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## Somatic symptoms and parental attachment in middle childhood: the mediating role of anxiety, depressive symptomatology and peer attachment

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### Abstract

Somatic symptoms represent a multi-determined phenomenon that need to be addressed in both clinical and non-clinical settings in light of their impact on child emotional and psychosocial functioning. According to a developmental perspective, children with insecure attachment are more likely to experience somatic symptoms and to perceive greater symptom severity. The present study was designed to increase our understanding of the relationship between parental attachment and somatic symptoms by testing the mediational role of anxiety, peer attachment and depressive symptoms in a non-clinical sample of 332 Italian children (49.4% males) aged 8 to 11 years ( $M_{age} = 9.26$ ;  $SD = 0.89$ ). A serial multiple mediation model was used to verify the study's hypothesis. Somatic symptoms correlated with attachment, anxiety and depressive symptoms. Anxiety, peer attachment and depression mediated the association between parental attachment and somatic symptoms. This association remained significant after controlling for mediators ( $b = -0.185$ ,  $p < .05$ ), suggesting that low levels of child-parent attachment security relationships can predispose children to experience more somatic symptoms. Results are discussed considering clinical implications.

**Keywords:** somatic symptoms; attachment; developmental perspective; mediation models; middle childhood.

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## Introduction

Somatic symptoms (SS) such as headaches, abdominal pain, low energy and skin problems, are frequently reported by children and adolescents. Although for some children SS have no negative impact on daily functioning or developmental course, persistent or recurrent SS can influence the quality of daily life (Ordóñez et al., 2015) and are related to emotional distress with suffering and low functioning (Cerutti et al., 2017; Cerutti et al., 2019; Essau et al., 2013; Saps et al., 2009). There is also evidence of strong relationships between SS, anxiety and depression in childhood and adolescence (Campo et al., 2004; Dufton et al., 2009). The co-occurrence of these internalizing symptoms can predispose children to different biological and psychological conditions such as high sensitivity to stress, emotional distress, dysfunctional coping strategies, behavioural inhibition, psychopathology and chronic pain in adulthood (Vacarino et al., 2008; Weersing et al., 2012). In addition, the presence of peer conflicts can exacerbate SS causing negative emotional responses (Gini et al., 2009; Jellesma et al., 2006).

Previous studies have shown that dysfunctional relationships among family members increase one's vulnerability for the onset of SS (Ibeziako & Bujoreanu, 2011), highlighting the tendency to (a) express psychological suffering through physical complaints; (b) exhibit bodily symptoms to trigger care-taking behaviors in others, given that SS are more accepted by caregivers than the expression of anxiety; and (c) use of the SS as a protection mechanism by children from families who have high expectations (e.g., school expectations) of them (Ibeziako & Bujoreanu, 2011; Silber, 2011). Research has also demonstrated that the interactions between parents and children with recurrent or persistent SS were frequently characterized by the expression of anger/hostility, overprotective behaviours, ambivalence and poor emotional involvement (Craig et al., 2004; Kozłowska & Williams, 2009).

Emotional processing has a significant place in attachment theory (Bowlby, 1977). Contributions on attachment theory and research have shown that secure attachment develops when caregivers interpret and satisfy children's emotional and physical needs (Kissgen & Franke, 2016) while insecure attachment results when caregivers failed to respond to children's needs (Wissink et al., 2016). According to a developmental perspective, children and adolescents with insecure parental attachment are more likely to experience somatic and painful symptoms as well as functional disability (Esposito et al., 2013; Taylor et al., 2012). Moreover, attachment insecurity contributes to the persistence of children's pain (Donnelly & Jaaniste, 2016).

