptable if  $\chi^2/df$  was less than 3, CFI and TLI were greater than .95, RMSEA was less than .08, SRMR was less than .10 (Schermelleh-Engel, Moosbrugger, & Müller, 2003).

To define the dimensionality of the questionnaire, and to examine whether the instrument was composed of three correlated factors (avoidance, anxiety, and security) or two correlated factors (anxiety and avoidance) plus an additional supplementary subscale (security), we tested (a) a three-factor solution, with five items loading on each hypothesized factor, and (b) a two-factor solution that included only the anxiety and avoidance dimensions. First, we compared the fit of the three-factor model to the fit of a two-factor model that included the only two correlated latent dimensions (i.e., anxiety and avoidance). Then, to further disambiguate the dimensionality of the scale, we evaluated its external validity via structural equation modelling (SEM) and examined the degree to which the three- and two-factor models were associated with external criterion measures, that is, general self-worth (as assessed via the SPPC subscale), CR (as assessed via the ERQ-CA), and children's internalizing and externalizing behavioral problems (as reported by teachers via the SDQ). Specifically, for both mother and father questionnaires, we conducted a series of SEMs and tested the extent to which each factor was associated with the external measure

in the condition of (a) three correlated factors (avoidance, anxiety, and security) and (b) two correlated factors (anxiety and avoidance) controlling for the shared variance across factors. In sum, for each outcome (i.e., endogenous variable) we estimated two SEMs: one with avoidance, anxiety and security as predictors (i.e., exogenous variables), the other one with only anxiety and avoidance as predictors.

Again, all models were estimated using the WLSMV, and goodness-of-fit indexes considered in CFAs were evaluated following the guidelines provided above. Thus, the most plausible model was selected by evaluating goodness-of-fit in terms of explained variance (i.e., R<sup>2</sup>) of the endogenous variables, and the significance of the structural coefficients between attachment factors and external criterion measures.

## **Results**

A series of CFAs were conducted to test a model in which each item loaded onto the hypothesized latent factor (i.e., anxiety, avoidance, and security). The first CFA was run, and after inspecting the MI we removed those items that showed high cross-loadings on a step-by-step basis. This procedure yielded a 15-item measure of attachment, in which three dimensions were each assessed using five items. As shown in Table 2, the model had excellent values for CFI and TLI, but unacceptable values for RMSEA and SRMR. Furthermore, the correlations between avoidance and security factors, as well as between anxiety and felt security, were very high.

Next, a second CFA was conducted to examine the fit of the two insecurity latent factors. This model yielded a good fit in all the considered indexes (Table 2).

Table 2

*Model fit for the two- and three factor models of the final 15 items*

	$\chi^2/df$	CFI	TLI	RMSEA [90% CI]	SRMR
<i>Mother</i>					
Three-factor model	2.94	.999	.999	.095 [.082 – .109]	.107
Two-factor model	1.35	.991	.998	.041 [.000 – .068]	.075
Security factor	0.58	1.000	1.020	.000 [.000 – .071]	.036
<i>Father</i>					
Three-factor model	2.06	.999	1.000	.0671[.056 – .086]	.068;
Two factors model	1.90	.995	.993	.065 [.040 – .089]	.710
Security factor	.651	1.000	1.002	.000 [.000 – .076]	.022

*Note:* Mother form:  $N = 217$ . Father form:  $N = 211$ . CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square of Approximation; SRMR = Standardized Root Mean Square Residual.

To disambiguate the dimensions of anxious and avoidant attachment and examine whether these dimensions sufficiently captured the quality of parent-child attachment in middle childhood, or if a third security factor needed to be added for the purpose of incremental assessment, SEM was used to evaluate the association of the new instrument with the latent mean scores derived from the other questionnaires (i.e., SPPC, ERQ-CA, and SDQ). In particular, for the mother questionnaire we conducted two separate SEMs on each considered external measure: one considering the three correlated factor solution, the other considering the two correlated factor solution.

Overall, the expected associations were found when we considered the two insecurity dimensions. Specifically, higher levels of anxiety and avoidance were linked to lower self-esteem ( $B = -.339, p < .001$ ;  $B = -.492, p < .001$ ). Furthermore, attachment

anxiety was positively related to internalizing problems ( $B = .259, p = .036$ ), while avoidance was marginally associated with externalizing problems ( $B = .233, p = .052$ ), and negatively related to CR ( $B = -.404, p < .001$ ). In contrast, no significant associations were found for the three factors solution. The strong correlations between anxiety and avoidance and the security factor were problematic in terms of multicollinearity, thus resulting in unstable parameter estimates in the structural models. Also, when the security factor was added as a predictor to avoidance and anxiety, the explained variance of the endogenous variables showed an overall negligible increase. Thus, the two-factors solution was more adequate in predicting the considered outcome variables.

Based on these results, we elected that the instrument would be composed of two main dimensions, namely anxiety and avoidance. The felt security factor was included within the new instrument as a supplementary scale. As shown in Table 2, CFAs performed on this supplementary scale indicated excellent fit indexes.

### **Study 3: Testing phase**

In Study 3, we aimed to: (a) test the factor structure and internal consistency of the final questionnaire — labelled the Attachment in Middle Childhood Questionnaire (AMCQ) — by conducting a CFA on a larger sample; (b) analyze its invariance across age and gender and, if equivalence was found, explore differences in anxiety and avoidance between younger vs. older children, and between boys and girls; (c) test concurrent validity by analyzing possible associations with the ECR-RC; and (d) test convergent validity by exploring the extent to which each of the three subscales was linked to external variables, including global self-worth, ER strategies, parent connectedness, social support from family and friends, and teacher-reported emotional-behavioral problems.



## Method

### Participants

The study was introduced to 826 children aged between 8 and 12 years, who were recruited in seven primary schools and three middle schools in northeastern Italy. All children with written consent obtained from both parents ( $N = 805$ , 97.5%) were involved in the study. Thirty-eight children (4.7%) were absent on the day of data collection. Moreover, the questionnaires completed by children with intellectual disabilities or with certified developmental/learning disorders (3.1%,  $n = 25$ ), and children who reported more than one missing value for each sub-scale ( $n = 10$ ), were not considered in the analyses.

Hence, the final sample consisted of 732 participants (50.6% girls), of whom 456 were primary school children (hereafter labeled “younger children”; 51% girls,  $M_{age} = 9.23$  yrs,  $SD = 0.83$ , range = 7.92 – 11.8); and 269 were middle school children (hereafter labeled “older children”; 50% girls,  $M_{age} = 11.7$  yrs,  $SD = 36$  months, range = 11.0 – 12.3). In the final sample, 26 children did not fill out the mother items, whereas 28 children did not complete the father items.

### Procedure

A detailed description of the procedure is reported in Study 1.

### Measures

Descriptions of the FAS, SPPC, ERQ-CA, and SDQ are provided in Study 1 and Study 2.

**Attachment.** As a measure of concurrent validity, children completed the Italian version of the Experience in Close Relationship Revised Child version (ECR-RC) (Brenning et al., 2014; Marci et al., 2018). The questionnaire consists of 12 items designed to capture attachment anxiety (e.g., ‘I worry that my mother/father does not really love me’) and attachment avoidance (e.g., ‘I prefer not to tell my mother/father how I feel deep down’) in

children and adolescents. Each item is rated on a 5-point Likert scale (from 1 = strongly disagree to 5 = completely agree). Scores across items are averaged to provide an anxiety and an avoidance score, respectively; higher scores indicate greater anxious or avoidant attachment.

**Parent connectedness.** Parent connectedness was measured by the relevant subscale included in the Parent-family connectedness questionnaire from the Add Health Study (Resnick et al., 1997; Sieving et al., 2001). It is designed to assess children's perception of their closeness to parents and family. The children completed the 6 item subscale that referred to parents (i.e., 'My parents care about me', 'I feel close to my parents'). Each item is scored on a 5-point scale (from 1 = strongly disagree to 5 = completely agree). Scores across items are averaged to yield an overall score, in which higher scores indicate higher levels of parent connectedness.

**Social support (family and friends).** Children's perceptions of social support from family and friends were assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). Children completed the subscales referring to family and friends, each of which consisted of four items scored on a 5-point scale ranging from 1 (strongly disagree) to 5 (completely agree). Scores across items were averaged to provide the respective overall scale scores, in which higher scores indicated higher perceptions of support.

### **Data Analysis**

All analyses were carried out using R (R Development Core team, 2018). All CFAs and MG-CFAs were performed using the lavaan package (Rosseel, 2012). All models were estimated using WLSMV, which is appropriate for analyzing ordinal data (Flora & Curran, 2004). Missing data (< 1%) were handled using the PML estimation method, which is

suitable for factor analytic models consisting of ordinal data (Myrsini, Moustakib, Yang-Wallentina, & Jöreskog, 2012) and available in the R package lavaan (Rosseel, 2012).

First, we calculated item response distributions separately for younger and older children and computed the main descriptive statistics (i.e., mean, standard deviation, and skewness) for both mother and father items.

Second, a series of CFAs were conducted on both mother and father items to test: (a) a single-factor model (baseline model), in which anxiety and avoidance items loaded onto a single latent factor; (b) a two-factor solution, in which each item loaded onto the corresponding insecure latent variable. In addition, the supplementary security factor was evaluated separately by CFA. The model fit was evaluated by combining the chi-square to degrees-of-freedom ratio ( $\chi^2/df$ ), the RMSEA, the CFI, the TLI, and the SRMR. Cut-off values for fit were considered acceptable if  $\chi^2/df$  was less than 3, CFI and TLI were greater than .95, RMSEA was less than .08, RMSEA was less than .08 and SRMR was less than .10 (Schermelleh-Engel, Moosbrugger, & Muller, 2003).

Third, multi-group confirmatory factor analyses (MG-CFA) were performed to examine measurement invariance of the factor structure across gender and age groups. Consistent with this procedure, the first models were fit separately for boys and girls, and for younger and older children. Configural invariance was then tested by allowing the parameters to remain free across groups. Then, metric and scalar invariance were simultaneously tested by constraining the factor loadings and thresholds to be equal across groups (Muthén & Muthén, 2010). Several fit indices (i.e., CFI, TLI, and RMSEA) were inspected, and the differences in CFI ( $\Delta$  CFI) and RMSEA ( $\Delta$  RMSEA) were computed between the two proximal models (i.e., configural vs. metric and scalar invariance). A change in CFI and RMSEA of less than .01 and .015 between models as well as acceptable model fit indices were considered evidence of model invariance (Chen, 2007; Cheung &

Rensvold, 2002). When metric and scalar invariance are established, the meaning of the construct (i.e., factor loadings) and levels of the underlying items (i.e., thresholds) are equal in both groups. Therefore, their latent scores can be compared. Measurement invariance was also evaluated for the supplementary felt security scale.

Fourth, differences between younger and older children and girls and boys in attachment anxiety, avoidance, and security latent scores were evaluated via separate latent mean analyses (LMA) following Finch and French's (2015) guidelines. One group was chosen as the reference group. Loadings, thresholds, and error variances were constrained to be equal across groups, while means were allowed to vary in only one group. Because latent means of the reference group were fixed to zero, latent means of the comparison group represented the mean differences between the two groups (Finch & French, 2015). Cohen's  $d$  was computed, and the effect sizes of the latent mean differences were evaluated. Values of  $d = 0.2$  were considered a small effect,  $d = 0.5$  a medium effect, and  $d = 0.8$  a large effect (Cohen, 1988).

Fifth, concurrent validity was evaluated using SEM, and latent correlations between anxiety, avoidance and security (as assessed via the new questionnaire) with anxiety and avoidance (as assessed via the ECR-RC) were calculated.

Sixth, convergent validity was tested via a series of SEMs. In particular we examined the latent bivariate association of each latent attachment dimension (i.e., anxiety and avoidance) with global self-worth, parent connectedness, perceptions of support by family and friends, ER strategies, and internalizing and externalizing problems.

Last, an additional series of SEMs was implemented to take the shared variance between the two attachment-related dimensions (i.e., anxiety and avoidance) into account, thus allowing to evaluate the unique contribution of each factor in predicting the external measures. Because previous research has found gender- and age-related effects on some of

the considered criterion measures (e.g., John & Gross, 2004; Tobia & Marzocchi, 2017), these variables were controlled for in analyses.

## Results

**Descriptive analysis.** The item response distributions are presented in Figure 1, Figure 2 and Figure 3. Mean, standard deviation, range, and skewness for each item are reported in Table A10 and Table A11 within the Appendix E.

**Factor structure.** The initial CFA performed to test the one-factor model showed that the majority of indexes exceeded the recommended cut-off values, whereas the two-factor model (see Table 3 and Table 4) yielded an excellent fit to all the considered fit indexes. The fit of of the supplementary security scale indicated also excellent fit indices.

**Measurement invariance across age groups and gender.** To test measurement invariance of the AMCQ, a multi-group analysis was performed across age-groups (younger vs. older) and gender (girls vs. boys). First, we tested measurement invariance across age groups. Consistent with this procedure, models were fit separately to the younger and older groups. All models reached an excellent fit based on the considered fit indexes (see Table 3 and Table 4). Then, configural invariance (without parameter restrictions) was tested and revealed a good model fit to the data, suggesting that the factor structure was similar between the two age groups. Finally, loadings and thresholds were held invariant across groups (metric and scalar invariance). The fit of this model was also good. Furthermore, both  $\Delta$  CFI and  $\Delta$  RMSEA between the constrained and unconstrained models were less than .01 Table 3 and Table 4 which indicated that metric and scalar invariance were achieved.

