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Articles

Adult Attachment, Loneliness, Covid-19 Risk Perception and Perceived Stress During Covid-19 Pandemic

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Abstract

The Covid-19 pandemic has spread throughout the world, affecting the psychological well-being of individuals. Drawing on the attachment theory perspective, the present work sought to understand individual differences in response to the Covid-19 pandemic, analyzing the emotional and cognitive factors involved. A cross-sectional study was conducted to examine the complex relationship between attachment anxiety and avoidance, loneliness, Covid-19 risk perception, and perceived stress during the Covid-19 pandemic. Seven hundred sixty-one participants were involved. Data were analyzed using path analysis. Consistent with attachment theory, results showed a direct relationship between attachment anxiety and perceived stress during the Covid 19 pandemic, mediated in part by loneliness and Covid 19 risk perception. Similarly, attachment avoidance was directly related to perceived stress during the Covid-19 pandemic; this relationship was partially mediated by loneliness but not by Covid-19 risk perception. Our results demonstrate the influence of adult attachment on perceived stress during the Covid-19 pandemic through its effect on emotional and cognitive variables, providing useful information for implementing interventions to promote individual well-being during these times of health emergency.

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1. Introduction

COVID -19 pandemic that has infected millions of people around the world and claimed the lives of 1,623,064 million of them to date (WHO Coronavirus Disease (COVID -19) Dashboard, 2020), is challenging nations and societies to reorder their lives and prioritize public

health over key social and economic needs. A recent study by Brooks et al. (2020) highlighted the negative psychological effects of quarantine on individual well-being, including posttraumatic stress symptoms, confusion, and anger. Nevertheless, individual differences in psychological response (Aschwanden et al., 2020) and individual well-being (Evanoff et al., 2020; Patrick et al., 2020) have been noted during general lockdown and social and economic restrictions due to the COVID -19 pandemic (Di Fronso et al., 2020; Lai et al., 2020; McGinty et al., 2020; Porcelli, 2020). Therefore, it seems crucial to identify the individual psychological factors that may influence perceived stress related to the COVID -19 pandemic.

The attachment theory perspective (Bowlby, 1969; Brennan et al., 1998; Mikulincer & Shaver, 2007) may be a useful framework for this goal.

The attachment system is activated any time a physical or psychological threat occurs, but the attachment strategies chosen may vary depending on the availability of caregivers. When adults respond to the child's need for closeness, the resulting security-oriented strategies are available to alleviate the child's distress and promote the development of adaptive coping mechanisms. In contrast, when caregivers are unavailable or unresponsive, secondary attachment strategies are activated: when proximity seeking appears to be a viable option, hyperactivating strategies are chosen; when it is not, deactivating strategies are preferred (Mikulincer & Shaver, 2007, 2016; Mikulincer et al., 2003). The former, employed by individuals with high levels of attachment anxiety, consist of a constant sense of hypervigilance and result in various efforts aimed at minimizing distance from the relationship partner, leading to a pattern of overdependence on attachment figures as a source of protection and a perception of oneself as needy and incapable of affect regulation (Mikulincer et al., 2003; Shaver & Hazan, 1993), whereas individuals with high levels of attachment avoidance primarily aim to disable the attachment system and deny attachment needs by maximizing physical and emotional distance from others and seeking to be independent and self-sufficient (Mikulincer et al., 2003; Mikulincer & Shaver, 2016).

Thus, the attachment system may influence an individual's perception of stress through its effects on key psychological functions such as affect regulation, cognition, and coping mechanisms.

Several studies have shown a correlation between attachment insecurity and perceived stress. It has been found that both attachment anxiety (Arambasic et al., 2019; Brugnera et al., 2019; Jin & Wang, 2018; Kafetsios & Sideridis, 2006; Maunder et al., 2005; Maunder et al., 2006; Mikulincer & Shaver, 2016; Pascuzzo et al., 2013) as well as attachment avoidance (Arambasic

et al., 2019; Brugnera et al., 2019; Jin & Wang, 2018) were associated with greater self-reported psychological distress. This association was also confirmed when looking at perceived stress and well-being during the pandemic COVID -19, although studies on this topic are still limited (Dennis et al., 2020; Taubman-Ben-Ari & Ben-Yakoov, 2020; Wagerman et al., 2020).