Despite this fact that previous studies have demonstrated that insecure attachment represents a risk factor for SS in children and adolescents, the mechanisms linking this association are not fully understood (Groh et al., 2012). Monaco and colleagues (2019) showed that emotional competencies (e.g., perceive and understand emotions, label and express emotions, manage and regulate emotions) mediated the relationship between attachment to parents and SS in a sample of Spanish adolescents. Similar findings were obtained in other adult studies. Liu (Liu et al., 2011, and Neumann et al.,

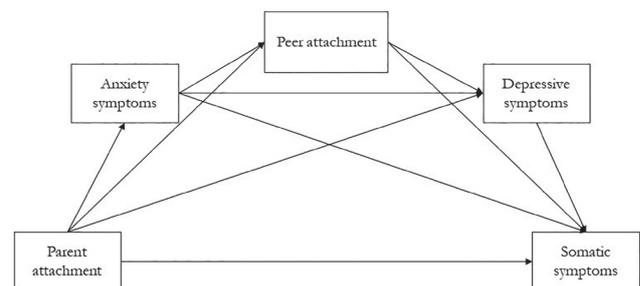
2015) reported the mediating role of anxiety, depression and regulation of angry feelings among adult couples. Falahatdoost and colleagues (2020) observed that weakness in emotional processing had a significant effect on the severity of somatic symptoms.

A meta-analysis (Madigan et al., 2013) examining 60 previous studies involving more than 5.000 families demonstrated a significant association between insecure attachment and internalizing symptoms of psychopathology (e.g., depression, anxiety, and social isolation). Longitudinal studies confirmed the role of attachment insecurity in predicting symptoms of anxiety and depression during adolescence (Bar-Haim et al., 2007; Murray et al., 2010). Moreover, anxious and depressive symptoms predicted SS one year later (Ruchkin & Schwab-Stone, 2014).

The quality of attachment relationships to caregivers directly influences the quality of attachment relationships to peers (Kochendorfer & Kerns, 2017; Wilkinson, 2004). A poor quality of peer relationships can negatively impact on children and adolescents' development leading to SS (e.g., headaches, stomachaches) and emotional difficulties (e.g., recurrent sadness and depression, low self-esteem, social isolation) (Atik & Güneri, 2013; Gini & Pozzoli, 2009; Hansen et al., 2012). Adverse peer experiences are related to internalizing symptoms (e.g., loneliness, depression, anxiety, and somatic symptoms) in both clinical (Cohen & Kendall, 2015) and non-clinical samples (Løhre et al., 2011).

In light of the above considerations, our study aimed to evaluate the direct effect of parental attachment on SS and its indirect effects via symptoms of anxiety, depression and peer attachment in middle childhood (Figure 1). All factors were tested simultaneously in a serial multiple mediation model to understand the causal order of the related mediators. To our knowledge, this has not yet been previously studied among non-clinical Italian children.

Fig. 1. Theoretical research model



## Methodology

### Participants and Procedures

Three hundred and forty children attending three public primary schools in Central Italy participated in the study. Of all the participants, eight participants' responses were removed to avoid possible outliers given extreme values on at least one measure and incomplete questionnaires, resulting in a 97.65% response rate. A final sample of 332 Italian students (49.4%

males,  $n=164$ ) aged 8 to 11 years ( $M$  age= 9.26;  $SD=0.89$ ) was involved in the present study. Exclusion criteria for participation in this study included the presence of a diagnosed psychiatric illness and/or history of psychiatric treatment, history of significant neurological illness or brain injury. A written informed consent was obtained from all schoolchildren and their parents before their enrolment. All participants included in the final sample ( $N=332$ ) completed the questionnaire battery, administered in written form, in the classroom during school time. The anonymity and privacy of participants was ensured by assigning them a code and allowing data access only to researchers involved in data analysis. This study was approved by the Ethics Committee of the Department of Dynamic and Clinical Psychology, Faculty of Medicine and Psychology, Sapienza University of Rome (Italy).

### Measures

All participants in the research study completed the questionnaires described below:

*Children Somatization Inventory-24 (CSI-24)* (Walker et al., 2009). This self-report questionnaire consists of 24 items that evaluate the perceived severity of 24 non-specific SS. The CSI-24 was translated into Italian using the translation-back-translation method, with the approval of the Author. Participants report how often they have suffered from each symptom investigated in the last two weeks (e.g., item 1: "Headache"; item 15: "Pain- stomach") through five response alternatives, distributed on a 5-point Likert scale (from 0= "not at all", to 4= "a whole lot"). The total score is obtained by summing the scores given by all the participant's answers and can vary from 0 to 96. Based on Walker and colleagues' instructions (1991), we considered a dichotomous scoring in which 0 indicates the absence of a symptom and 1 indicates its presence (i.e. score 3= "much" and score 4= "a whole lot"). Furthermore, we use the total score of 32 as the cut-off of clinical utility as demonstrated by a previous study (Stone et al., 2019).