Invariance across gender was tested using the same procedure. In this case, configural invariance revealed a good model fit to the data, suggesting that the factor structure was similar in girls and boys. Then, the loadings and thresholds were held

invariant across groups. The fit of this model was good, and the  $\Delta$  CFI and  $\Delta$  RMSEA between the constrained and unconstrained models were smaller than the recommended values (Table 3 and Table 4) thus suggesting that metric and scalar invariance were reached.

Following the same procedure, measurement invariance was evaluated for the supplementary felt security scale. Again, invariance across groups (i.e., age groups and gender) was supported, since the models showed excellent fit indexes and both  $\Delta$  CFI and  $\Delta$  RMSEA between the constrained and unconstrained models were less than .01 (see Table 5 and Table 6).

**Differences between age and gender groups.** Because scalar invariance was reached, LMAs of the mother and father forms were conducted separately to estimate potential differences in anxiety and avoidance scores between the two age groups and between boys and girls. Younger children were chosen as the reference group, which was constrained to have a mean of zero, whilst the girls' mean was allowed to vary. The results showed that older children reported significantly higher latent mean values in attachment avoidance and in anxiety toward mothers compared to their younger counterparts with a moderate and high effect size (Table 7).

Similarly, with regard to father items, older children reported higher latent mean values in avoidance and anxiety compared to younger children. However, the effect size was small. The structured mean differences between groups are presented in Table 7.

With regard to gender, boys were chosen as the reference group, which was constrained to have a mean of zero, while the mean of girls was allowed to vary. Results showed that boys reported significantly higher latent mean values in avoidant attachment compared to girls, but no significant differences were found in anxiety scores. With regard to father items, analyses indicated that girls reported significantly higher latent mean values in avoidant attachment compared to boys, but no significant differences were found in

anxiety scores. Finally, results suggested that older children reported significantly lower latent mean values in felt security than younger did but no significant differences were found in relation to gender (see Table 8).

**Concurrent validity.** Regarding concurrent validity, the results showed significant and positive latent correlations between anxiety and avoidance as assessed via the AMCQ and the ECR-RC for both mother ( $r = .701, p < .001$ ;  $r = .925, p < .001$  for anxiety and avoidance, respectively) and father forms ( $r = .733, p < .001$ ;  $r = .927, p < .001$  for anxiety and avoidance, respectively). As expected, the supplementary security scale was negatively correlated with the two dimensions for both mother (anxiety:  $r = -.432, p < .001$ ; avoidance:  $r = -.725, p < .001$ ) and father forms (anxiety:  $r = -.453, p < .001$ ; avoidance:  $r = -.768, p < .001$ ).

**Convergent validity.** A SEM framework was used to evaluate convergent validity. Latent bivariate correlations between each latent attachment dimension (i.e., anxiety and avoidance) and the latent means of each of the criterion validity measures were calculated. Attachment anxiety and avoidance — assessed by the AMCQ — were significantly and negatively related to global self-worth, parent connectedness, perceptions of support from family and friends, and CR. The results also showed that higher levels of anxiety and avoidance were associated with more ES as an ER strategy. Of interest, different correlational patterns emerged for father and mother items in relation to internalizing and externalizing problems. Specifically, anxiety and avoidance toward mother were significantly and positively related to internalizing problems, whereas only avoidance was only linked to externalizing problems (see Table 9 and Table 10). Regarding father items, at the bivariate level, children who scored higher on anxiety reported greater externalizing behavior, whereas no association with avoidance emerged (see Table 10). The same pattern of associations was found for internalizing problems.

In terms of felt security, results were consistent with those emerging from the avoidant and anxious subscales, with higher security being associated with higher self-esteem, more parental connectedness, perception of greater support from family and friends, increased use of CR, less use of ES and fewer externalizing behaviors. No significant associations with internalizing problems were observed, although correlations were close to the threshold for statistical significance (see Table 10).

Next, we estimated two SEMs — one for mother and one for father — for each attachment-related outcome, with avoidance and anxiety as predictors, and child age and gender as control variables. In relation to self-esteem, children who scored higher on avoidance and anxiety reported lower self-esteem ( $B = -.333, p < .001; B = -.371, p < .001$ ), whereas higher felt security was associated with higher self-esteem ( $B = .595, p < .001$ ). Regarding the father form, higher levels of anxiety and avoidance were negatively related to self-esteem ( $B = -.367, p < .001, B = -.288, p = .001$ ).

Regarding parental connectedness and perceived support by family and friends, the results showed that higher levels of avoidance and anxiety toward mother were linked to less parental connectedness ( $B = -.283, p < .001; B = -.469, p < .001$ ) and less perceived social support from family ( $B = -.505, p < .001; B = .294, p < .001$ ). Furthermore, higher avoidance was linked to less perceived support from friends ( $B = -.269, p < .001$ ). In contrast, no associations were found with the anxiety subscale ( $B = -.022, p = .737$ ).

Regarding the responses to father items, results showed that higher levels of avoidance and anxiety were linked to less parental connectedness ( $B = -.207, p = .011, B = -.471, p < .0001$ ) and less perceived support from family ( $B = -.590, p < .0001; B = .539, p = .005$ ). Furthermore, more avoidance and anxiety were linked to lower levels of perceived friend support ( $B = -.231, p < .0001; B = -.149, p = .033$ ).



In relation to ER strategies, responses to both questionnaires (i.e., mother and father forms) showed similar results. In particular, avoidance toward mother and father predicted increased use of ES ( $B = .504, p = .001$ ;  $B = .340, p < .0001$ , respectively) and less use of CR ( $B = -.271, p < .0001, B = -.199, p = .009$ ). In contrast, no association between the two ER strategies and anxiety toward mother and father emerged. Again, security toward both mother and father was related to less ES ( $B = -.303, p < .001, B = -.214, p = .001$ ) and more use of CR ( $B = .303, p < .001; B = .200, p < .001$ ).

In terms of problem behavior, higher levels of anxiety toward father were linked to more internalizing problems ( $B = .173, p = .023$ ).

With regard to felt security, a negative association between this subscale and children's anxiety toward the father emerged. However, after controlling for demographic variables, no association was found between the security factor toward both mother and father and teacher-reported internalizing or externalizing behavior. The bivariate associations with the other external measures (see Table 10) were confirmed.

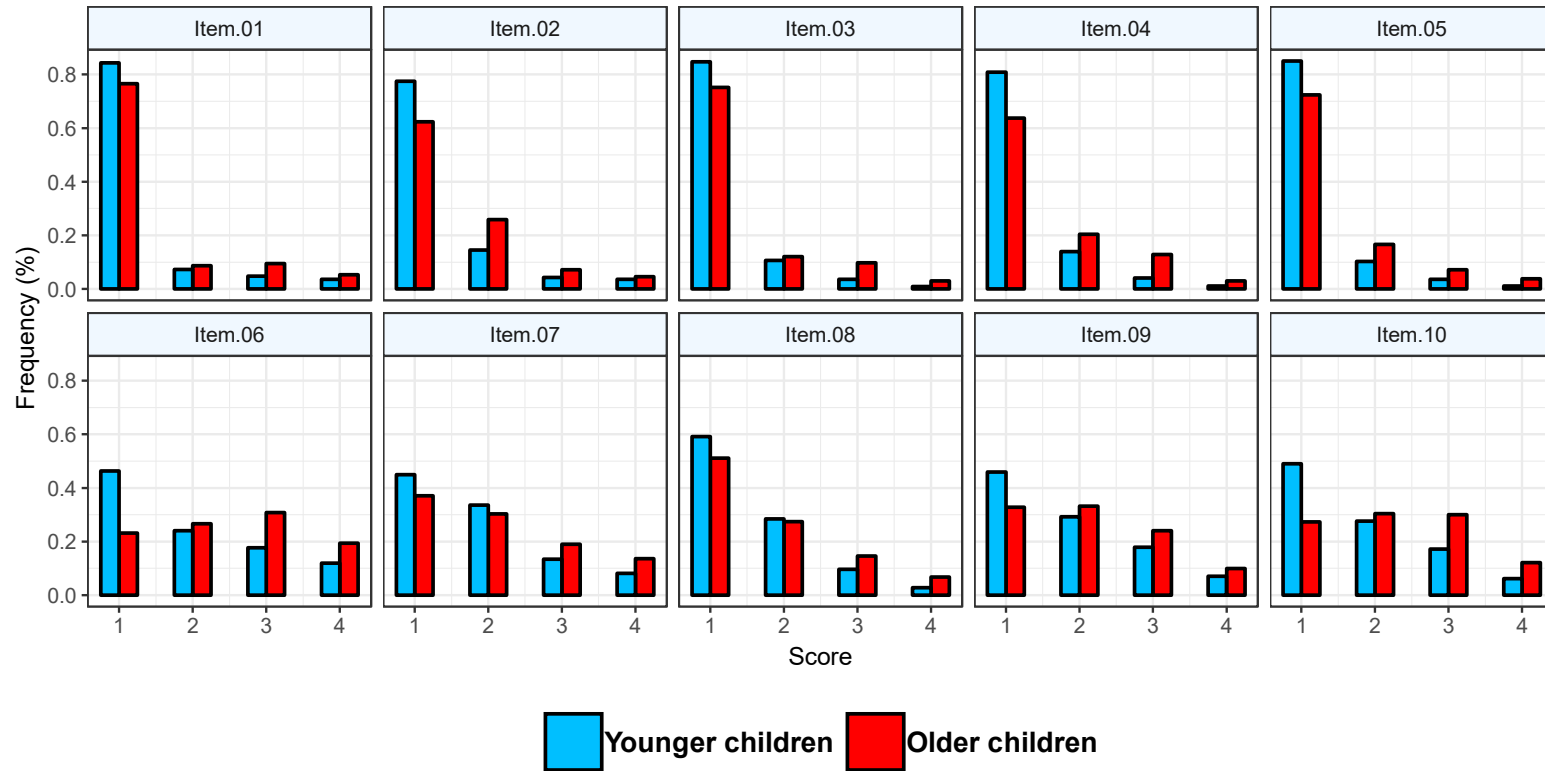


Figure 1. Response distribution of mother related items (anxiety and avoidance). Note. Younger children,  $n = 438$ ; Older children,  $n = 263$ .