In addition, attachment style may be related to perceived stress through its effects on cognitions, particularly risk perception. Research has shown that individuals high in attachment anxiety tend to appraise potentially stressful events as rapidly increasing and progressively worsening (Mikulincer & Shaver, 2016; Williams & Riskind, 2004). These behaviors may facilitate activation of the attachment system by increasing threat vigilance and intensifying circles of stress (Caldwell & Shaver, 2012). According to Schimmenti et al. (2020), attachment security is particularly likely to improve coping with fears that were particularly emphasized during the COVID -19 pandemic, such as fear of and for significant others. Therefore, we can hypothesize that, in contrast, high levels of attachment anxiety may lead to increased perceptions of risk related to self and significant others (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2016; Williams & Riskind, 2004), which in turn may result in higher levels of perceived stress (Komasi et al., 2018; Lange et al., 2004). Consistent with this hypothesis and the assumption that a stressor's ability to induce stress depends on whether it is perceived as harmful, beneficial, threatening, or challenging (Folkman & Lazarus, 1988; Lazarus & Folkman, 1984), research has found that psychological stress is influenced by risk perception (Komasi et al., 2018; Lange et al., 2004; López-Vázquez, 2001; López-Vázquez & Marván, 2003). The role of cognitions such as risk perception and perceived control on distress is widely recognized (Brailovskaia & Margraf, 2021; Frazier et al., 2011; Gallagher et al., 2014; Myles, 2021; Myles et al., 2021; Zhou & Yao, 2020), even as mediators of the association between personality and psychological symptoms (Myles et al., 2020). Given these findings and the influence of attachment on cognitions (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2016), we hypothesize that there is an indirect link between attachment anxiety and stress during COVID -19 that is mediated by risk perception.

However, conflicting results were found regarding the relationship between attachment avoidance and risk perception (Berant et al., 2001b; Williams & Riskind, 2004); indeed, individuals with avoidant attachment may appear calm in the face of a risky situation, whereas their internal experience may be quite different. Nevertheless, we assume that an insecure-avoidant attachment dismisses stressors precisely when it perceives a lower risk.

Attachment anxiety and avoidance may also be indirectly associated with perceived stress through loneliness, a particularly relevant factor during the COVID -19 pandemic due to social distancing measures taken by governments around the world. Direct (Carr et al., 2013; Garrido Rojas et al., 2016; Liu et al., 2019; Spence et al., 2020) and indirect (Jin & Wang, 2018; Lane & Fink, 2015; Lopez & Brennan, 2000; Sockalingam et al., 2011; Wang et al., 2012; Wei et al., 2005) associations between attachment anxiety and avoidance and loneliness have been found. As Mikulincer and Shaver (2014) noted, both insecure attachment styles suffer from self-focused worry and distrust of others' benevolence and responsiveness, which can lead to low-quality relationships that can trigger feelings of loneliness. Loneliness, in turn, may influence feelings of stress, especially during this time of health distress. Accordingly, loneliness has been linked to many negative mental health outcomes (Heinrich & Gullone, 2006; Victor & Yang, 2012), such as suicidality, decreased positive emotions, poor sleep quality, and overall health and depressive symptoms (Anderson & Arnoult, 1985; Cacioppo et al., 2006; VanderWeele et al., 2012). Notably, research has found a direct link between loneliness and psychological distress (Steptoe et al., 2004), the former of which can elicit acute stress responses (Brown et al., 2018).

1.1 Aims

In this paper, we report on a cross-sectional study designed to examine whether insecure attachment (anxiety and avoidance) are risk factors for perceived stress associated with the COVID -19 pandemic. Specifically, we proposed a mediation model that insecure attachment predicts increased feelings of loneliness and increased COVID -19 perceptions of risk, which in turn predict worse perceptions of stress.

More specifically, we hypothesize that attachment anxiety is associated with perceived stress during COVID -19 and that this relationship is mediated by loneliness and COVID -19 risk perception.

In addition, we hypothesized that attachment avoidance is indirectly related to perceived stress through its effect on loneliness, that a lack of secure attachment can lead to difficulties in relating to others, creates loneliness, and increases the likelihood of COVID -19 risk perception; indeed, insecure attachment is associated with a negative portrayal of self and others that decreases trust in social relationships and increases alarmed responses to potential threats such as the pandemic.

Finally, we hypothesized that feelings of loneliness and higher COVID -19 risk perceptions would predict increased perceived stress, as participants exposed to COVID -19 threats are more likely to feel unable to cope with stressful experiences and consequently report higher perceived stress.