In the present study, the scale showed excellent internal consistency (Cronbach's  $\alpha$  of .88) similar to the original study (Walker et al., 2009).

*Children Depression Inventory-2 Short version (CDI-2(S))* (Kovacs, 2015; Camuffo & Cerutti, 2018). It is the most widely used depression rating scale for children and adolescents. The short version comprises 12 items that quantify a depressive syndrome and provides an index of the current range of symptoms and their severity in children and adolescents. The questionnaire helps assess cognitive, affective, and behavioural signs of depression (e.g., item 1: "Sad feelings"; item 7: "Rarely cranky"). For each item, the respondent is presented with three choices that correspond to three levels of symptomatology (0= "absence of symptoms", 1= "mild or probable symptom", 2= "definite or severe symptom"). The scale ranges from 0 to 24. A higher total score reflects a high level of depressive symptoms. Furthermore, a cut-off score of 6 discriminates the risk of a depressive symptomatology that requires clinical attention. The CDI 2(S) has excellent psychometric properties and

yields a total score that is typically very comparable to the one produced by the full-length version.

The questionnaire demonstrated high internal consistency, with a Cronbach's coefficient alpha ranging from .74 in Italian non-clinical samples to .80 in Italian clinical samples (Camuffo & Cerutti, 2018). Specifically, for the 7-12 years age group Cronbach's alpha was .71. In the present study, the scale showed acceptable internal consistency (Cronbach's  $\alpha$  of .67).

*Screen for Child Anxiety Related Emotional Disorders (SCARED)* (Birmaher et al., 1999; Scaini et al., 2017). This is a self-report questionnaire composed by 41 items assessing anxiety symptoms in children and adolescents. Participants report how often they have suffered from each symptom investigated in the last 3 months (e.g., item 8: "I follow my mother or father wherever they go"; item 39: "I feel nervous when I am with other children or adults and I have to do something while they watch me (for example: read aloud, speak, play a game, play a sport) using three response alternatives, distributed on a 3-point Likert scale (0= "not true or hardly ever true", 1= "somewhat true or sometimes true", 2= "very true or often true"). Anxiety symptoms increase with increasing scores and a cut-off score of 25 indicates the risk of clinical anxiety. The scale demonstrated excellent internal consistency (Cronbach's  $\alpha$  of .90) and discriminant validity. In the present study, the scale showed excellent internal consistency (Cronbach's  $\alpha$  of .92).

*Inventory of Parent and Peer Attachment- Revised (IPPA-R)* (Gullone & Robinson, 2005). This self-report questionnaire was used to measure the quality of parent and peer attachment in children and the affective-cognitive dimension of attachment. It consists of two scales: parent and peer attachment. The first scale measures attachment to parents and consists of twenty-eight items on a Likert-type scale. Each item has five possible responses (from "completely untrue" to "completely true"). The second scale measures the attachment to peers and consists of twenty-five items on a Likert-type scale.

This instrument has been adapted by Gullone and Robinson (2005) for use with children and adolescents aged 9–15 years by modifying the original version of the inventory (Armsden and Greenberg, 1987). According to a previous study (Lau et al., 2012), this age range was deemed appropriate for the age range of the children in this study (8-11 years). Parent and peer attachment scales are made up of three factors that provide indications of felt security in attachment relationships: Trust, measuring the adolescent's trust in the availability and sensitivity of an attachment figure; Communication, with a focus on communication quality which fosters comfort in the relationship with an attachment figure; and finally, Alienation, the extent of anger and/or hopelessness resulting from an unresponsive or inconsistently responsive attachment figure. Total scores of parent and peer attachment are computed by adding the Trust and Communication subscales scores and subtracting the Alienation subscale score. A higher total score reflects a high level of felt security in attachment relationships. The reliability and validity of the IPPA have been shown to be satisfactory (Baiocco et al., 2009; Tambelli et al., 2012). In the present study, Cronbach's alpha of the parent and peer attachment scales were .54 and .78, respectively. Cronbach's alpha of the parent and peer attachment subscales were .71 and

.82 for parent and peer Trust subscales; .62 and .82 for parent and peer Communication subscales; .68 and .68 for parent and peer Alienation subscales.