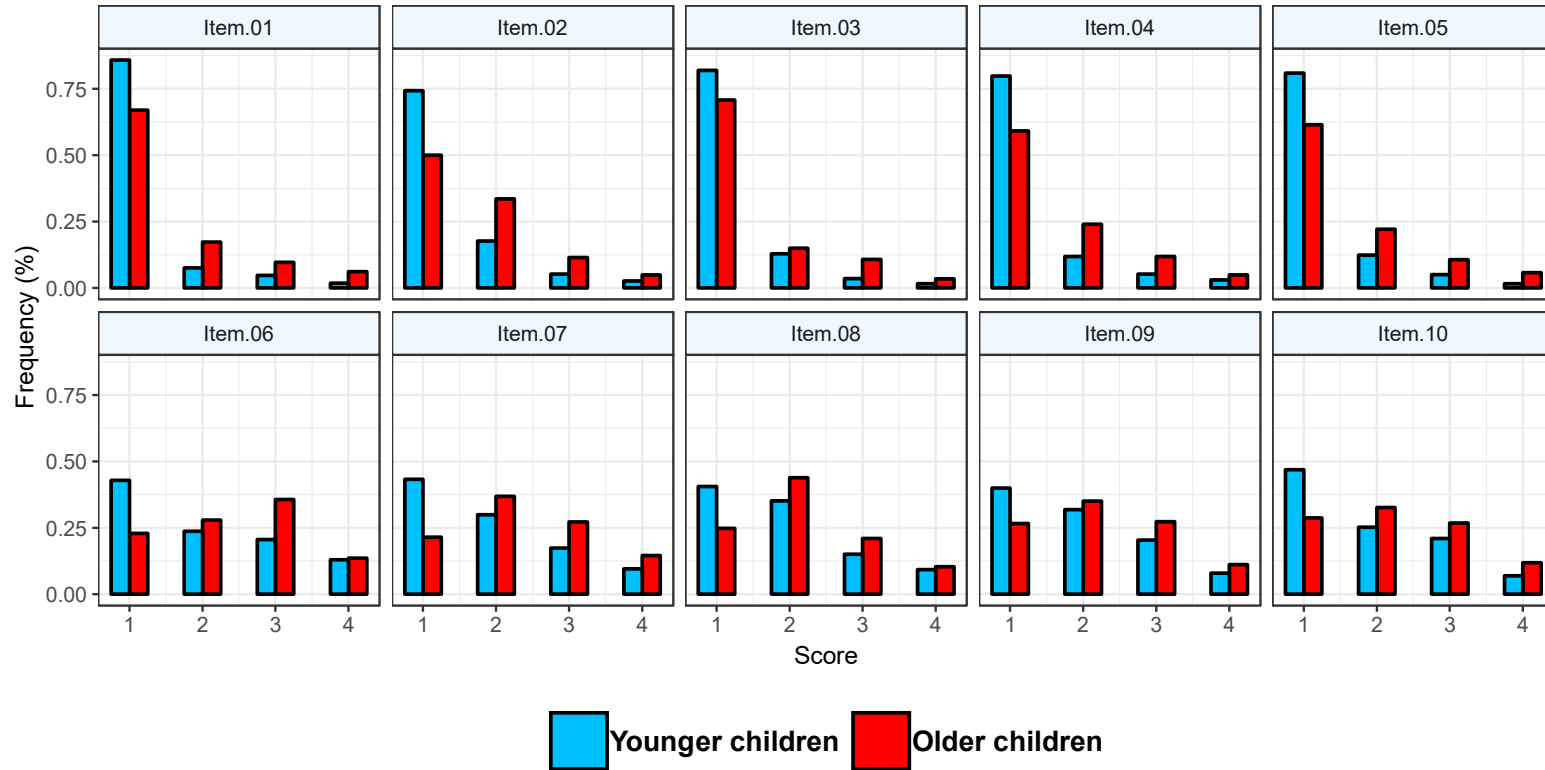
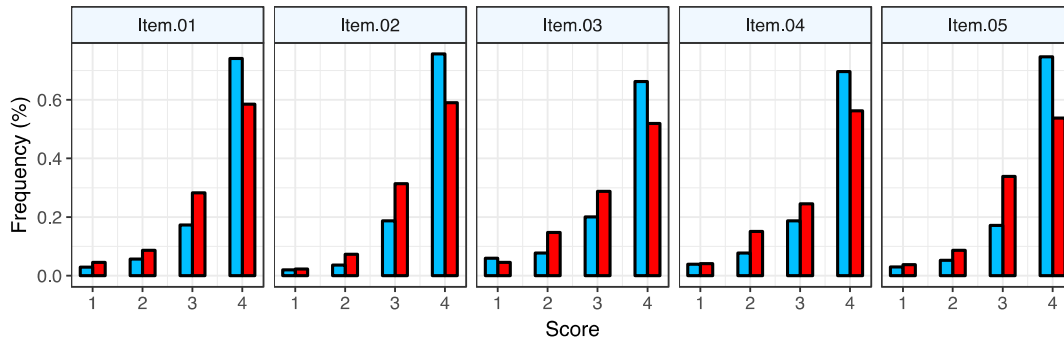
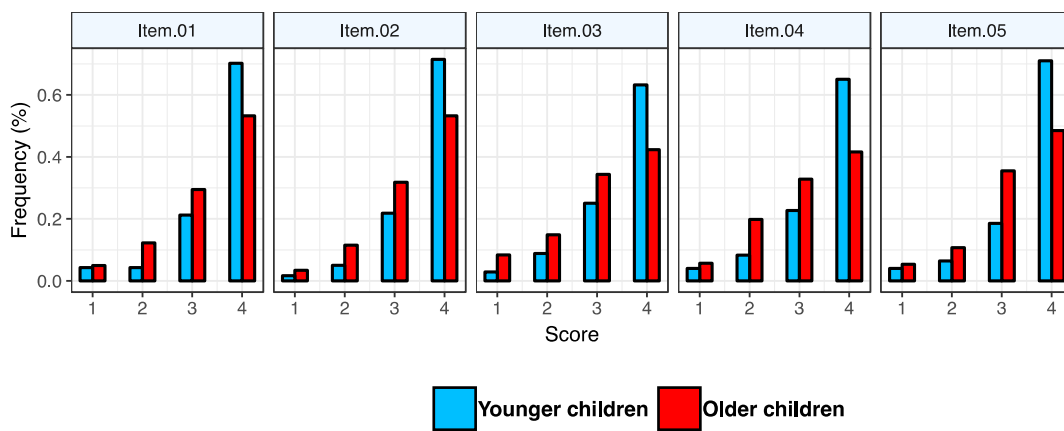


Figure 2. Response distribution of father related items (anxiety and avoidance). Note. Younger children,  $n = 437$ ; Older children,  $n = 264$ .

Mother



Father



■ Younger children
 ■ Older children

Figure 3. Response distribution of mother and father related items (supplementary scale).

Note. Mother items: Younger children,  $n = 438$ ; Older children,  $n = 263$ . Father items: Younger children,  $n = 437$ ; Older children,  $n = 264$ .

Table 3

*Fit indices of the confirmatory factorial models of the mother's AMCQ and invariance across age groups and gender*

	$\chi^2/df$	<i>p</i>	CFI	TLI	RMSEA [90% CI]	SRMR	$\Delta$ CFI	$\Delta$ RMSEA
<b>Total sample</b>								
<i>One-factor</i>	10.25	.000	.957	.945	.115 [.105 – .126]	.116		
<i>Two-factor</i>	1.97	.001	.996	.994	.044 [.024 – .050]	.037		
<b>Age group</b>								
Younger children	1.38	.071	.995		.029 [.000 – .048]	.057		
Older children	.881	.666	1.000	.996	.029 [.000 – .037]	.045		
STEP 1 – Configural	1.129	.219	.999	.999	.019 [.000 – .038]	.530		
STEP 2 – Metric and scalar	1.264	.041	.997	.997	.027 [.000 – .038]	.056	– .002	.008
<b>Gender</b>								
Boys	1.489	.033	.996	.993	.038 [.000 – .021]	.058		
Girls	.971	.516	1.00	.996	.000 [.035 – .072]	.046		
STEP 1 – Configural	1.230	.096	.998	.997	.026 [.000 – .043]	.052		
STEP 2 – Metric and scalar	1.295	.028	.996	.996	.029 [.025 – .051]	.055	– .001	.006

*Note.* Younger children,  $n = 438$ ; Older children,  $n = 263$ . Boys,  $n = 343$ ; Girls,  $n = 358$ .

$\chi^2/df$  = chi-square/degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation.  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEAs.

Table 4

*Fit indices of the confirmatory factorial models of the father's AMCQ and invariance across age groups and gender*

	$\chi^2/df$	<i>p</i> -value	CFI	TLI	RMSEA [90% CI]	SRMR	$\Delta$ CFI	$\Delta$ RMSEA
<b>Total sample</b>								
<i>One-factor</i>	19.694	.000	.970	.961	.167 [.156 – .178]	.134		
<i>Two – factors</i>	1.721	.006	.999	.999	.033 [.018 – .047]	.033		
<b>Age group</b>								
Younger children	1.122	.287	.999	.999	.017 [.000 – .041]	.048		
Older children	1.953	.001	.997	.997	.061 [.039 – .083]	.049		
STEP 1 – Configural	1.537	.003	.998	.998	.040 [.024 – .055]	.048		
STEP 2 – Metric and scalar	1.493	.001	.998	.998	.038 [.024 – .051]	.050	– .001	– .002
<b>Gender</b>								
Boys 343	.729	.876	1.000	1.002	.000 [.018 – .047]	.037		
Girls 358	1.995	.000	.998	.998	.054 [.035 – .072]	.047		
STEP 1 – Configural	1.362	.025	.999	.999	.033 [.012 – .049]	.042		
STEP 2 – Metric and scalar	1.508	.001	.998	.998	.039 [.025 – .051]	.043	– .001	.006

*Note.* Younger children,  $n = 437$ ; Older children,  $n = 264$ . Boys,  $n = 341$ ; Girls,  $n = 360$ .  $X^2/df$  = chi-square/degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation.  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEAs

Table 5

*Model fit for the mother's security factor tested for invariance across age group and gender.*

	$X^2/df$	<i>p</i> -value	CFI	TLI	RMSEA [90% CI]	SRMR	$\Delta$ CFI	$\Delta$ RMSEA
<i>Total sample</i>								
<i>One-factor</i>	1.299	.261	.999	.997	.000 [.000 – .059]	.510		
Younger	.827	.530	.999	1.00	.000 [.000 – .060]	.034		
Older	1.053	.384	.997	1.000	.014 [.000 – .088]	.037		
STEP 1 – Configural	.940	.494	1.000	1.001	.000 [.055 – .035]	.035		
STEP 2 – Metric and scalar	1.089	.347	.998	.998	.000 [.000 – .047]	.044		
							– .002	– .005
<i>Two-factor model (15 items)</i>								
Boys	1.115	.329	.999	.998	.038 [.000 – .080]	.038		
Girls	.699	.624	1.000	.999	.000 [.000 – .061]	.033		
STEP 1 – Configural	1.230	.096	.998	.997	.026 [.000 – .043]	.052		
STEP 2 – Metric and scalar	1.295	.028	.996	.996	.029 [.010 – .043]	.055		
							– .002	.004

*Note.* Younger children,  $n = 438$ ; Older children,  $n = 263$ . Boys,  $n = 343$ ; Girls,  $n = 358$ .  $X^2/df$  = chi-square/degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation.  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEAs.

Table 6

*Model fit for the father's security factor tested for invariance across age group and gender.*

	$X^2/df$	<i>p</i> -value	CFI	TLI	RMSEA [90% CI]	SRMR	$\Delta$ CFI	$\Delta$ RMSEA
<i>Total sample</i>								
<i>One-factor</i>	1.825	.532	1.000	1.000	.000 [.000 – .049]	.019		
<i>yong</i>	.154	.979	1.000	1.000	.000 [.000 – .010]	.011		
<i>old</i>	1,223	.295	.999	.998	.029 [.000 – .095]	.037		
STEP 1 – Configural	1.537	.003	.998	.998	.040 [.024 – .055]	.048		
STEP 2 – Metric and scalar	0.905	.001	.998	.998	.038 [.024 – .051]	.050		
<i>Two-factor model (15 items)</i>							– .001	– .002
Boys	.984	.426	1.000	.999	.000 [.000 – .076]	.031		
<i>Girls</i>	.965	.438	1.000	.999	.000 [.000 – .074]	.023		
STEP 1 – Configural	1.362	.025	.999	.999	.033 [.012 – .049]	.042		
STEP 2 – Metric and scalar	1.509	.001	.998	.998	.039 [.025 – .051]	.043		
							– .001	.006

*Note.* Younger children,  $n = 437$ ; Older children,  $n = 264$ . Boys,  $n = 341$ ; Girls,  $n = 360$ .  $X^2/df$  = chi-square/degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square of Approximation.  $\Delta$  CFI = difference among CFIs;  $\Delta$  RMSEA = difference among RMSEAs.



Table 7

*Structured mean differences between age groups and gender*

Latent variable	Latent Mean	Latent Mean	<i>p</i> -value	Effect size
	Younger <sup>a</sup>	Older	<i>p</i> -value	Effect size
Anxiety (Mother)	0	.458	< .001	.794
Avoidance (Mother)	0	.566	< .001	.577
Anxiety (Father)	0	.513	< .001	.701
Avoidance (Father)	0	.342	<.001	.455
	Boys <sup>a</sup>	Girls		
Anxiety (Mother)	0	– .027	.779	.039
Avoidance (Mother)	0	– .202	.003	.270
Anxiety (Father)	0	.090	.260	.125
Avoidance (Father)	0	.145	.022	.196

*Note.* <sup>a</sup> Reference groups. Younger children, *n* = 438; Older children, *n* = 263. Boys, *n* = 343; Girls, *n* = 358. Father items: Younger children, *n* = 437; Older children, *n* = 264. Boys, *n* = 341; Girls, *n* = 360.

Table 8

*Structured mean differences between age groups and gender (supplementary scale)*

Latent variable	Latent Mean	Latent Mean		
Age group				
	Younger <sup>a</sup>	Older	<i>p-value</i>	Effect size
Felt security (Mother)	0	-.402	< .001	.641
Felt security (Father)	0	.457	< .001	.620
Gender				
	Boys <sup>a</sup>	Girls	<i>p-value</i>	Effect size
Felt security (Mother)	0	.087	.387	.113
Felt security (Father)	0	-.148	.058	.195

*Note.* <sup>a</sup> Reference groups. Mother form: Younger children,  $n = 438$ ; Older children,  $n = 263$ . Boys,  $n = 343$ ; Girls,  $n = 358$ . Father form: Younger children,  $n = 417$ ; Older children,  $n = 258$ ; Boys,  $n = 330$ ; Girls,  $n = 345$ .

Table 9

*Latent bivariate correlations between the mother's Attachment in Middle Childhood questionnaire and the criterion validity measures.*

	Respondent	Avoidance	Anxiety	Security
Internalizing	Teacher	.107	.136*	-.114*
Externalizing	Teacher	.067	.119*	-.100
Parent-connectedness	Child	-.559***	-.645***	.654***
Family support	Child	-.678***	-.592***	.737***
Friends support	Child	-.283***	-.189***	.294***
General self-worth	Child	-.588***	-.613***	.601***
Cognitive reappraisal	Child	-.493***	-.293***	.347***
Expressive suppression	Child	.265***	.127*	-.337***

Note. \*  $p < .05$ ; \*\*\*  $p < .001$ .

Table 10

*Latent correlations between the fathers' Attachment in Middle Childhood questionnaire and the criterion validity measures*

	Respondent	Avoidance	Anxiety	Security
Internalizing problems	Teacher	-.042	.100	-.111
Externalizing problems	Teacher	.043	.149**	-.052
Parent-connectedness	Child	-.507***	-.603***	.641***
Family support	Child	-.590***	-.539***	.596***
Friends support	Child	-.327***	-.297***	.300***
General self-worth	Child	-.593***	-.574***	.586***
Cognitive reappraisal	Child	-.218***	-.155**	.247***
Emotion suppression	Child	.344***	.215**	-.228***

Note. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

## General discussion

Although the quality of parent-child undergoes substantial changes in middle childhood, assessing attachment in this developmental period remains a challenging task due to the scarcity of information concerning the psychometric properties of the most frequently used questionnaires. Drawing upon existing self-report measures, the current study aimed to develop an age-appropriate questionnaire to assess attachment in middle childhood — the Attachment in Middle Childhood Questionnaire (AMCQ) — by incorporating items that measure anxiety, avoidance and felt security in relation to mother and father. Furthermore, we tested the psychometric properties of the AMCQ in terms of factor structure, invariance across age and gender, and external validity (i.e., convergent and predictive validity). To this end, we recruited three independent samples of Italian school age children.