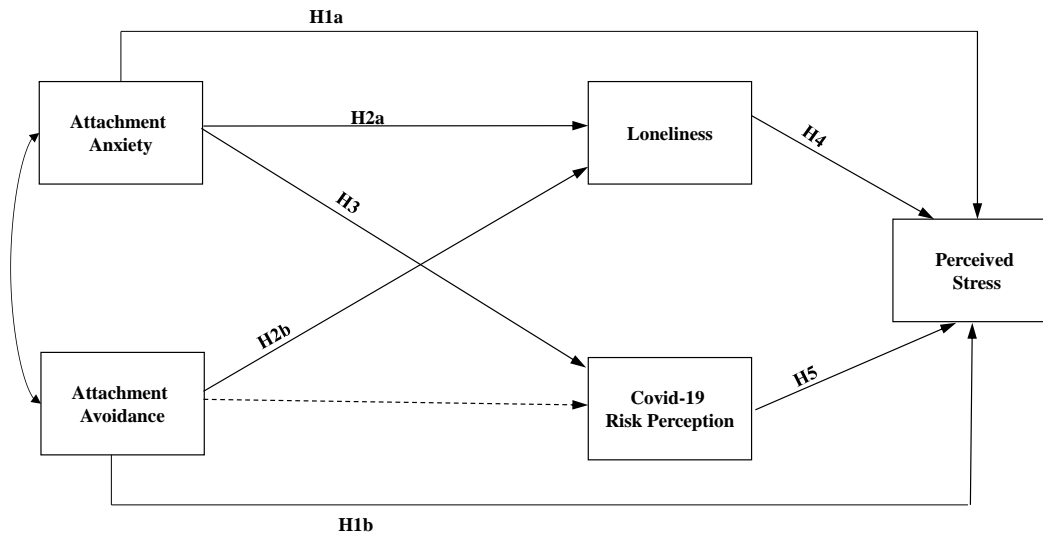


Figure 1. Hypothesized model and suggested hypotheses

Testing these hypotheses will allow us to further explore the relationship between adult attachment and stress during COVID -19 pandemic and shed light on the cognitive and relational variables that intervene in this relationship and that are poorly explored today. The results obtained will be useful for implementing interventions aimed at reducing stress and promoting individual well-being during these times of health emergency.

2. Methods

2.1 Study design

A cross-sectional study design was used to explore the pathways linking attachment, feelings of loneliness, COVID-19 risk perception and perceived stress in Italian individuals.

The study was conducted through an online survey between May 1st and May 11th, 2020. This timeframe was preferred to evaluate participants' answer during a central phase of the COVID-19 outbreak, following the World Health Organization (WHO) declaration of the COVID-19 as a pandemic (March 11th, 2020) and the Italian Government announcement of lockdown (Decree of March 9th, 2020).

Efforts were made to engage people from all Italian regions in order to have a representative sample of the Italian population. An advertisement message was published on dedicated forums and many social networks. The announcement specified that we were doing research on "Italian individuals *over 18 that had lived in Italy since at least February 2020*". The ad provided a link to an anonymous online survey. After introducing in detail the goals of the study, the message explained to the individuals that the survey would take about 20 minutes of their time. If an individual chose to participate and click on the link to the survey, he or she would be directed

to an informed consent document detailing the nature of the survey. The participants were asked to answer each question to the best of their capability.

This study has been conducted following the ethical requirements established by the National Board of Italian Psychologists Code of Ethics for the Psychologist and it was approved by the Ethics Committee of the University of Turin on April 29th with the code number 174968, dated April 30th.

2.2 Participants

Seven hundred sixty-one individuals took part in the present study. Participants came from all regions of Italy and were aged between 18 to 76 years ($M = 29.35$, $SD = 11.39$). The sampling was non-probabilistic and comprised participants who voluntarily participated in the research.

Sociodemographic characteristics are summarized in Table 1.

Table 1. Demographic and socioeconomic sample's characteristics

<i>Variable</i>	(N= 761)
<i>Age (years)</i>	
≤ 25	439 (57.7%)
26–35	179 (23.5%)
36–50	67 (8.8%)
≥ 51	76(10.1%)
<i>Gender</i>	
Males	142 (18.7%)
Females	619(81.3%)
<i>Educational level</i>	
Middle school	112 (14.7%)
High school	551(72.4%)
University degree	98 (12.9%)
<i>Marital status</i>	
Unmarried	390 (51.2%)
Married	371 (48.8%)
<i>Occupation</i>	
Student	481 (63.2%)
Employed	207 (27.2%)
Unemployed	73 (9.6 %)
<i>Geographical area</i>	
Northern Italy	596 (78.3%)
Central Italy	49 (6.4%)
Southern Italy and Islands	116 (15.2%)

2.3 Measures

Attachment anxiety

To measure attachment anxiety, we used the Experiences in Close Relationships Scale 12 (Lafontaine et al., 2016; Italian version by Brugnera et al., 2019). The measure is composed of 6 items, each rated on a 7-point Likert scale from strongly disagree to strongly agree). Participants were instructed to “*take a moment to think about your overall experiences in romantic/love relationships, including both your previous and current relationship experiences*”. An example item is “*I worry about being alone*”. Higher scores suggested an increased severity of attachment anxiety. In the current study, internal consistency was $\alpha = .89$.

