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''CAROL DAVILA'', BUCHAREST

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DOCTORAL THESIS

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LONELINESS AND MENTAL HEALTH DURING THE COVID-19 PANDEMIC

THESIS SUMMARY

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1. Hopulele-Petri A, M Fadgyas-Stanculete, M Manea (2023). *Attachment and Coping in the Second Pandemic Year: The Impact on Loneliness and Emotional Distress*. COVID, 3(9), 1322-1335, DOI:/10.3390/covid3090092 (chapter 8, p17-21)

2. Hopulele-Petri A, M Manea, M Manea, 2024, *Adult Attachment And Loneliness During The First Covid-19 Lockdown In Romania*, Bulletin of Integrative Psychiatry, DOI: 10.36219/bpi.2024.1.08 (chapter 6, p10-14)

3. **Hopulele-Petri A**, S. Matu, O. Capatina, M Manea, 2024, *Lonely during Lockdown: A SEM Analysis of Loneliness, Intimacy, Social Media use and Mental Health During the Covid-19 Pandemic* Journal Of Evidence-Based Psychotherapies (*în proces de publicare*) (chapter 7, p14-17)

List of abbreviations

B-COPE	Brief COPE Scale
BMI	Body Mass Index
BNST	Bed Nucleus of Stria Terminalis
CAR	Cortisol Awakening Response
CART	Cocaine and Amphetamine Regulated Transcript Protein
CRS	Cortisol Response to Stress
DASS-21	Depression,Anxiety and Stress Scale
HF-HRV	High Frequencey Heart Rate Variability
HIV	Human immunodeficiency virus
HPA	Hypothalamic-Pituitary-Adrenal axis
HRV	Heart Rate Variability
IRS	Intimate Relationship scale
ISO	Objective social isolation
ISP	Perceived social isolation
MDD	Major Depressive Disorder
NA	Noradrenaline
OMS	World Health Organisation
PCR	C Reactive Protein
R-AAS	Revised Adult Attachment Scale
SAM	Sympathetic–Adrenal–Medullary axis
SARS	Severe acute respiratory syndrome
SNC	Central nervous system
SNP	Parasympathetic nervous system
SNS	Sympathetic nervous system
TPJ	Temporo-parietal junction
TPVR	Peripheral vascular resistance
UCLA-L	UCLA Lonliness scale
VS	Vental striatum

STATE OF THE ART

1. The COVID-19 pandemic

Émile Durkheim observed that major crises are often associated with a decrease in suicide rates, arguing that collective events, such as wars, strengthen social cohesion and integration (Durkheim, 1951). However, historical evidence shows that pandemics, unlike wars, often lead to an increase in psychological distress and suicide rates. For example, the "Russian" flu of 1889 led to a marked increase in suicides, with a 25% rise between 1889 and 1893 in Great Britain (Honigsbaum, 2010; Smith, 1995). Similarly, the 1918 Spanish flu, which affected one-third of the world's population, generated high psychological tension, particularly among young adults, and an increase in suicides (Johnson & Mueller, 2002; Wasserman, 1992). The SARS epidemic of 2003 and the H1N1 pandemic of 2009 also highlighted the severe impact on mental health. In Hong Kong, SARS was associated with an increase in suicides among the elderly due to social isolation and anxiety (Chan et al., 2006; Yip et al., 2010). Although less severe, the H1N1 pandemic caused widespread anxiety and distrust, with a significant portion of the population reporting high levels of distress (Rubin et al., 2009).

The COVID-19 pandemic has had a profound impact on global mental health, exacerbating existing vulnerabilities. A UN report highlighted that the psychological impact of the COVID-19 pandemic tends to be broader than the purely medical impact (UNSDG, 2020). It particularly affected certain demographic groups, such as the elderly, healthcare workers, women, and adolescents, amplifying psychological distress in these categories.