*Data Analysis*

This is a cross-sectional design research. Data were analysed using the Statistical Package for Social Science (SPSS) 25.0 for Windows. Descriptive statistics were used to evaluate sample characteristics (frequency, means and standard deviations).

Univariate analysis of variance (ANOVAs) were used to investigate the main differences according to gender.

The zero-order correlations between the variables were initially calculated to analyse the relationships between the variables of interest. Subsequently, the sample (N= 332) was divided in psychopathological at risk groups based on clinical cut-offs proposed by the Authors of the CDI-2, the SCARED and the CSI-24, exploring co-occurrence of internalizing symptoms. A Chi-square test of independence was used to examine the relationship between psychopathology and gender.

Finally, a Serial Multiple Mediation Model (PROCESS, Model 6) (Hayes, 2013) was conducted in order to empirically test the theoretical research model presented above. In particular, we explored if anxiety symptoms (*mediator 1*), peer attachment (*mediator 2*) and depressive symptoms (*mediator 3*) explained the relationship between attachment to parents and SS (*Figure 1*).

**Results**

*Descriptive statistics and associations between the variables of interest*

Table 1 shows the sample characteristics for the variables considered in the present study. According to gender, statistically significant differences were observed only for anxiety. Specifically, girls reported higher symptoms of anxiety than did boys.

**Tab. 1.** Descriptive statistics according to gender

Variables	Total (n =332)	Boys (n =164)	Girls (n =168)	F value
	Mean (±SD)	Mean (±SD)	Mean (±SD)	
Age	9.26 (0.89)	9.29 (0.89)	9.23 (0.90)	0.31
Somatic symptoms	15.12 (12.36)	14.07 (12.55)	16.14 (12.13)	2.36
Depressive symptoms	3.78 (3.06)	3.64 (3.04)	3.92 (3.07)	0.71
Anxiety symptoms	20.65 (13.28)	18.01 (12.94)	23.23 (13.15)	13.29***
Parent attachment	38.28 (8.99)	37.67 (9.65)	38.88 (8.27)	1.51
Peer attachment	29.77 (10.17)	28.92 (10.8)	30.6 (9.46)	2.29

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

Correlation analyses revealed significant associations between all of the variables explored. In particular, the CSI-24 showed significant positive correlations with the CDI-2

(S) (r= .338, p< .001) and the SCARED (r= .467, p< .001), and significant negative correlations with the IPPA-Parent (r= -.276, p< .001) and the IPPA-Peer (r= -.218, p< .001).

The CDI-2(S) correlated positively with the SCARED (r=.372, p< .001) and negatively with the IPPA-Parent (r= -.458, p< .001) and the IPPA-Peer (r= -.474, p< .001). Furthermore, significant negative associations emerged between the SCARED and both the IPPA-Parent (r= -.178, p< .01) and the IPPA-Peer (r= -.226, p< .001). There was also an expected significant relationship between the IPPA-Parent and the IPPA-Peer (r= .537, p< .001).

Finally, age showed significant positive correlations with the CSI-24 (r= -.178, p< .01) and CDI-2(S) (r= -.159, p< .01) scores. Age is positively correlated with the IPPA-Parent scores (r= .227, p< .001). No significant associations emerged between age and the SCARED or the IPPA-Peer.

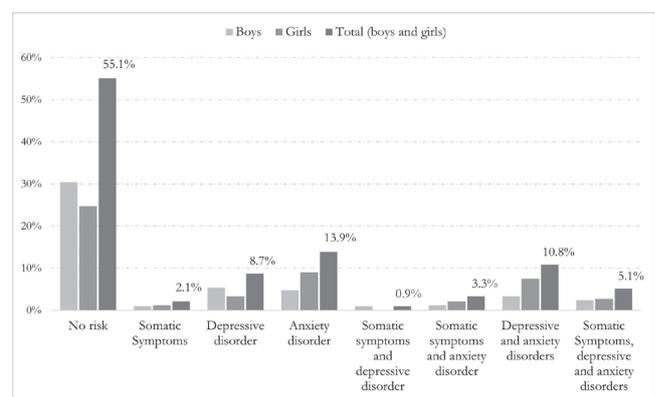
*Psychopathological risk and comorbidity*

The analysis of the frequencies of the CSI-24 indicated that half of the total sample (50.9%, n=169) reported at least one SS during the last two weeks and 11.4% (n= 38) of participants obtained a clinically significant CSI-24 total score (Stone et al., 2019). According to the Author of the CDI-2(S) and the SCARED, 25.6% (n= 85) and 33.1% (n= 110) of the sample were at risk for depressive and anxiety disorders, respectively.