From a theoretical perspective, the study dresses the critical issues concerning if two separate factors, namely anxiety and avoidance are enough to capture attachment in this developmental period (Fraley et al., 2000) or if a third factor, namely “felt security,” provides consistent improvement in the assessment of attachment in middle childhood.

In Study 1, we tested the dimensionality of the first pool of 30 items and reduced the number from 30 to 21 items. Using an exploratory approach, we then performed a factor analysis separately on mother and father items. In particular, by adopting a model comparison perspective in both questionnaires, we first selected the more plausible model in using the Bayesian Information Criterion (BIC). Then we evaluated the variance explained by the best fitting model to ensure that it reached a satisfactory level. Finally, we inspected the factor loadings of the 30 items with the aim of deriving a 21-item pool. Inconsistent results emerged from the mother and father questionnaires. While the two- and three-factor solution were equally plausible for the mother items, the three-factor solution appeared to be the most plausible for the father items. Thus, we extracted three factors which were labeled

anxiety, avoidance, and felt security based on item content. While the first two factors, anxiety and avoidance, were well-represented by their respective items, the third factor, felt security, was comprised mostly of items with weak primary loadings and cross-loadings.

In Study 2, further reduced the number of items from 21 to 15 and defined the instrument's structure (a three-factor scale vs. two-factor scale, plus a supplementary security scale) by adopting a semi-confirmatory approach. To this end, a series of CFAs were performed in which each item was loaded on the corresponding factor (i.e., anxiety, avoidance, and security). All factor loadings were large in both the mother and the father forms. However, the correlation between the felt security factor and the avoidance factor, as well between felt security and anxiety, was extremely strong. To select the final pool of items, we followed a semi-confirmatory approach. In particular, by examining the modification indexes (MI), we removed 6 items (2 for each factor) that reported high cross-loadings. The procedure resulted in the selection of 15 items (i.e., 3 factors with 5 items each). However, the security-avoidance and security-anxiety correlations remained strong, and a few fit indexes exceeded the recommended values. The subsequent CFAs conducted on the two-factor model (anxiety and avoidance) produced an excellent fit.

To definitively establish the structure of the new instrument, a Structural Equation Models (SEM) approach was undertaken by means of which we evaluated the associations of each factor with the latent means of self-worth, the use of CR, and teacher-reported behavioral problems (internalizing and externalizing). In particular, we estimated two SEMs for each outcome, namely one for three correlated factors (i.e., felt security, avoidance, and anxiety), and one for the two correlated factors (i.e., avoidance and anxiety). The expected correlations with external measures were found for the two-factor model. In line with attachment theory, lower levels of anxiety and avoidance toward the mother were related to higher self-worth. Furthermore, higher levels of avoidance toward the mother were linked

with more externalizing problems, while higher levels of anxiety were associated with more internalizing problems. It is worthy of note that all these associations became nonsignificant when the felt-security factor was added to the model, presumably because of the strong correlations between anxiety and avoidance with the felt-security factor. These correlations may cause problems of multicollinearity, resulting in unstable parameter estimates in the structural models. The strong and negative associations of anxiety and avoidance to felt security provides support to extant theory which posits that attachment entails two independent dimensions (Brennan et al., 1998), namely anxiety and avoidance, in which security is reflected by low scores on both dimensions. Thus, contrary to our expectations but consistent with Brenning et al.'s study (2012), the felt-security factor seemed to contribute little to the assessment of attachment when gauged in association with anxiety and avoidance. We therefore elected the AMCQ as comprised of two principal dimensions (anxiety and avoidance). However, we also included the security factor as a supplementary subscale because from an applied perspective, this subscale might be particularly useful as a first screening tool of children's basic functioning (secure or insecure) and to identify children at risk of insecure attachment.

In Study 3, we tested the factor structure and internal consistency of the two-factor questionnaire on a large sample of Italian children (aged between 8-12 years). Using CFA, we analyzed its invariance across age and gender and explored the differences in anxiety and avoidance between boys and girls and younger and older children (i.e., primary and middle school children, respectively). We also tested concurrent validity with the ECR-RC as well as convergent validity by analyzing the extent to which each subscale (i.e., anxiety, avoidance, and felt security) was linked to several external variables, including global self-worth, social support, ER strategies (i.e., expressive suppression and cognitive reappraisal), and problem behavior (i.e., internalizing and externalizing symptoms).

In relation to factor structure, the AMCQ showed a good model fit for the two-factor structure when considering the total sample, as well as when the factor structure was investigated based on gender and age group in the mother and father items. Likewise, the felt security scale reported an excellent fit in both parent-forms. In terms of invariance across gender and age groups, the results showed that the AMCQ was invariant at the metric and configural levels. Thus, the instrument assessed attachment avoidance and anxiety in the same way for both boys and girls as well as for both younger and older children, which enabled a direct comparison of anxiety and avoidance scores. When we examined differences in anxiety and avoidance latent scores for the father and mother items, the results revealed higher levels of anxiety and avoidance toward both parents in older as opposed to younger children. The growing autonomy from parental figures that starts in this developmental period may partly explain this result (Ammaniti, Van IZendoorn, Speranza, & Tambelli, 2000). Indeed, children are involved in the complex process of managing physical and emotional proximity in an effort to balance separation and connectedness with their parents, which can be accompanied by higher levels of both anxiety and avoidance.

Regarding gender-related differences, girls and boys showed similar levels of anxiety toward mother and father. However, boys were significantly more avoidant toward their mother than girls, while girls were significantly more avoidant toward their father. A possible explanation lies in differences between parental relationships with boys and girls. For example, research has shown that mothers often talk more with girls than with boys and also exhibit more supportive speech toward girls, thus suggesting differences in relationship qualities. Furthermore, fathers are less communicative and engaging with their daughters than their sons at all ages and the level of a father's involvement decreases as the daughter grows from childhood to adolescence (Nielsen, 2012; Pleck, & Masciadrelli, 2004). Overall, these results stress the existence of gender-related differences in the way fathers are

involved with their children. Because the perception of security in middle childhood is largely supported by open communication and psychological availability, and avoidant attachment is characterized by low involvement in communication, the relationship between fathers and daughters might be particularly affected by such aspects and, consequently, become more unstable. This is a possible reason why girls showed more insecure-avoidant attachment toward their father, while boys showed higher avoidance toward their mothers. Further research may simultaneously evaluate differences in anxiety and avoidance scores in relation to age and gender to test possible moderation effects.

In relation to concurrent validity, we evaluated the association between corresponding dimensions of the AMCQ and the ECR-RC (i.e., anxiety and avoidance), together with the association between the supplementary security factor and each of the ECR-RC-dimensions. In line with our expectations, strong correlations emerged between the anxiety and avoidance dimensions of the two questionnaires. Furthermore, higher security scores (as assessed by the supplementary scale) were associated with lower anxiety and avoidant scores of the ECR-RC.

Convergent validity was also examined for the two-factor scale and separately for the supplementary scale of the AMCQ in relation to a number of external measures which were selected based on attachment theory and previous research. Consistent with our expectations, anxiety and avoidance toward both mothers and fathers were significantly and negatively related to global self-worth, parent connectedness, and perceptions of support by family and friends. After controlling for age and gender, the results remained statistically significant and similar for the mother and father items. Also, higher perceived security was associated with higher levels of self-esteem, parental connectedness, and support from family and friends.



In relation to ER strategies, consistent with previous studies with school-age children (Brenning et al., 2011), avoidance toward mother and father predicted increased use of ES and reduced use of CR. Furthermore, security toward both parents was related to a decrease in ES. In contrast, anxiety toward mother and father failed to reach any significant association.

Regarding problem behavior, responses to the mother items were significantly related to internalizing problems, whereas only the avoidant subscale was related to externalizing problems. For father items, children who scored higher on anxiety reported greater externalizing behavior, whereas no association with avoidance emerged. However, after controlling for demographic variables, an increase of internalizing problems was found to be associated with higher levels of anxiety toward fathers; no other meaningful association was found. Our results are in line with previous findings highlight the prominent role of child-father attachment in predicting children's internalizing problems (Brumariu & Kerns, 2010; Desjardins & Leadbeater, 2011; Roelofs, Meesters, Huurne, Bamelis, & Muris, 2006), and lend support to the idea that anxious/ambivalent and avoidant children are at increased risk of different forms of maladjustment. Because anxious attachment limits exploration and mastery of the environment, it may compromise the development of self-confidence which, in turn, makes children more vulnerable to feelings of anxiety, low self-esteem, and withdrawal (Finnegan, 1999).

Overall, our work adds to the current literature by underscoring the complex nature of attachment relationships in middle childhood, which needs to be assessed via psychometrically sound instruments to avoid misinterpretations and can lead to inaccurate conclusions. In this perspective, the AMCQ is a promising tool to assess the quality of child-parent attachment in this specific developmental period due to its excellent? reliability and validity. Nonetheless, some limitations should be noted when interpreting the results.

First, this study was conducted with Italian school age children. Further research applying the AMCQ to other samples from different countries is warranted to increase the generalizability of findings and test its appropriateness in other cultural environments.

Second, as previously noted, our participants represented typically developing samples, thus not allowing to ascertain whether the types of validity addressed in this study may also be found in clinical populations. Research involving at-risk groups would be helpful to test the instrument's discriminant validity, particularly the utility of the security scale. Third, we exclusively relied on self-report measures to assess convergent, concurrent, and predictive validity. Other assessment tools, such as interviews and behavior observations, should be used to gain a more nuanced picture of attachment representations in middle childhood.

Despite these shortcomings, our study contributes to the literature by proposing a new questionnaire which is psychometrically sound, easy to administer, and respectful of children's cognitive characteristics in middle childhood. Although more research is needed to ascertain its reliability and validity in other national contexts, the AMCQ seems to adequately capture the components of avoidant, anxious, and secure representations in middle childhood. Future studies may build on these findings to test the invariance across parents and examine test-retest reliability across both short and long time periods.

## CHAPTER 7

### General conclusions

In the last 20 years, several instruments have been developed to assess attachment in middle childhood, including semi-projective techniques, interviews, and self-report questionnaires. The latter are the most used in this developmental period. Although their efficacy in assessing attachment has often been questioned by research that supported the use of interviews as the gold standard in the acquisition of dynamic and unconscious attachment processes (Jacobvitz, Curran, & Moller, 2002), self-report questionnaires have enabled researchers to better understand attachment in middle childhood, which is a relatively understudied developmental period in attachment research.

Several scholars have recognized and stressed the utility of self-report measure to assess attachment in middle-childhood (Main, 1999; Bosmans & Kerns, 2015). For example, Bosmans and Kerns (2015) advocated the usefulness of this measurement approach, stating that it is complementary to other approaches (i.e., interviews). Because during middle childhood children are able to understand and manage their own feelings, internal states, and manifest behaviors, self-report questionnaires may be a valid tool to investigate the conscious aspects of attachment organization. Furthermore, Mikulincer, and Shaver (2007, p. 109) argued that “conscious and unconscious processes typically operate in the same direction to achieve a goal, and unconscious motives are often manifested in conscious appraisals (Chartrand & Bargh, 2002)”.

Few self-report measures assess attachment in middle childhood, and a limited number of studies tested their psychometric properties in a systematic way. However, the availability of well-validated measures is of utmost importance, and if reliability and validity of current procedures are not extensively tested, their application may lead to inaccurate or even erroneous conclusions. Filling this gap is the primary challenge addressed by this dissertation.

In particular, this work was guided by three main aims: (1) to test the psychometric properties of existing self-report questionnaire for assessing attachment in middle childhood; (2) to examine the reliability and psychometric proprieties of Harter's response format as compared to the Likert format; and (3) to develop an age-appropriate and reliable instrument to measure attachment in middle childhood.

In the following paragraphs, we will summarize and discuss the main results.

### **Aim 1 - Evaluating the psychometric properties of extant self-report questionnaires**

To address this aim, we tested the psychometric properties of three self-report tools that have been highlighted as promising questionnaires to assess attachment in middle childhood, namely the SS (Chapter 2), the ECR-RC (Chapter 3), and the PACQ (Chapter 4: Study 1). Subsequently, a comparative study across instruments was carried out (Chapter 4: Study 2).

The SS was originally designed to assess attachment in children aged between 8 and 12 years. Since its introduction, the scale has become one of the most frequently used methods to assess attachment in the school-aged population. Although a recent meta-analysis provided evidence for its concurrent and convergent validity (Brumariu et al., 2018), formal testing of the factor structure has been rarely performed. We, therefore, examined the factor structure of the SS and its invariance across both mother and father in a sample of Italian children aged between 8 and 10 years. In line with the research aims, a

series of CFAs were applied to the data, which were treated as ordinal to respect the nature of the items. Furthermore, factor structure invariance was explored using an ad hoc bootstrapping method. The CFAs revealed satisfactory psychometric properties of the 12-item version of the SS for Italian children, providing provisional support for the structural invariance of its underlying construct across parents.