Attachment avoidance

To measure attachment avoidance, we used the Experiences in Close Relationships Scale 12 (Lafontaine et al., 2016; Italian version by Brugnera et al., 2019). The measure is composed of 6 items, each rated on a 7-point Likert scale from strongly disagree to strongly agree). Participants were instructed to “*take a moment to think about your overall experiences in romantic/love relationships, including both your previous and current relationship experiences*”. An example item is “*don't feel comfortable opening up to romantic partners*”. Higher scores suggested an increased severity of attachment avoidance. In the current study, internal consistency was $\alpha = .91$.

Loneliness

To measure feelings of loneliness, we used the Revised UCLA Loneliness Scale (RULS; Russell, 1996). It is a 20-item Likert scale and consists of 10 positively worded items and 10 negatively worded items and assesses participants' level of loneliness as defined by a discrepancy between actual and desired social contact. Respondents are asked to indicate how often (1 = never, 2 = rarely, 3 = sometimes, or 4 = often) they feel the way described in each item.

An example item is “*How often do you feel that your relationships with others are not meaningful?*”. Positive items were reverse coded to create a summary measure in which higher scores indicated greater loneliness. In this study, Cronbach for the whole scale was $\alpha = .91$.

COVID-19 items

To measure COVID-19 risk perception, we used the risk perception scale by COVID-19 created by Okruszek et al. (2020). Specifically, the risk perception scale included three specific factors: Contact Risk, severe symptoms Risk, and Financial Problems. Participants were asked to rate the perceived probability of various events associated with the COVID-19 outbreak related issues (e.g., “Physical contact with an infected person”) on 7-point Likert scales from (1)

definitely not to (7) definitely yes. In the current study, the internal consistency coefficient for risk perception was $\alpha=.79$

Perceived Stress

To measure Perceived Stress levels, we used the Perceived Stress Scale (PSS-10; Cohen, 1988; Italian Version by Mondo et al., 2019). It is a 10-item questionnaire assessing thoughts and emotions of individuals referred to stressful events. The total score ranges from 0 to 50, and it is an indicator of perceived stress. In the current study, the internal consistency coefficient for risk perception was $\alpha=.85$

Data analysis

Means, standard deviations among variables are reported in Table 2.

Table 2. Means and Standard Deviations

	Total sample
	N=761
	M (SD)
Attachment Anxiety	19.07 (9.31)
Attachment Avoidance	8.84 (3.47)
Loneliness	40.25(9.34)
COVID-19 Risk Perception	24.21 (7.95)
Perceived Stress	30.11 (7.0)

To test our hypothesized model and the relations presented (Fig.1), we applied Path Analysis using Amos 21.0. In addition, the significance of direct and indirect effects was examined using a bias-corrected bootstrap 95% confidence interval (CI). The following fit indices were used to assess the overall model fit: root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI). CFI and TLI values above 0.90 and RMSEA values below 0.08 indicated acceptable fit; CFI and TLI values above 0.95 and RMSEA values below 0.05 indicated good fit (Kline; 2015).

3. Results

3.1 Path model

Fig. 2 shows the path model with standardized path coefficients. The significance of all the effects were examined using a 95% bootstrapped confidence interval estimate. Demographic covariates (age, sex, education) acted as covariates. The overall model fit indices of the final

model were: $\chi^2 = 4.685$, $df = 1$, $p = .03$, $CFI = .99$, $TLI = .94$, $RMSEA = .07$ (90% [CI]: .02 to .14), $SRMR = .02$.

To develop a parsimonious model, one non-significant path (attachment avoidance -COVID-19 risk perception) was removed without a significant decrease in model fit. Compared to the first model, the final model had the same CFI (.99), higher TLI (.95) and lower RMSEA (.06) and SRMR (.01) values.