Chi square tests of independence showed that only the risk for anxiety disorders was associated with gender ( $\chi^2= 12.79$ , df= 1, p<.001, Cramer’s V= 0.20). Specifically, there were more females (42.3%, Stand. Residual= 2.1) than males (23.8%, Stand. Residual= -2.1) at risk for anxiety disorders.

Figure 2 shows the prevalence of risk for psychopathology by gender.

**Fig. 2.** Prevalence of risk for psychopathology



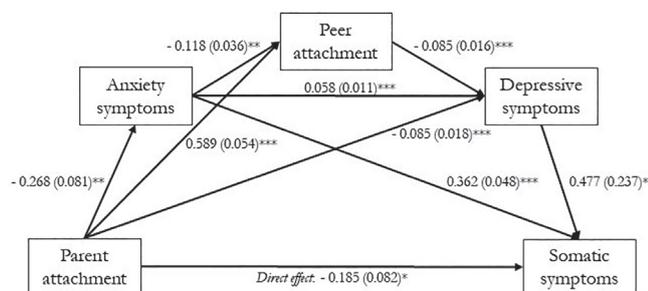
*Serial multiple mediation model*

The hypothesis that the relationship between parental attachment and an increase in SS in children was mediated by higher symptoms of anxiety (*mediator 1*), peer attachment (*mediator 2*) and depressive symptoms (*mediator 3*) was tested using PROCESS Macro, model 6 (Hayes, 2013)

(Figure 1). This model assumes that mediator 1 causally influences both mediator 2 and mediator 3 as well as mediator 2 causally influences mediator 3. Then, we tested this specific etiological model of parental attachment' influences on SS by three mediators in children and in accordance with the theoretical research presented above (Figure 3). The age and gender of the participants were included as covariates in the mediation model.

The total effect of parental attachment on SS was significant and negative ( $b = -0.352$ , Bootstrap SE = 0.074, 95% C.I. = -0.498; -0.206,  $p < .001$ ,  $R^2 = .10$ ). The total indirect effect of parental attachment was significant ( $b = -0.168$ , Bootstrap SE = 0.06, 5000 bootstrap samples 95% C.I. = -0.289; -0.051). Five paths of indirect effects were found: through anxiety symptoms ( $b = -0.097$ , Bootstrap SE = 0.034, 5000 bootstrap samples 95% C.I. = -0.178; -0.041); through depressive symptoms ( $b = -0.041$ , Bootstrap SE = 0.024, 5000 bootstrap samples 95% C.I. = -0.096; -0.001); through anxiety and depressive symptoms ( $b = -0.007$ , Bootstrap SE = 0.005, 5000 bootstrap samples 95% C.I. = -0.022; -0.001); through peer attachment and depressive symptoms ( $b = -0.024$ , Bootstrap SE = 0.012, 5000 bootstrap samples 95% C.I. = -0.051; -0.002); and, finally, through anxiety, peer attachment and depressive symptoms ( $b = -0.002$ , Bootstrap SE = 0.001, 5000 bootstrap samples 95% C.I. = -0.004; -0.001). After controlling for the mediators, a significant total direct effect of parental attachment on SS was found ( $b = -0.185$ , Bootstrap SE = 0.082, 5000 bootstrap samples 95% C.I. = -0.346; -0.024,  $p < .05$ ).

Fig. 3. Serial multiple mediation model



Note: The bold lines indicate the significant patterns of mediation model. Values outside parentheses = path coefficient or unstandardized coefficient; values in parentheses = standard error.

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Age and gender were included as covariates.