However, it is worth noting that three items were removed, and that another three items could have been removed due to their low factor loadings. Nonetheless, we decided to retain them because those items showing a poor fit with the mother SS (i.e., items 6 and 11) were acceptable for the father SS (i.e., item 10) and vice versa. The rationale for this decision was that the final model yielded good fit indices, and we preferred to adopt a conservative approach by trying to maintain the original structure as much as possible. Yet, these three items deserve further investigation. Furthermore, our overlapping procedure highlighted three items (3, 6, and 10) that behaved differently in terms of loadings in the mother and father versions. Of these, items 6 and 10 also showed low factor loadings and therefore require further investigation. From a methodological perspective, this study provides a useful example of how to evaluate measures involving dependency between observations. Indeed, the bootstrap-based procedure allowed us to test measurement invariance across mother and father-related items in a flexible and informative way.

Compared to the SS, the ECR-RC (Chapter 3) and PACQ (Chapter 4) carry the advantage of being able to explicitly distinguish between anxiety/preoccupation and avoidance in attachment relationships towards mother and father.

To assess the psychometric properties of the ECR-R (Chapter 3), we changed the response format of the short ECR-RC to a 5-point Likert scale (from the original 7-point Likert scale; Brenning et al., 2014) in order to meet the cognitive abilities of younger children. From a theoretical perspective, a major issue was to determine the dimensionality

of the scale: although the instrument was originally proposed as having two-factors, the literature (see Lionetti et al., 2018) also evidenced a third “security” factor comprising three of the six items originally pertaining to the avoidance subscale. We performed a series of CFAs separately for middle childhood and early adolescence, and a series of alternative models were compared. Further, invariance across age groups, internal consistency, concurrent validity, and convergent validity was tested. In our study, the results corroborated the two-factor solution, and measurement invariance across age groups, internal consistency, concurrent validity, and convergent validity were all supported.

Among the three existing questionnaires considered in this dissertation, the PACQ (Chapter 4, Study 1 and Study 2) has been much less investigated, and empirical evidence of its validity is extremely scarce. Indeed, the factorial validity of the PACQ had not been previously tested via CFA, and concerns were raised with respect to its external validity (Karavasilis, Doyle, & Markiewicz, 2003). We therefore addressed these gaps by systematically analyzing the factor structure of the PACQ and invariance across girls and boys (Study 1). We then examined its external validity by evaluating associations with the short ECR-RC and investigated and compared convergent and predictive validity of the two questionnaires.

Overall, our results indicate that the Italian version of the PACQ has good psychometric properties and is invariant between school-aged girls and boys. However, five items reported relatively high cross-loadings and were therefore dropped, suggesting the need for further investigation. Moreover, only partial support for the association between the PACQ and the ECR-RC was found, given that only the avoidance subscales were mutually associated. Likewise, the results did not lend support to the external validity of the preoccupied and anxiety subscales. Hence, the results raise questions about the validity of the PACQ-preoccupied coping subscale and the ECR-RC-anxiety subscale, while the

avoidant coping subscales of both questionnaires seem to reliably capture a component of insecure attachment. More research is warranted to clarify the specific aspects of insecure attachment measured by the preoccupied and anxiety scales.

Overall, these results indicate that the SS, the short ECR-RC and the PACQ are psychometrically sound instruments to assess attachment representations toward mother and father among Italian children.

**Aim 2 – Examining the reliability and psychometric proprieties of Harter’s response format as compared to Likert format**

The second main aim of this dissertation was to examine the reliability and psychometric proprieties of Harter’s response format (e.g. ‘Some kids...but other kids...’; Harter, 1982) in comparison with the most popular Likert scales as used in questionnaires to assess attachment in middle childhood (Chapter 5). This study can therefore be viewed as a preliminary step to accomplish the overall aim of developing a new self-report questionnaire, as discussed in Chapter 6.

To this end, we created additional versions of the short ERC-RC and SS by using Harter response options and Likert-type scales, respectively. The four versions were compared using a multigroup approach, which allowed us to examine whether latent constructs may be operationalized in the same way across the same items with different types of response formats. The literature suggests that, although children are valuable informants in referring their opinions and internal states, the choice of an age-appropriate response format is key to obtaining reliable and valid data. Our findings supported the use of both Harter and Likert formats in terms of psychometric properties and concurrent and convergent validity, but Harter’s format may be particularly suitable for young children for whom it was specifically designed. Indeed, as suggested by the cognitive development literature, younger children primarily think in a dichotomous way (Gelman & Baillargeon,

1983). Thus, responding in Harter's format, which basically consists of dichotomous questions, may facilitate the answer process without compromising the reliability of the questionnaire. Furthermore, the absence of a negative form (e.g. 'False' or 'Not like me') could be an advantage in this regard as younger children may find it difficult to understand and respond to negatively worded items (Marsh, 1986). Thus, our findings suggest that both the ECR-RC and the SS could be used with either response format. Because Harter's format carries an impersonal structure that could facilitate children's sharing of their internal states, it may limit social desirability responses and facilitate children's sharing of their feelings about their relationship with each parent.

**Aim 3 – Developing and testing the psychometric properties of the Attachment in Middle Childhood Questionnaire (AMCQ)**

As discussed in Chapter 6, the third aim of this research was to develop an age-appropriate questionnaire to assess attachment in middle childhood, namely the AMCQ. Second, the psychometric properties of the AMCQ in terms of factor structure, invariance across age and gender, and both concurrent and convergent validity were tested. In developing the new measure, it was expected that assessing felt security in association with anxiety and avoidance would provide an additional contribution to understanding attachment representations in middle-to-late childhood.

A pool of 51 items drawn from the SS and the ECR-RC was evaluated for content and sentence formulation, and an initial set of 30 items was selected. Based on the results of previous empirical research included in this dissertation (Chapter 5), the Harter response format was adopted to develop the new tool. In Study 1, EFA was performed to verify the dimensionality of the 30 items and reduce the number of items from 30 to 21. In this step items measuring anxiety, avoidance, and felt security regarding child-mother and child-father relationships were included and subjected to EFA. A model comparison approach was



used; we selected the most plausible model using the Bayesian information criterion, evaluating the variance explained by models and inspecting the factor loadings of the 30 items. While items relevant to the mother supported the two- and three-factor solutions as equally plausible, the three-factor solution appeared to be most plausible according to items relevant to the father. Three factors were therefore determined and, based on item content, they were labeled anxiety, avoidance, and felt security.

In a subsequent step (Study 2), we selected the final pool of items and re-assessed the dimensionality of the scale by adopting a semi-confirmatory approach. We tested whether the instrument had a three- or a two-factor scale, as well as a supplementary felt security scale of five items. A series of CFAs was performed on the three-factor scale (21 items), and two items in each factor which had high cross-loadings were dropped step-by-step. To definitively establish the structure of the new instrument, we undertook a procedure that allowed us to test the unique contribution of each factor in predicting a host of external variables. In particular, two SEMs were estimated for each outcome: one for the three correlated factors of felt security, avoidance, and anxiety as predictors, and one for the two correlated factors of avoidance and anxiety. When we analyzed the two-factor model, the expected correlations were generally found in relation to external measures, but when we added the felt security factor to the model, both anxiety and avoidance became unrelated to the external measures. Thus, our results are consistent with findings emerging from the short ECR-RC (Chapter 3) and support extant theory (Brennan et al., 1998) proposing a model with two dimensions, namely anxiety and avoidance, in which security is the result of low scores in those two dimensions. Eventually, the AMCQ comprised 10 items across two principal dimensions. However, because the felt security scale could prove particularly useful as a first screening tool to assess children's basic functioning (secure or insecure) and

identify individuals at risk of insecure attachment, we nevertheless decided to include it within the new instrument as a supplementary scale.

Lastly, we tested the psychometric properties of the AMCQ by running a series of analyses on the two-factor questionnaire and separately on the supplementary scale. We first tested the factor structure by conducting a CFA on a large sample of Italian children aged between 8 and 12 years, followed by MG-CFA to evaluate invariance across age and gender and explore differences in anxiety and avoidance between boys and girls, and between younger (primary school) and older (middle school) children. We also tested concurrent validity with the ECR-RC, and thoroughly evaluated external validity by performing SEMs for mother and father items, with attachment-related dimensions as independent variables, and global self-worth, social support (parents and peers), emotion regulation strategies (e.g. CR and ES), and problem behaviors (e.g. internalizing and externalizing) as criterion variables.

In terms of factor structure, the AMCQ showed an excellent fit for the two-factor structure, and the felt security subscale also reported an excellent fit in both parent-forms. Furthermore, both the AMCQ and the supplementary felt security scale were invariant across age and gender groups. In other words, the instrument assessed attachment avoidance, anxiety, and security in the same way for both boys and girls as well as for both younger and older children, enabling direct comparison of the resulting scores.

When we examined the differences in anxiety and avoidance latent scores for father and mother items, the results revealed higher levels of anxiety and avoidance toward both parents from middle childhood to early adolescence. Furthermore, the results showed significant and positive latent correlations between the AMCQ anxiety and avoidance subscales and the corresponding subscales of the short ECR-RC for both mother and father, suggesting that concurrent validity was achieved. Furthermore, a negative and consistent

association emerged between perceived security scores and the anxiety and avoidance subscales of the brief ECR-RC.

The findings also supported concurrent validity, since higher levels of avoidance and anxiety toward mother and father were linked to lower parental connectedness and a perception of lower family support, even when controlling for age and gender. In addition, higher anxiety toward father was linked to a perception of lower friend support. Avoidance toward both mother and father predicted higher use of ES and lower use of CR, whereas high felt security toward both mother and father was related to lower ES and higher CR. Finally, higher levels of anxiety toward the father were linked to increased internalizing problems.

Overall, our results indicate that the AMCQ has good psychometric properties and is invariant between primary and middle school children and between boys and girls. Furthermore, the results support concurrent and convergent validity of the AMCQ. Thus, it is a sound psychometric tool to capture the components of avoidance, anxiety, and security representations in middle childhood. In addition to replicating these findings, further research may focus on testing the invariance across parents and on evaluating test-retest reliability across both short and long time periods.

### **Limitations and future directions**

This dissertation adds to the current literature by systematically examining the psychometric properties of the major self-report questionnaires assessing attachment in middle childhood and by proposing a new, psychometrically sound tool (i.e., the AMCQ) to capture the components of avoidance, anxiety, and security representations in school-age children.

However, there are some limitations that need to be considered when interpreting the results. First, replication studies in other countries are needed to allow greater confidence in

the generalizability of results to children with different cultural backgrounds. Second, examination of test-retest reliability of the instruments and the association between questionnaire with measurements that are supposed to be unrelated to attachment construct is needed to determine the stability and discriminant validity of the scales in measuring the underlying constructs. Third, the present study is limited by the exclusive reliance on self-report measures to test concurrent and convergent validity. Future studies might include other assessment methods, such as interviews and behavior observations. Last, since participants represented a 'normative' sample, future studies may consider administering the AMCQ to at-risk groups (e.g., children with clinical disorders, children with socioeconomic disadvantage) to test its discriminant validity in middle childhood.

### **Theoretical Implications**

Despite these shortcomings, we believe that this dissertation provides a prominent contribution to the evaluation of extant attachment self-reports in middle childhood using a systematic approach as well as a comparative evaluation of instruments. Furthermore, although all the evaluated instrument provided evidence of good psychometric properties, the AMCQ suggested greater sensitivity in detecting, for example, internalizing problems. Taken together, the results of this dissertation suggest that (a) the underlying structure of attachment representations as assessed via self-report questionnaires is the same between boys and girls, and between middle (8–10 years) and late childhood (10–12 years); (b) the results support existing theory (Brennan et al., 1998) that posits two key dimensions, namely anxiety and avoidance, in which levels of security are reflected in low scores in both dimensions; (c) Harter's format is a psychometrically sound approach for assessing attachment in middle childhood via self-report; and (d) the anxiety components of attachment seem to be more difficult to capture compared to avoidant attachment representations.

From a theoretical perspective, our findings provide an overview of the characteristics related to attachment styles in middle childhood as derived from self-report tools. First, our results replicate — at least in part — the gender differences found in previous attachment studies (Chen & Chang, 2012; Del Giudice, 2009). Indeed, in line with other recent work, we found that girls are more anxious than boys. Furthermore, in exploring differences in anxiety and avoidance toward either parent, boys demonstrated more avoidance toward their mothers than girls, while girls were significantly more avoidant toward their fathers. A possible explanation lies in different parenting styles and behaviors as a function of child gender. For example, research has shown that mothers often talk more with girls than with boys and also exhibit more supportive speech toward girls, thus suggesting differences in relationship qualities. In a similar vein, previous studies have suggested that fathers are less communicative and engaging with their daughters than with their sons at all ages, with an increase in these tendencies from childhood to adolescence (e.g., Nielsen, 2012). Because the perception of security in middle childhood is largely supported by open communication and psychological availability, the relationship between fathers and daughters would be particularly affected by these aspects and, consequently, become more unstable. This may be a reason why girls exhibited greater insecure-avoidant attachment toward their fathers, and why higher avoidance toward mothers was observed in boys. However, further research concerning gender-related differences toward mothers and fathers is warranted to shed light on these issues.