As can be seen in Table 3, the direct effects of attachment anxiety and attachment avoidance on perceived stress were significant, which supported our hypothesis. The direct effects of Attachment anxiety and attachment avoidance on loneliness were both significant. The direct effect of Attachment anxiety on COVID-19 risk perception was significant as well as the direct effects of loneliness and COVID-19 risk perception on perceived stress were significant. Finally, there was a significant indirect effect of Attachment anxiety on perceived stress through feelings of loneliness and COVID-19 COVID-19 risk perception while there is a significant indirect effect of Attachment avoidance on perceived stress through feelings of loneliness.

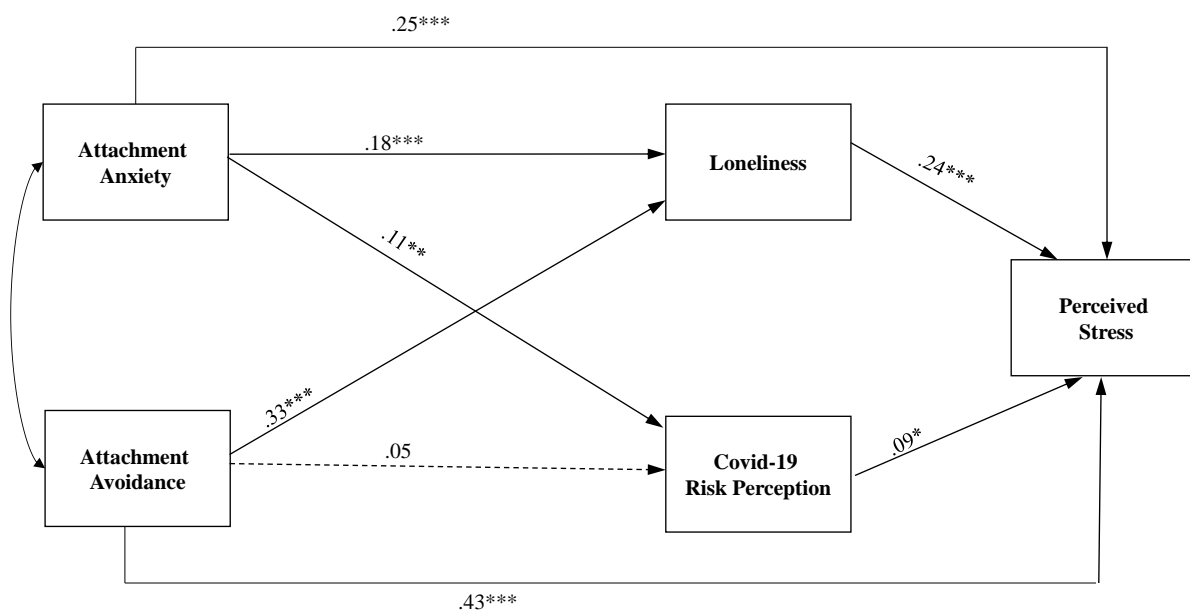


Figure 2. Path model with standardized path coefficients.

* $p < .05$; ** $p < .01$; *** $p < .001$; Note: The dotted line is non-significant paths.

Table 3. The results of hypothesized paths for the model.

<i>Link</i>	<u>Direct</u>	<u>Indirect</u>	<u>Total effect</u>
H1a. Attachment anxiety – perceived stress	.18** 95% CI .13 to .23	.07** 95% CI .05 to .09	.25** 95% CI .20 to .30
H1b. Attachment avoidance - perceived stress	.43** 95% CI .38 to .48	.08** 95% CI .06 to .11	.52** 95% CI .47 to .56
H2a: Attachment anxiety -feelings of loneliness	.25** 95% CI .20 to .31	–	.25** 95% CI .20 to .31
H2b: Attachment avoidance -feelings of loneliness	.33** 95% CI .27 to .38	–	.33** 95% CI .27 to .38
H3a: Attachment anxiety -COVID-19 risk perception	.11* 95% CI .05 to .17	–	.11* 95% CI .05 to .17
H3b: Attachment avoidance -COVID-19 risk perception	.05 95% CI -.00 to .12	–	.05 95% CI -.00 to .12
H4: Feelings of loneliness - perceived stress	.24** 95% CI .19 to .29	–	.24** 95% CI .19 to .29
H5 COVID-19 risk perception - perceived stress	.09* 95% CI .02 to .12	–	.09* 95% CI .02 to .12

Note: CI, confidence interval; All of the effects were examined using a bias-corrected bootstrap 95% confidence interval;

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

4. Discussion

COVID -19 outbreak shakes the financial, social, and political balance around the world, causing the general population to experience new forms of psychological distress (Brooks et al., 2020; Di Fronso et al., 2020; Flesia et al., 2020; Lai et al., 2020; McGinty et al., 2020; Porcelli, 2020). Social distancing measures, while necessary, force individuals into a state of isolation that has been shown to be detrimental to individual mental health (Brooks et al., 2020; de Lima et al., 2020; Killgore et al., 2020).