## Discussion

The primary aim of the present study was to extend our knowledge on the relationship between parental attachment and SS in a sample of non-clinical Italian children, by testing the mediational role of anxiety, peer attachment and depressive symptoms. Somatic symptomatology refers to physical symptoms whose genesis and evolution mainly depend on psychological factors and represent a complex

and multi-determined phenomenon to be addressed in both clinical and non-clinical settings since it causes emotional and daily functional impairment in children (Spensieri et al., 2019). Furthermore, there is evidence that recurrent SS in childhood represents a risk factor for several psychopathological disorders (Cerutti et al., 2017; Cerutti et al., 2020; Natalucci et al., 2018).

Regarding parental attachment, research has demonstrated that poor attachment has a negative effect on the severity of SS (Neumann et al., 2015) and influences the perception of pain intensity, increasing the severity of emotional problems related to the somatic symptomatology among children (Yavuz et al., 2019). Insecure parental attachment may exacerbate anxiety in children and adolescents with migraine symptomatology pointing to the importance of multimodal interventions (Williams et al., 2017).

In the current cross-sectional study, we analyzed the features of 332 children, providing results according to gender. Findings highlighted that more than half of participants ( $n = 160$ ) reported at least one SS during the last two weeks and a great portion of children were at risk for depressive ( $n=85$ ) and anxiety ( $n=110$ ) disorders. Consistent with studies on clinical and non-clinical samples (Cerutti et al., 2015; Cerutti et al., 2017; Masi et al., 2016), statistically significant differences emerged only for anxiety, with girls scoring higher than boys while no significant gender differences were found for somatic and depressive symptoms. In line with evidence on emotional functioning in childhood and adolescence, the lack of a gender difference about somatic and depressive symptoms is probably due to the fact that these internalizing symptoms increase in prevalence and severity with age thereby showing statistical significance only later on in adolescence.

With regard to the correlational analyses, we observed that the total CSI-24 score was positively and significantly related to symptoms of depression and anxiety and negatively related to parental and peer attachment. This last negative association is probably due to the fact that children with insecure attachment learn to fulfill their unsatisfied emotional needs by attracting their parent's attention through SS (Craig et al., 2002). Further, children with insecure attachment tend to perceive bodily sensations in term of signs of serious threats, increasing the severity and duration of their symptoms (Yavuz et al., 2019).

In line with our hypothesis, results of the multiple regression analyses lend clear support to the assumption that internalizing symptoms (i.e., anxiety and depression) and problematic peer relationships may represent mechanisms through which attachment patterns can influence SS. This result means that parental attachment indirectly influences children's SS through internalizing symptoms and peer relationships. However, it is important to underline that parent attachment is a variable that continues to have a direct influence on SS. Our results are in line with previous research which directly related insecure attachment and SS by demonstrating a direct effect of parental attachment on somatic symptomatology, confirming that attachment plays an important role in the quality of health across a variety of health symptoms (Lewczuk et al., 2018; Monaco et al., 2019).

This study provides an important contribution on the mechanisms linking attachment and internalizing symptoms

during middle childhood stage, since this is a population with particular characteristics and needs. Further, to our knowledge, this is the first study carried out among non-clinical Italian children which took into account a variety of mediators.

However, there are several limitations that should be considered. First, our sample comprised healthy children which may limit the generalizability of our results to other populations. Second, data were based only on self-report measures that may have affected the results owing to the social desirability response bias. Third, this is a cross-sectional study and consequently, the conclusions should be interpreted with caution. Finally, although mediational analyses provide evidence on the relationship between the variables investigated, they do not establish a direction of causality.

To conclude, our findings emphasize the importance of preventing SS in middle childhood in order to avoid chronic conditions and to detect other internalizing symptoms and problematic peer relationships. Additionally, attachment insecurity can increase nonspecific vulnerability to stress that predicts the likelihood of experiencing SS as observed in previous studies of adult populations (West et al., 1986). Finally, this study points out the importance to improve educational programs and policies that promote well-being in developmental age. The need to encourage parent's knowledge of children's health and emotional development is recommended as well as to share helpful strategies designed to enhance children's physical and psychological well-being.

#### Author Contributions

The authors contributed equally to this manuscript.

#### Compliance with Ethical Standards

#### Conflict of interest

The authors declare that they have no competing interests.

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#### Ethical approval

This study was approved by the Ethics Committee of the Department of Dynamic and Clinical Psychology, and Health Studies, Faculty of Medicine and Psychology, Sapienza University of Rome (Italy).

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