Second, an increase in both anxiety and avoidance toward both parents was found from middle childhood to early adolescence. Increasing autonomy from parental figures that starts in this developmental period may be a reason for the normative increase of avoidance (Ammaniti, Van IZendoorn, Speranza, & Tambelli, 2000). Moreover, children in middle- to -late childhood start to manage the ongoing dialectic between separation and connectedness

with their parents as they avoid completely melding with or completely separating from them. This separation-individuation process can lead children to experience greater anxiety, particularly when they receive critical feedback from their parents, and this may naturally lead to increased anxiety scores.

Third, in relation to avoidant attachment, our findings replicate those of existing research and provide additional information to characterize the avoidant style. Indeed, avoidant children showed increased suppression of emotional expression, as illustrated throughout this dissertation by means of different instruments. This finding is consistent with the theoretical view that children who experience repeated rejection are more likely to develop an insecure, avoidant attachment style and learn to manage their emotions so as to reduce future rejection by decreasing expressive behavior (Cassidy, 1994). Furthermore, avoidance was related with less use of CR.

Of importance, across our studies we found that secure children met the theoretical expectation that the parent-child relationship represents the foundation for children's positive social development (Bretherton, 1987), as these children reported greater self-esteem, higher levels of perceived parental connectedness and support from family and friends, more use of CR, and less use of ES strategies to regulate their emotions.

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## **APPENDICES**



**Appendix A**

Table A1

*The three deleted items of the original Security Scale (Kerns et al., 2001)*

---

Item 2	Some kids feel like their (mom/dad) butts in a lot when they are trying to do things BUT Other kids feel like their (mom/dad) lets them do things on their own
Item 7	Some kids wish they were closer to their (mom/dad) BUT Other kids are happy with how close they are to their (mom/dad).
Item 14	Some kids wish their (mom/dad) would help them more with their problems BUT Other kids think their (mom/dad) helps them enough.

---

Table A2

*Analysis of variance of the mixed-effects model with attachment security as dependent variable*

Fixed effect	$\chi^2(1)$	<i>p</i> -value
Parental role (mother vs father)	1.582	.209
Grade (3 <sup>rd</sup> vs 5 <sup>th</sup> )	.305	.581
Gender (male vs female)	1.780	.182
Parental role X grade	1.683	.195
Parental role X gender	1.423	.233
Grade X gender	.013	.910
Parental role X grade X gender	1.300	.254

*Note.* Wald chi-square tests were used to test fixed effects. Random effect was subject ( $n = 149$ ).

**Convergent validity using factor scores**

The child's ratings of security toward mother as measured via the SS were negatively related to avoidance ( $r(144) = -.34, p < .001$ ) and positively related to ambivalence ( $r(144) = .27, p = .002$ ) as measured via the PACQ.



### Commented sample syntax in R for Structural Equation Models, Bootstrap and Overlapping

```

# Let 'd' be the dataset with 149 observations (N=149)
# and 30 variables:
# - cm1 to cm15 are the Security Scale coded items (mother)
# - cp1 to cp15 are the Security Scale coded items (father)
#
#
# Loading the data
load('d.rda')
#
# Loading R packages
library(lavaan) # For Structural Equation Models
library(overlapping) # For overlapping estimation
#
# Best fitting model (i.e., M5 in the paper) specification
m='
  sm = ~ cm1+cm3+cm4+cm5+cm6+cm8+cm9+cm10+cm11+cm12+cm13+cm15
  sp = ~ cp1+cp3+cp4+cp5+cp6+cp8+cp9+cp10+cp11+cp12+cp13+cp15
  cm1~~cp1
  cm3~~cp3
  cm4~~cp4
  cm5~~cp5
  cm6~~cp6
  cm8~~cp8
  cm9~~cp9
  cm10~~cp10
  cm11~~cp11
  cm12~~cp12
  cm13~~cp13
  cm15~~cp15
  ,
#
# Model fit
fit <- sem(m,data=d,std.lv =TRUE,ordered=colnames(d))
# Bootstrapping
BB <- bootstrapLavaan(fit,R=B)
# where B indicates the number of bootstrap replicates
#
# Overlapping: An example of one item
Y <- list(m=BB[,1],f=BB[,13])
overlap(Y,plot=TRUE)

```

**Items of the Italian translation of the Security Scale (Calvo, 1998; Simonelli, A., & Calvo, V. (2002))**

Per alcuni bambini è facile avere fiducia nella loro mamma/nel loro papà. INVECE

1 Altri bambini non sono sicuri se possono avere fiducia nella loro mamma/nel loro papà.

Alcuni bambini sentono che la loro mamma/il loro papà si mette molto in mezzo

2 quando fanno delle cose. INVECE Altri bambini sentono che la loro mamma/il loro papà li lascia fare le cose da soli.

Per alcuni bambini è facile contare sulla mamma/sul papà per avere aiuto. INVECE

3 Altri bambini pensano che è difficile contare sulla loro mamma/sul loro papà.

Alcuni bambini pensano che la loro mamma/il loro papà passa abbastanza tempo con

4 loro INVECE Altri bambini pensano che la loro mamma/il loro papà non passa abbastanza tempo con loro.

Ad alcuni bambini non piace veramente raccontare alla mamma/al papà quello che

5 pensano o che sentono INVECE Ad altri bambini piace raccontare alla mamma/al papà quello che pensano o che sentono.

Alcuni bambini non hanno veramente bisogno della mamma/del papà per molte cose.

6 INVECE Altri bambini hanno bisogno della mamma/del papà per molte cose.

Alcuni bambini vorrebbero essere più vicini alla loro mamma/al loro papà. INVECE

7 Altri bambini sono contenti della vicinanza che c'è con la loro mamma/il loro papà.

8 Alcuni bambini hanno paura che la loro mamma/il loro papà non gli voglia veramente

bene. INVECE Altri bambini sono veramente sicuri che la loro mamma/il loro papà gli vuole bene.

Alcuni bambini sentono che la loro mamma/il loro papà li capisce veramente. INVECE  
9 Altri bambini sentono che la loro mamma/il loro papà non li capisce veramente.

Alcuni bambini sono veramente sicuri che la loro mamma/il loro papà non li lascerà.  
10 INVECE Altri bambini a volte si chiedono se la loro mamma/il loro papà li lascerà.

Alcuni bambini hanno paura che la loro mamma/il loro papà potrebbe non essere lì  
11 quando hanno bisogno di lei. INVECE Altri bambini sono sicuri che la loro mamma/il loro papà sarà lì quando hanno bisogno di lei.

Alcuni bambini pensano che la loro mamma/il loro papà non li ascolta. INVECE Altri  
12 bambini pensano che la loro mamma/il loro papà li ascolta.

Alcuni bambini vanno dalla loro mamma/dal loro papà quando sono tristi. INVECE  
13 Altri bambini non vanno dalla loro mamma/dal loro papà quando sono tristi.

Alcuni bambini vorrebbero che la loro mamma/il loro papà li aiutasse di più con i loro  
14 problemi. INVECE Altri bambini pensano che la loro mamma/il loro papà li aiuta a sufficienza.

Alcuni bambini si sentono meglio quando la loro mamma/il loro papà è attorno.  
15 INVECE Altri bambini non si sentono veramente meglio quando la loro mamma/il loro papà è attorno.

## Appendix B

Table A3

*Item response distributions and descriptive statistics for the Italian version of the brief ECR-RC by age group (mother-related items)*

Item	Younger children										Older children									
	<i>n</i>	1	2	3	4	5	Mean	<i>SD</i>	Range	Skew	<i>n</i>	1	2	3	4	5	Mean	<i>SD</i>	Range	Skew
<i>Anxiety</i>																				
Item 1	259	78.0	10.0	5.0	5.0	2.0	1.43	0.94	1–5	2.28	185	75.1	14.1	4.9	3.8	2.7	1.44	0.91	1–5	2.31
Item 5	253	52.6	20.6	13.8	6.0	7.0	1.94	1.23	1–5	1.17	184	60.9	26.1	9.8	2.7	0.05	1.56	0.82	1–5	1.49
Item 7	255	79.6	9.8	2.7	3.5	4.3	1.43	1.02	1–5	2.49	185	80.5	10.8	5.4	0.05	2.7	1.34	0.83	1–5	2.90
Item 8	257	79.4	8.2	5.8	1.6	5.1	1.45	1.03	1–5	2.43	185	80.0	12.9	3.8	0.05	2.7	1.33	0.81	1–5	3.05
Item 9	255	74.9	17.7	3.1	2.3	2.0	1.39	0.82	1–5	2.63	185	80.0	11.4	5.4	0.05	2.7	1.35	0.83	1–5	2.87
Item 12	254	71.3	13.4	8.3	0.7	6.3	1.57	1.10	1–5	2.05	185	74.6	18.9	2.7	1.6	2.2	1.38	0.81	1–5	2.75
<i>Avoidance</i>																				
Item 2	254	40.6	27.2	20.1	5.9	6.3	2.10	1.19	1–5	0.92	184	28.3	33.7	23.9	9.2	4.9	2.29	1.12	1–5	0.65
Item 3	256	40.6	25.8	19.5	10.2	3.9	2.11	1.16	1–5	0.77	184	37.0	27.8	20.7	8.2	6.5	2.20	1.21	1–5	0.79
Item 4	254	69.7	12.6	5.1	5.9	6.7	1.67	1.22	1–5	1.72	182	72.5	15.0	7.1	3.3	2.8	1.49	0.96	1–5	2.11
Item 6	253	37.9	26.5	17.4	12.7	5.5	2.21	1.23	1–5	0.71	185	28.6	19.5	24.3	15.1	12.4	2.63	1.37	1–5	0.30
Item 10	254	40.2	22.1	20.9	11.8	5.1	2.20	1.23	1–5	0.67	184	27.7	19.6	24.5	22.3	6.0	2.59	1.27	1–5	0.15
Item 11	257	52.1	29.2	10.1	3.5	5.1	1.80	1.09	1–5	1.50	185	39.0	30.3	17.8	9.7	3.2	2.08	1.12	1–5	0.82

Table A4

*Item response distributions and descriptive statistics for the Italian version of the brief ECR-RC by age group (father-related items)*

Item	Younger children										Older children									
	<i>n</i>	1	2	3	4	5	Mean	<i>SD</i>	Range	Skew	<i>n</i>	1	2	3	4	5	Mean	<i>SD</i>	Range	Skew
<i>Anxiety</i>																				
Item 1	253	82.2	7.9	3.2	2.8	4.0	1.38	0.97	1–5	2.70	181	77.6	14.7	3.3	1.7	3.3	1.39	0.90	1–5	2.73
Item 5	243	58.4	16.9	14.4	6.2	4.1	1.81	1.15	1–5	1.28	182	62.1	19.2	9.3	7.1	2.2	1.68	1.05	1–5	1.48
Item 7	251	78.9	8.8	6.0	4.4	2.0	1.42	0.93	1–5	2.31	182	78.0	11.5	5.0	3.3	2.2	1.40	0.90	1–5	2.46
Item 8	249	75.5	8.8	6.8	4.8	4.0	1.53	1.08	1–5	2.01	182	72.5	13.2	9.9	1.1	3.3	1.49	0.96	1–5	2.13
Item 9	249	74.7	12.1	6.0	2.8	4.4	1.50	1.04	1–5	2.20	182	70.9	14.3	11.5	2.2	1.1	1.48	0.87	1–5	1.81
Item 12	251	67.7	13.2	11.6	4.4	3.2	1.62	1.06	1–5	1.67	181	67.4	19.9	5.5	2.8	4.4	1.57	1.03	1–5	2.06
<i>Avoidance</i>																				
Item 2	251	43.4	23.1	20.7	4.4	8.4	2.11	1.25	1–5	0.95	178	33.7	25.3	24.7	10.1	6.2	2.30	1.21	1–5	0.60
Item 3	251	41.4	21.9	18.7	12.4	5.6	2.19	1.25	1–5	0.70	182	28.6	24.7	28.0	15.4	3.3	2.40	1.15	1–5	0.31
Item 4	249	68.3	13.7	7.2	5.2	5.6	1.66	1.17	1–5	1.72	179	59.8	21.8	10.6	3.4	4.5	1.71	1.08	1–5	1.61
Item 6	250	31.2	23.6	22.8	13.6	9.0	2.45	1.30	1–5	0.47	182	15.9	17.0	23.1	26.4	17.6	3.13	1.33	1–5	–.19
Item 10	251	32.7	22.7	22.3	14.7	7.6	2.42	1.29	1–5	0.46	182	15.9	19.8	23.6	24.7	15.9	3.05	1.31	1–5	–.09
Item 11	252	36.1	31.6	20.2	7.6	4.8	2.13	1.13	1–5	0.84	182	26.4	20.1	28.0	16.5	6.0	2.53	1.22	1–5	.28

Table A5

*Standardized and unstandardized factor loadings between age groups (mother-related items)*

	<b>Younger children</b>		<b>Older children</b>	
	<b>Loading (SE)</b>		<b>Loading (SE)</b>	
	<i>Standardized</i>	<i>Unstandardized</i>	<i>Standardized</i>	<i>Unstandardized</i>
<i>Anxiety</i>				
Item 1	.611 (.066)	1.00	.794 (.045)	1.000
Item 5	.680 (.052)	1.114 (0.137)	.582 (.080)	0.732 (0.106)
Item 7	.703 (.072)	1.151 (0.149)	.914 (.031)	1.150 (0.066)
Item 8	.798 (.075)	1.306 (0.188)	.910 (.030)	1.146 (0.064)
Item 9	.751 (.047)	1.230 (0.144)	.816 (.050)	1.027 (0.071)
Item 12	.759 (.056)	1.243 (0.153)	.820 (.042)	1.032 (0.062)
<i>Avoidance</i>				
Item 2	.651 (.051)	1.00	.702 (.045)	1.00
Item 3	.624 (.058)	0.958 (0.112)	.837 (.037)	1.192 (0.086)
Item 4	.423 (.100)	0.649 (0.170)	.630 (.083)	0.897 (0.124)
Item 6	.800 (.045)	1.228 (0.119)	.895 (.033)	1.274 (0.101)
Item 10	.731 (.038)	1.122 (0.105)	.855 (.028)	1.217 (0.085)
Item 11	.497 (.062)	0.763 (0.105)	.666 (.045)	0.949 (0.087)

*Note.* All  $ps < .001$ . Younger children,  $n = 259$ ; older children,  $n = 185$ .