This study examined the relationship between adult attachment, feelings of loneliness, COVID -19 risk perception, and perceived stress. It was hypothesized that levels of attachment anxiety and avoidance would be positively associated with levels of perceived stress during the COVID -19 pandemic and that this association would be partially mediated by COVID -19 risk perception and loneliness. These hypotheses were confirmed by our results. Consistent with previous studies (Arambasic et al., 2019; Brugnera et al., 2019; Ditzen et al., 2008; Ford, 2011; Jin & Wang, 2018; Kafetsios & Sideridis, 2006; Maunder et al., 2005, 2006; Mikulincer & Shaver,

2016; Pascuzzo et al., 2013; Powers et al., 2006) and with our expectations, our results show that attachment anxiety and attachment avoidance have both a direct and an indirect effect on perceived stress. Other studies (Ford, 2014; Riggs et al., 2007) had already demonstrated the direct relationship between adult attachment and perceived stress, including during the pandemic COVID -19 (Dennis et al., 2020; Taubman-Ben-Ari & Ben-Yakoov, 2020; Wagerman et al., 2020). These findings underscore the importance of early developmental experiences in structuring effective strategies for affect regulation. Stress experienced in childhood and how caregivers are able to cope with it have a major impact on the biological structure of the brain and nervous system, creating a permanent response style of the hypothalamic-pituitary-adrenal (HPA) axis to stress (Charmandari et al., 2003; Creedon, 2004). For example, Powers et al. (2006) found that males high in attachment anxiety and avoidance and females high in attachment avoidance exhibited higher cortisol reactivity during a conflict negotiation task due to rapid activation of the HPA axis.

Our findings provide evidence that adult attachment plays an important role in predicting perceived stress during the COVID -19 pandemic and influences the cognitive and emotional strategies individuals use to attempt to cope with psychological threats in times of distress.

The mediating role of loneliness in the relationship between the two dimensions of adult attachment and perceived stress during the COVID -19 pandemic was also confirmed by our findings. Several studies have found an association between attachment anxiety, attachment avoidance, and loneliness (Carr et al., 2013; Garrido Rojas et al., 2016; Liu et al., 2019; Wei et al., 2005), underscoring the potentially dysfunctional effects of secondary attachment strategies on relationship functioning and, by extension, individual well-being. Individuals high in attachment anxiety tend to use hyperactivating strategies that lead them to emphasize threatening signals (Cassidy & Berlin, 1994). They typically respond to the unavailability of close people by exaggerating their needs for love and protection and by increasing the psychological pain that results from the neglect or rejection of attachment figures. Thus, the increased loneliness reported by these individuals in our study can be interpreted as both a painful awareness of unsatisfying relationships and a deeply ingrained habit of emphasizing emotional vulnerability (Berlin et al., 1995). Moreover, according to attachment theorists (Lopez & Brennan, 2000; Mikulincer, Shaver & Pereg, 2003), the use of secondary attachment strategies (i.e., hyperactivating or deactivating strategies) tend to be exacerbated every time a psychological threat is encountered. As a result, the dysfunctional outcomes of the hyperactivating strategies adopted by these individuals may become more salient during stressful times or challenging situations such as COVID -19 pandemic, thus reinforcing the cycle of distress.