Table A6

*Standardized and unstandardized factor loadings between age groups (father-related items)*

	<b>Younger children</b>		<b>Older children</b>	
	<b>Loading (SE)</b>		<b>Loading (SE)</b>	
	<i>Standardized</i>	<i>Unstandardized</i>	<i>Standardized</i>	<i>Unstandardized</i>
<i>Anxiety</i>				
Item 1	.633 (.070)	1.000	0.761(.048)	
Item 5	.603 (.066)	0.952 (0.141)	.786 (.039)	1.032 (0.079)
Item 7	.837 (.063)	1.322 (0.186)	.953 (.019)	1.252 (0.077)
Item 8	.805 (.054)	1.271 (0.165)	.846 (.031)	1.111 (0.069)
Item 9	.794(.049)	1.254 (0.146)	.897 (.017)	1.178 (0.074)
Item 12	.867(.039)	1.369 (0.176)	.866 (.044)	1.137 (0.085)
<i>Avoidance</i>				
Item 2	.761(.040)	1.000	.781(.029)	1.000
Item 3	.753(.035)	0.989 (0.071)	.828 (.029)	1.060 (0.055)
Item 4	.435(.081)	0.571 (0.109)	.666 (.085)	0.853 (0.115)
Item 6	.782(.038)	1.027 (0.074)	.887 (.023)	1.136 (0.048)
Item 10	.768(.032)	1.009 (0.068)	.827 (.024)	1.059 (0.047)
Item 11	.505(.051)	0.663 (0.071)	.728 (.035)	0.933 (0.055)

*Note.* All  $ps < .001$ . Younger children,  $n = 253$ ; older children,  $n = 182$

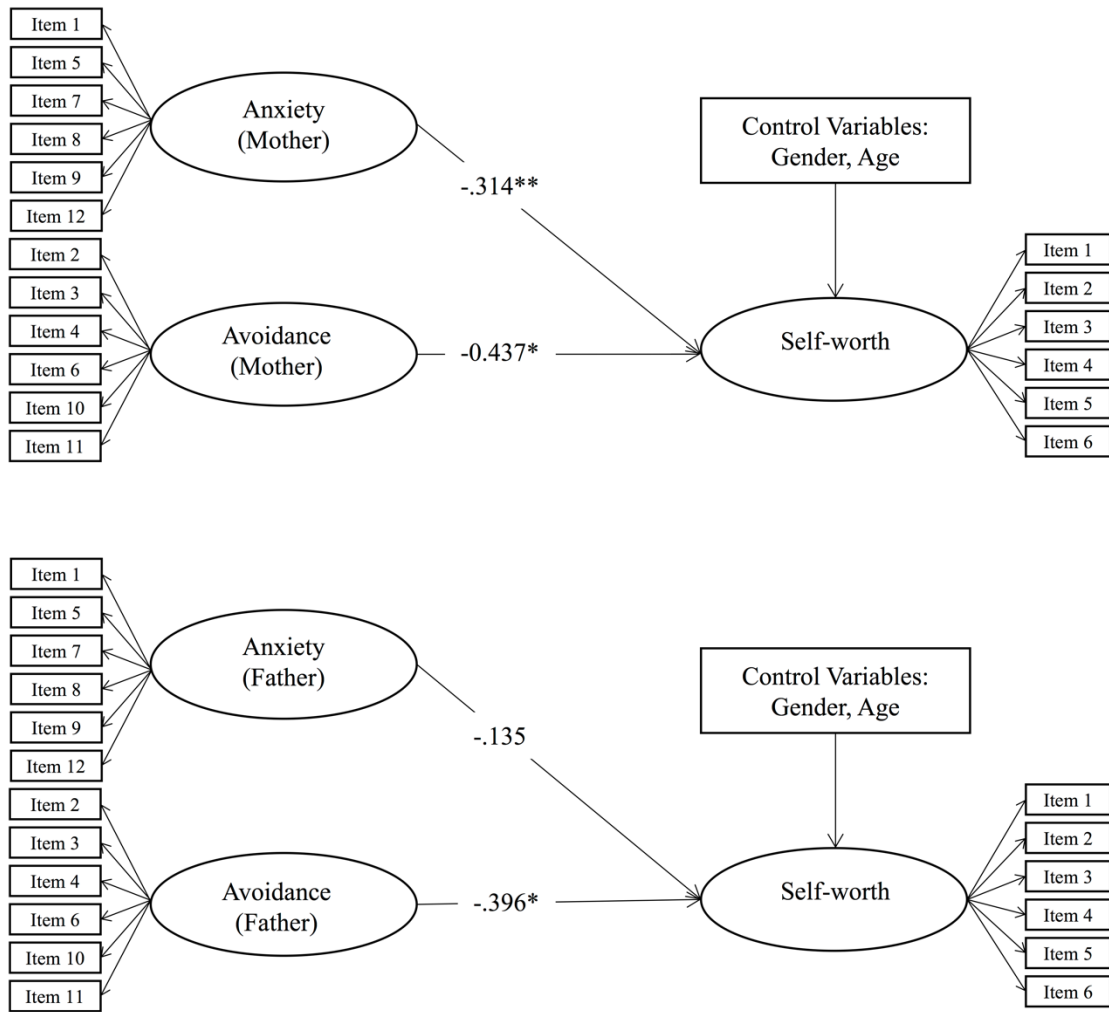


Figure A1. Structural equation model of the association between attachment dimensions (anxiety and avoidance, mother and father items) and self-worth.

Note: Mother,  $n = 435$ ; Father,  $n = 424$ . All structural coefficients are standardized.



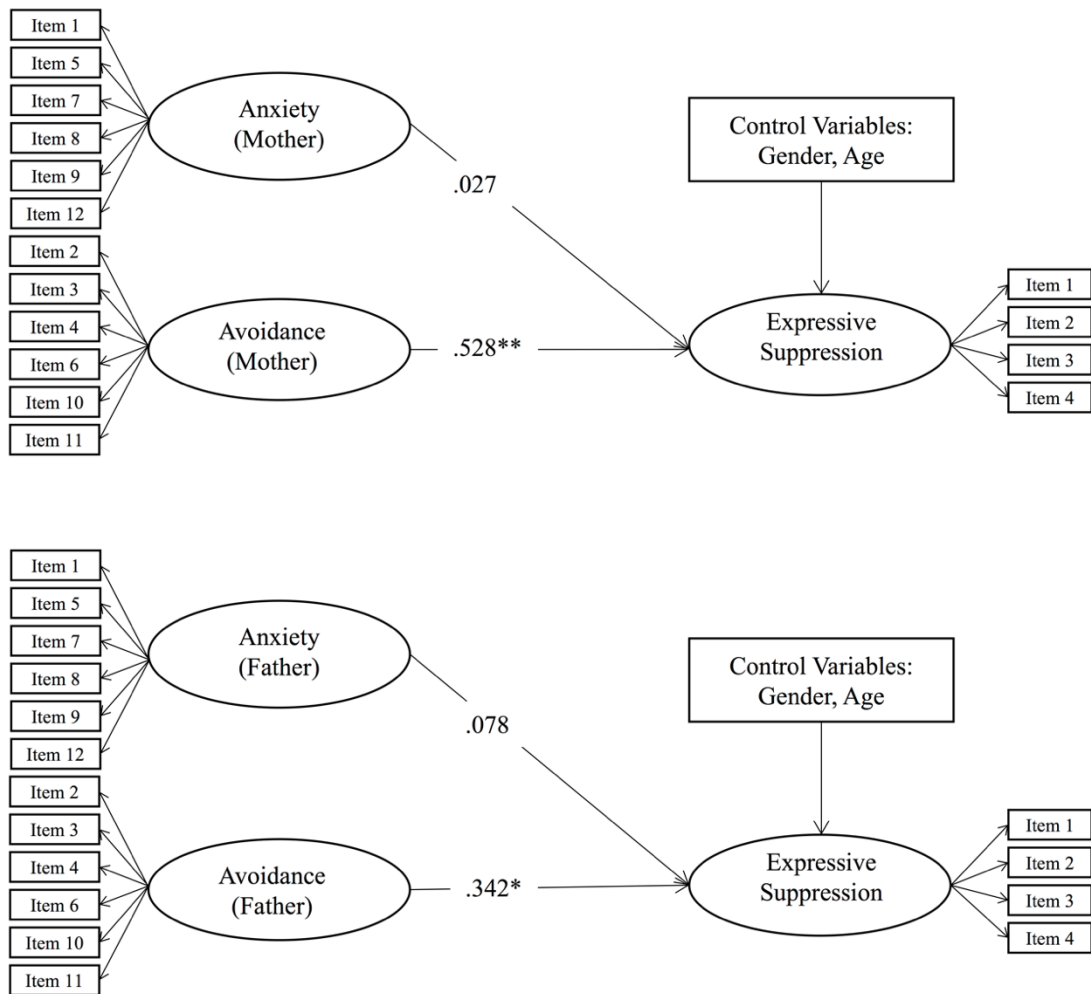


Figure A2. Structural equation model of the association between attachment dimensions (anxiety and avoidance, mother and father items) and Expressive suppression. Note: Mother,  $n = 414$ ; Father,  $n = 406$ . All structural coefficients are standardized.

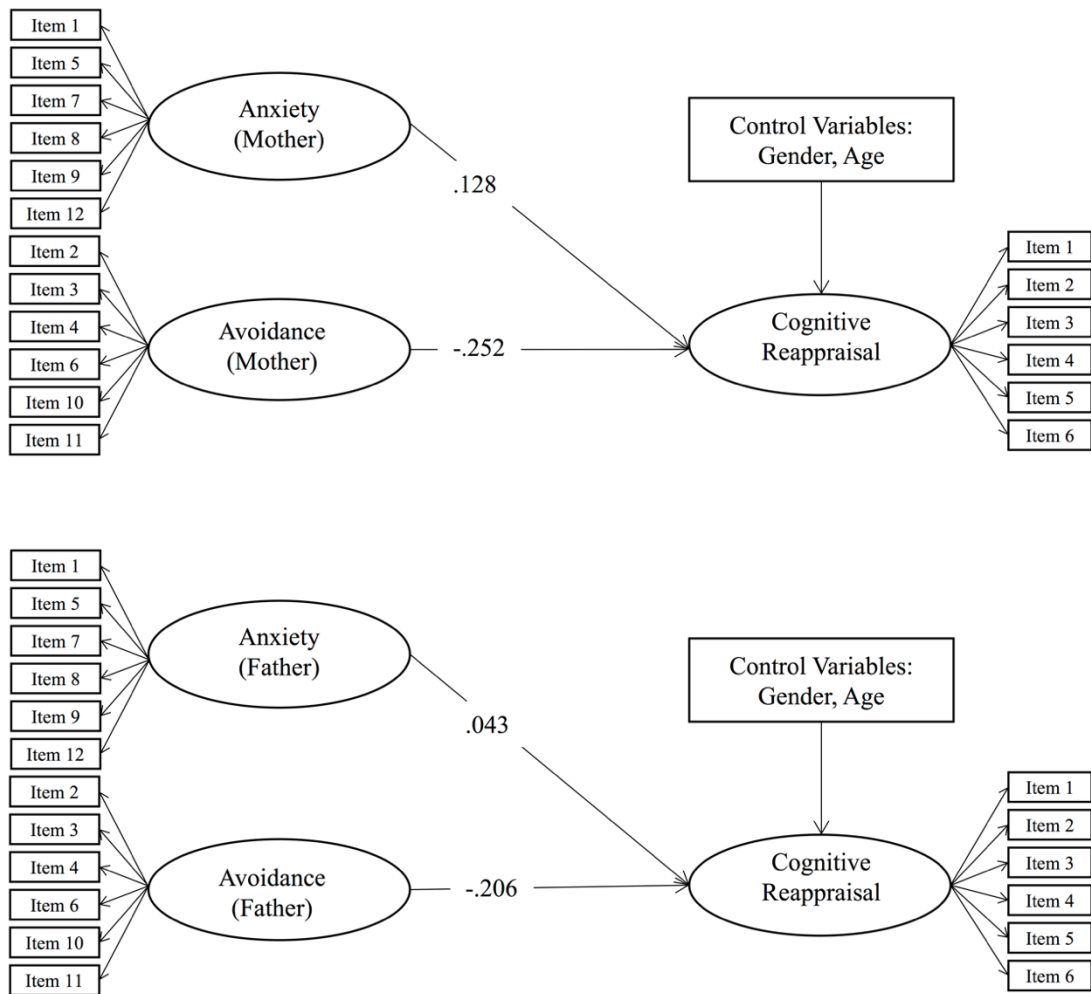


Figure A3. Structural equation model of the association between attachment dimensions (anxiety and avoidance, mother and father items) and Cognitive reappraisal. Note: Mother,  $n = 414$ ; Father,  $n = 404$ . All structural coefficients are standardized.

### Appendix C

Table A7

*Model fit for the PACQ short form tested for invariance across S1 (sub-sample considered only in study 1) and S2 (sub-sample considered in Study 1 and Study 2)*

	$\chi^2/df$	<i>p</i> -value	CFI	TLI	RMSEA [90% CI]	$\Delta$ CFI	$\Delta$ RMSEA
S1	1.010	.447	.999	.999	.008 [.000 – .042]		
S2	1.260	.050	.985	.982	.036 [.000 – .056]		
Configural invariance	1.140	.104	.990	.989	.027 [.000 – .044]		
Metric and scalar invariance	1.200	.027	.984	.983	.033 [.012 – .047]	– .007	.006

*Note.* S1:  $n = 174$ ; S2:  $n = 197$ .  $\chi^2/df$  = chi-square to degrees of freedom ratio; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index;

RMSEA = Root Mean Square of Approximation.

## Appendix D

### Adapted versions of the Security Scale (SS; Kerns, Aspelmeier, Gentzler, & Grabill, 2001)

- 
- |    |   |
|----|---|
| 1  | Per me è facile avere fiducia nella mia mamma                     |
| 3  | È difficile contare sulla mia mamma per avere aiuto               |
| 5  | Mi piace raccontare alla mia mamma quello che penso o che sento   |
| 6  | Sento che per molte cose non ho veramente bisogno della mia mamma |
| 9  | Sento che la mia mamma mi capisce veramente.                      |
| 12 | Penso che la mia mamma non mi ascolta.                            |
| 13 | Quando sono triste vado dalla mia mamma                           |
| 15 | Per me è facile avere fiducia nella mia mamma                     |
| 4  | Mi sento meglio quando la mia mamma è vicino                      |
| 8  | Vorrei essere più vicino alla mia mamma                           |
| 10 | Sono veramente sicuro che la mia mamma mi vuole bene              |
| 11 | Sono sicuro che la mia mamma non mi lascerà mai.                  |
-

**Adapted versions of the Experience of Close Relationships Revised Child version**

**(ECR-RC; Brenning, Van Petegem, Vanhalst, & Soenens, 2014)**

1	Alcuni bambini si preoccupano che la loro mamma possa abbandonarli	INVECE	Altri bambini sono sicuri che la mamma non li abbandonerà mai
2	Ad alcuni bambini non piace dire alla loro mamma quello che sentono veramente nel profondo	INVECE	Ad altri bambini piace dire alla loro mamma quello che sentono veramente nel profondo
3	Per alcuni bambini è facile parlare con la loro mamma delle cose che li riguardano.	INVECE	Per altri bambini non è facile parlare con la loro mamma delle cose che li riguardano
4	Alcuni bambini preferiscono non stabilire una eccessiva vicinanza con la loro mamma	INVECE	Ad altri bambini piace stabilire vicinanza con la loro mamma
5	A volte alcuni bambini sentono che la loro mamma cambia il sentimento che prova per loro senza un vero motivo	INVECE	Altri bambini sentono che la loro mamma è stabile nei sentimenti che prova per loro
6	Alcuni bambini parlano con la loro mamma quasi di tutto.	INVECE	Altri bambini trovano difficile parlare con la loro mamma di molte cose
7	Alcuni bambini si preoccupano che la loro mamma non voglia loro bene	INVECE	Altri bambini sono sicuri che la loro mamma voglia loro bene
8	Alcuni bambini hanno paura che la loro mamma non provi per loro quell'affetto che loro provano per lei	INVECE	Altri bambini sono sicuri che la loro mamma provi per loro lo stesso affetto che loro provano per lei
9	Alcuni bambini, quando mostrano alla loro mamma che le vogliono bene, hanno paura che lei non gliene voglia altrettanto	INVECE	Altri bambini, quando mostrano alla loro mamma che le vogliono bene, sono sicuri che lei gliene voglia altrettanto
10	Alcuni bambini parlano con la loro mamma dei loro problemi e delle loro preoccupazioni	INVECE	Altri bambini non parlano con la loro mamma dei loro problemi e delle loro preoccupazioni.
11	Per alcuni bambini è di aiuto rivolgersi alla loro mamma nei	INVECE	Per altri bambini non è di aiuto rivolgersi alla loro mamma nei

	momenti di bisogno		momenti di bisogno
12	Alcuni bambini si preoccupano che la loro mamma non voglia stabilire con loro quella vicinanza emotiva che vorrebbero	INVECE	Altri bambini sono sicuri che la loro mamma voglia stabilire con loro quella vicinanza emotiva che vorrebbero

Table A8

*Descriptive statistics of ECR-RC items across the two formats*

<i>Items</i>	<b>Harter's format</b>					<b>Likert format</b>				
	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Range</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Range</i>
<i>Anxiety</i>										
Item 1	104	1.24	0.66	2.90	(1–4)	102	1.90	1.23	0.88	(1–4)
Item 5	104	1.79	1.04	0.99	(1–4)	102	1.82	0.97	0.87	(1–4)
Item 7	104	1.18	0.62	3.51	(1–4)	102	1.34	0.84	2.39	(1–4)
Item 8	104	1.29	0.66	2.38	(1–4)	102	1.32	0.80	2.37	(1–4)
Item 9	103	1.28	0.65	2.44	(1–4)	102	1.40	0.87	2.17	(1–4)
Item 12	102	1.47	0.74	1.62	(1–4)	102	1.45	0.84	1.99	(1–4)
<i>Avoidance</i>										
Item 2	104	2.10	1.03	0.50	(1–4)	102	1.90	1.02	0.75	(1–4)
Item 3	104	2.18	1.10	0.43	(1–4)	102	2.28	1.14	0.19	(1–4)
Item 4	104	1.38	0.85	2.18	(1–4)	101	1.48	0.87	1.76	(1–4)
Item 6	104	1.85	0.94	0.79	(1–4)	102	1.56	0.85	1.35	(1–4)
Item 10	103	1.73	0.84	1.02	(1–4)	101	1.52	0.78	1.41	(1–4)
Item 11	103	1.32	0.64	2.20	(1–4)	102	1.33	0.59	1.83	(1–4)

*Note.* Harter's format,  $n = 104$ ; Likert format,  $n = 102$ .

Table A9

*Descriptive statistics of SS items across the two formats*

<i>Items</i>	<b>Harter's format</b>					<b>Likert format</b>				
	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Range</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Range</i>
Item 1	95	3.73	0.49	- 1.51	(2-4)	109	3.71	0.50	- 1.34	(2-4)
Item 2	95	3.66	0.61	- 1.87	(1-4)	109	3.01	1.25	- 0.66	(1-4)
Item 3	95	3.27	1.03	- 1.08	(1-4)	109	3.34	0.94	- 1.25	(1-4)
Item 4	95	2.99	1.04	- 0.60	(1-4)	109	2.97	1.13	- 0.59	(1-4)
Item 5	94	2.65	1.00	- 0.10	(1-4)	109	2.59	1.18	- 0.02	(1-4)
Item 6	95	3.68	0.78	- 2.52	(1-4)	108	3.94	0.37	- 6.34	(1-4)
Item 7	95	3.28	0.92	- 1.07	(1-4)	109	3.48	0.75	- 1.41	(1-4)
Item 8	95	3.61	0.80	- 2.13	(1-4)	109	3.80	0.66	- 3.34	(1-4)
Item 9	95	3.00	1.04	- 0.45	(1-4)	109	2.68	1.23	- 0.18	(1-4)
Item 10	95	3.36	0.78	- 1.10	(1-4)	109	3.61	0.86	- 2.09	(1-4)
Item 11	95	3.40	0.82	- 1.30	(1-4)	109	3.61	0.75	- 2.02	(1-4)
Item 12	95	3.58	0.81	- 2.00	(1-4)	109	3.80	0.49	- 2.84	(1-4)

*Note.* Harter's format,  $n = 95$ ; Likert format,  $n = 109$ .



**Appendix E**

Table A10

*Descriptive statistics and factor loading of the 15 items of AMCQ (mother-related items)*

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>	<i>Range</i>
<i>Anxiety</i>					
Anx1	696	1.34	0.78	2.30	1–4
Anx2	694	0.41	0.77	1.98	1–4
Anx3	697	0.28	0.65	2.42	1–4
Anx4	697	0.36	0.70	1.94	1–4
Anx5	699	0.29	0.66	2.47	1–4
<i>Avoidance</i>					
Av1	694	2.14	1.08	0.41	1–4
Av2	700	1.94	0.99	0.76	1–4
Av3	695	1.63	0.85	1.20	1–4
Av4	699	1.95	0.97	0.64	1–4
Av5	698	1.98	0.98	0.57	1–4
<i>Security</i>					
Ss1	697	3.55	0.77	– 1.75	1–4
Ss2	697	3.60	0.68	– 1.85	1–4
Ss3	692	3.40	0.88	– 1.34	1–4
Ss4	696	3.46	0.84	– 1.45	1–4
Ss5	696	3.55	0.74	– 1.71	1–4

Table A11

*Descriptive statistics of the 15 items of AMCQ (father-related items)*

<i>Items</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Skewness</i>	<i>Range</i>
<i>Anxiety</i>					
Anx1	671	1.35	0.76	2.21	1–4
Anx1	669	1.50	0.79	1.78	1–4
Anx2	671	1.33	0.70	4.27	1–4
Anx3	674	1.43	0.79	2.47	1–4
Anx4	672	1.40	0.76	2.85	1–4
<i>Avoidance</i>					
Av1	669	2.18	1.06	0.32	1–4
Av2	675	2.09	1.01	0.50	1–4
Av3	675	2.02	0.96	0.64	1–4
Av4	672	2.07	0.97	0.47	1–4
Av5	674	2.01	1.00	0.52	1–4
<i>Security</i>					
Ss1	671	3.47	0.82	– 1.55	1–4
Ss2	673	3.52	0.74	– 1.53	1–4
Ss3	670	3.34	0.87	– 1.18	1–4
Ss4	672	3.34	0.85	– 1.14	1–4
Ss5	673	3.45	0.83	– 1.49	1–4

**Items of Attachment in Middle Childhood Questionnaire (AMCQ)**

1	Alcuni bambini si preoccupano che la loro mamma/il loro papà possa abbandonarli	INVECE	Altri bambini sono sicuri che la mamma/il loro papà non li abbandonerà mai
2	Ad alcuni bambini non piace dire alla loro mamma/al loro papà quello che sentono veramente nel profondo	INVECE	Ad altri bambini piace dire alla loro mamma/al loro papà quello che sentono veramente nel profondo
3	Alcuni bambini quando non sono con la loro mamma/il loro papà hanno paura che lei non pensi più a loro	INVECE	Altri bambini sono sicuri che la loro mamma/il loro papà pensa a loro anche quando non sono con lei
4	Per alcuni bambini è facile parlare con la loro mamma/il loro papà delle cose che li riguardano	INVECE	Per altri bambini non è facile parlare con la loro mamma delle cose che li riguardano
5	Per alcuni bambini è facile avere fiducia nella loro mamma/nel loro papà	INVECE	Altri bambini non sono sicuri se possono avere fiducia nella loro mamma
6	Per alcuni bambini è facile contare sulla mamma/sul papà per avere aiuto	INVECE	Altri bambini pensano che è difficile contare sulla loro mamma per avere aiuto
7	Alcuni bambini parlano con la loro mamma/il loro papà quasi di tutto.	INVECE	Altri bambini trovano difficile parlare con la loro mamma di molte cose
8	Alcuni bambini si preoccupano che la loro mamma/il loro papà non voglia loro bene	INVECE	Altri bambini sono sicuri che la loro mamma voglia loro bene
9	Alcuni bambini hanno paura che la loro mamma/il loro papà non provi per loro quell'affetto che loro provano per lei	INVECE	Altri bambini sono sicuri che la loro mamma provi per loro lo stesso affetto che loro provano per lei
10	Alcuni bambini, quando mostrano alla loro mamma/al loro papà che le vogliono bene, hanno paura che lei non gliene voglia altrettanto	INVECE	Altri bambini, quando mostrano alla loro mamma che le vogliono bene, sono sicuri che lei gliene voglia altrettanto
11	Alcuni bambini parlano con la loro mamma/il loro papà dei loro problemi e delle loro	INVECE	Altri bambini non parlano con la loro mamma dei loro problemi e delle loro

	preoccupazioni		preoccupazioni
12	Alcuni bambini pensano che la loro mamma/il loro papà non li ascolta	INVECE	Altri bambini pensano che la loro mamma li ascolta
13	Ad alcuni bambini non piace veramente raccontare alla mamma/al loro papà quello che pensano o che sentono	INVECE	Ad altri bambini piace raccontare alla mamma/al papà quello che pensano o che sentono
14	Alcuni bambini si sentono meglio quando la loro mamma/il loro papà è attorno	INVECE	Altri bambini non si sentono veramente meglio quando la loro mamma è attorno
15	Alcuni bambini sentono che la loro mamma/il loro papà li capisce veramente	INVECE	Altri bambini sentono che la loro mamma non li capisce veramente

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