Although several attachment researchers have claimed that attachment anxiety contributes more to loneliness than attachment avoidance (Berlin et al., 1995; Man & Hamid, 1998; Marsa et al., 2004), other studies have shown that both anxious and avoidant attachment are strongly associated with higher levels of loneliness (e.g., Carr et al., 2013; Garrido Rojas et al., 2016; Larose & Bernier, 2001; Wei et al., 2005; Wiseman et al., 2006). Despite their tendency to deny or suppress attachment needs and therefore be less aware of their potential relationship dissatisfaction, Mikulincer and Shaver (2014) suggest that people with high levels of attachment avoidance may not deactivate their attachment system to the point where they can no longer feel the lack of supportive relationships. The deactivation strategies that people with high levels of attachment avoidance use lead to a state of social isolation, particularly in times of distress, and prevent them from accessing useful sources of social support (Dennis et al., 2020; Jin & Wang, 2018; Lane & Fink, 2015; Lopez & Brennan, 2000; Sockalingam et al., 2011; Wang et al., 2012; Wei et al., 2005). For example, Dennis et al. (2020) suggested that attachment avoidance may lead to maladaptive support seeking, which in turn may exacerbate the effects of reduced social support during confinement by increasing difficulty in asking for help within the limited social contacts allowed by social distancing measures. In a recent study, Vowels & Carnelley (2020) found that individuals with higher attachment avoidance perceived their partner as less supportive of their goals overall. Because social distancing measures taken during the COVID-19 pandemic strictly limited social contact, partner support may be particularly important for some individuals. Consequently, individuals with higher attachment avoidance might be particularly vulnerable and lack support during the COVID-19 pandemic (Vowels & Carnelley, 2020). Therefore, we can again hypothesize that the deleterious consequences of the disengagement strategies used by these individuals may be even more severe during stressful times such as the COVID-19 pandemic.

Higher levels of loneliness in our study were again associated with greater perceived stress, which is consistent with findings from previous articles (Brown et al., 2018; Steptoe et al., 2004) confirming an indirect relationship between adult attachment (both anxiety and avoidance) and perceived stress during COVID-19 mediated by loneliness.

Given the influence of adult attachment on cognitive appraisal and consistent with several studies showing an association between attachment anxiety and risk perception (Caldwell & Shaver, 2012; Mikulincer & Shaver, 2016; Williams & Riskind, 2004) and between risk perception and stress (Komasi et al., 2018; Lange et al., 2004), our results revealed an indirect association between adult attachment and perceived stress during COVID-19 mediated by risk

perception. However, these results were confirmed only for attachment anxiety. According to Williams & Riskind (2004), attachment anxiety is associated with a cognitive vulnerability to anxiety-the tendency to appraise potentially stressful events as rapidly deteriorating; therefore, attachment anxiety leads to increased COVID -19 risk perception, which in turn is related to higher levels of perceived stress during COVID -19 pandemic. Other studies (Florian & Mikulincer, 1998; Mikulincer et al., 2003) had previously examined the relationship between adult attachment anxiety and the severity of death anxiety and found that attachment anxiety was associated with increased fear of death at both conscious and unconscious levels, as well as increased accessibility to death thoughts. Taubman-Ben-Ari & Ben-Yakoov (2020), in their study on the relationship between adult attachment and COVID -19 anxiety in recent Israeli parents, found that lower levels of attachment anxiety correlated with lower levels of pandemic-related parental fears and COVID -19 anxiety. The latter were assessed using specific items that focused, among other things, on indicators similar to those of the COVID -19 risk perception scale used in our study (Okruszek et al., 2020), such as the economic damage caused by COVID -19 and the risk of contracting the virus, supporting our findings. Lozano & Fraley (2020) examined the relationship between attachment orientation and sentinel behavior-relating to recognizing a threat and encouraging others to take appropriate precautions such as face masks and hand washing-during COVID -19 pandemic. The authors (Lozano & Fraley, 2020) found that people who exhibit higher attachment anxiety are more likely to exhort their loved ones to COVID -19 safe behaviors and thus act as guardians. From our perspective, these results are consistent with our data and support the association between attachment anxiety and risk perception, as people with higher levels of attachment anxiety might exhibit more sentinel behaviors because of their tendency to perceive greater COVID -19 risks. Therefore, we can hypothesize that our findings reflect the particular cognitive biases induced by hyperactivating strategies typically employed by people with higher levels of attachment anxiety, which increase their likelihood of experiencing maladaptive psychological symptoms such as rumination and frequent thoughts of death during a stressful and challenging event such as COVID -19 a pandemic (Schimmenti et al., 2020), ultimately affecting perceived stress.

Our results show that individuals who perceive greater COVID-19-related risk are more likely to report higher levels of psychological distress. An association between risk perception and psychological distress has been noted in other studies (Komasi et al., 2018; Lange et al., 2004; López-Vázquez, 2001; López-Vázquez & Marván, 2003) and may be explained by accounting for the psychological weight of perceiving oneself and loved ones to be in an uncontrollable state of danger. Psychological responses to pandemics-including emotional distress, anger,

anxiety, fear, depressive symptoms, sleep problems, and hypochondriacal worry-have been reported in the literature on previous pandemics (Cheng & Cheung, 2005; Huremović, 2019) and on the COVID -19 outbreak (Brooks et al., 2020; Di Fronso et al., 2020; Flesia et al., 2020; Lai et al., 2020; Liu et al., 2020; McGinty et al., 2020; Porcelli, 2020; Xiang et al., 2020), highlighting the sense of powerlessness and danger caused by unpredictable viral phenomena. Consistent with our findings, we can hypothesize that these feelings may be particularly intense in individuals who are typically fearful of abandonment and loss of attachment figures and who hold negative beliefs about their own coping abilities, such as attachment anxious individuals.

Conversely, the association between attachment avoidance and perceived stress during the COVID -19 pandemic was not mediated by the extent of risk perception. Consistent with previous findings (Berant et al., 2001a, 2001b), attachment avoidance was not related to higher perceptions of risk, likely due to the tendency of people with higher levels of attachment avoidance to minimize threatening cues and deny their vulnerability at a conscious level, consistent with their use of disabling strategies of affect regulation (Brennan et al., 1998; Goodall et al., 2012; Mikulincer & Shaver, 2016). A recent study (Lozano & Fraley, 2020) found a negative association between attachment avoidance and COVID -19 protective behaviors directed toward both self and others. The authors (Lozano & Fraley, 2020) have argued that individuals with high scores on attachment avoidance may be influenced by negative cognitive biases related to their distrust of the benevolence of others and their desire for independence, which may cause them to undervalue the efficacy of COVID -19 protective behaviors. Therefore, these results can be considered as further evidence for the threat minimization strategies used by individuals with high levels of attachment avoidance.

5. Limitations

This study has several limitations. First, the cross-sectional method used in this study does not allow us to establish causal relationships between variables; our results can only be interpreted in terms of correlation. Second, the sample used in this study cannot be considered representative of the Italian population; therefore, our results are not generalizable. Finally, all measurements used in this study are self-reported, so perceptual errors cannot be excluded.

6. Clinical Implications

Although the COVID -19 pandemic represents a unique stressor for the general population (Brooks et al., 2020; Di Fronso et al., 2020; Flesia et al., 2020; Lai et al., 2020; McGinty et al., 2020; Porcelli, 2020; Presskreischer et al., 2020), our results indicate that stress perception may vary depending on adult attachment. Therefore, our findings highlight the importance of

promoting attachment security as it can buffer the harmful effects of highly stressful events such as the COVID -19 pandemic and promote effective affect regulation strategies (Moccia et al., 2020; Schimmenti et al., 2020). The latter has been shown to enable better emotional cognition and coping, making it possible to endure stress caused by difficult or conflictual situations (Koole, 2009; Pallini et al., 2018). Given the fundamental role that adult attachment plays in cognitive appraisal, affect regulation, and coping strategies, it seems critical to promote attachment-oriented clinical interventions to improve psychological well-being, especially during a stressful and challenging time such as the COVID -19 pandemic.

Interventions that promote attachment security might be suggested to alleviate isolation and the resulting malaise. Thus, it seems particularly important to help people become aware of their images of self and others that are influenced by their attachment orientation so that the possibility of being included in supportive social networks-a particular resource in times of pandemic-can be promoted.

7. Future directions

The literature on adult attachment and COVID -19 pandemic is still limited. Further studies are needed to better understand the cognitive and affective mechanisms by which adult attachment influences individual psychological responses to the COVID -19 pandemic so that clinicians can implement appropriate attachment-oriented interventions for individuals who are struggling to cope with stress during the COVID -19 pandemic. In addition, longitudinal studies are needed that can clarify the correlative data found in the current study.

Finally, it is important to consider the impact of other cognitive mediating variables that may explain the relationships analyzed, such as perceived control (Myles, 2021).

8. Conclusions

The current study demonstrated the direct and indirect relationship between adult attachment and perceived stress. Consistent with our expectations, attachment anxiety was found to directly influence perceived stress during the COVID -19 pandemic, and this association was partially mediated by loneliness and COVID -19 risk perception. Similarly, attachment avoidance was directly and positively related to perceived stress during the COVID -19 pandemic, and this relationship was partially mediated by loneliness but not by COVID -19 risk perception.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any potential conflict of interest.

Authors' contribution: Creation of the frame used in the study and research design: L.R., L.V., and T.T.; Data analysis: C.S.; Interpretation of the results: L.R., C.C., T.T., L.V.; Supervision of the entire work: L.R., T.T., and C.S. All authors were involved in the discussion, writing and revision of the manuscript and they gave the final approval of the version to be published.

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