Although the elderly were initially considered vulnerable due to their frailty, most studies have shown that young people were more susceptible to psychological distress during the pandemic, due to the disruption of daily routines and the lack of mature coping mechanisms (Daly et al., 2020; Ramiz et al., 2021). Women were also identified as being more at risk of developing mental symptoms (Proto & Quintana-Domeque, 2020; Ramiz et al., 2021).

The social isolation imposed during the pandemic intensified loneliness, which had already affected between 10% and 40% of the population in different regions of the world before the pandemic (Leigh-Hunt et al., 2017; Xia & Li, 2018). While some studies have shown a return

to pre-pandemic levels of loneliness, others have reported a persistence of psychological symptoms even after the lifting of restrictive measures (Beutel et al., 2021; Seifert & Hassler, 2020; Hansen et al., 2021).

Humans are fundamentally driven by the need for socialization, and crises, such as the COVID-19 pandemic, intensify this need, but restrictive measures limited social connectivity, exacerbating loneliness (Baumeister & Leary, 1995; Vinkers et al., 2020). Loneliness increased significantly during the pandemic, with some studies indicating a return to pre-pandemic levels, suggesting an adaptation process, while other studies showed the persistence or worsening of symptoms (Killgore et al., 2020; Beutel et al., 2021; Hansen et al., 2021). Risk factors such as being female, having a low income, and living alone remained stable or worsened (Bu et al., 2020). Surprisingly, students, previously considered protected, became a risk group for loneliness (Hansen et al., 2021). In 2023, few studies have evaluated the long-term effects, but research from Germany and Australia indicated that depression and loneliness continued to evolve even after restrictions were lifted, due to poorly developed coping mechanisms and other global factors (Benke et al., 2023; Pieh, 2021).

2. Loneliness

Loneliness, defined as an aversive state resulting from the discrepancy between desired and obtained social relationships (Perlman & Peplau, 1981), is not only an emotional experience but also a significant risk factor for physical and mental health. From a biological perspective, the evolutionary theory of loneliness proposed by Cacioppo and Cacioppo (2018) suggests that loneliness evolved as an adaptive mechanism to ensure survival in conditions of social isolation. It activates stress systems such as the sympathetic-adrenal-medullary (SAM) axis and the hypothalamic-pituitary-adrenal (HPA) axis, profoundly influencing the autonomic nervous system and the body's immune response (Cacioppo et al., 2003). For example, chronic loneliness has been associated with persistent activation of the HPA axis, leading to increased levels of cortisol, a stress hormone that, in the long term, can cause immunological dysfunction and chronic inflammation (Adam et al., 2006; Cacioppo et al., 2015).

Loneliness also influences the cardiovascular system. Studies have shown that chronic loneliness is associated with increased blood pressure, decreased heart rate variability (HRV),

and increased total peripheral vascular resistance (Hawkley et al., 2006). These changes indicate a tonic cardiovascular tone, rather than an acute "fight or flight" response, suggesting that chronic loneliness can transform an adaptive physiological mechanism into a maladaptive one (Cacioppo & Cacioppo, 2018). Additionally, loneliness is associated with attenuated HRV reactivity under stress conditions, indicating a reduced capacity of the body to respond adequately to stressors (Roddick & Chen, 2021).

Neurobiologically, chronic loneliness is associated with changes in brain structures such as the prefrontal cortex and the temporoparietal junction, which are involved in emotion regulation and social perception (Cacioppo et al., 2009; Nakagawa et al., 2015). A reduced activation of these regions has also been observed in lonely individuals, suggesting a diminished ability to manage social interactions and correctly interpret others' intentions (Cacioppo et al., 2010).

Regarding mental health, loneliness is strongly associated with depression, anxiety, and other psychiatric disorders. Studies have shown that loneliness can be a predictor for the development of depressive symptoms, especially in young adults and adolescents (Cacioppo et al., 2010). Additionally, there is evidence suggesting that loneliness can exacerbate symptoms of chronic illnesses, such as chronic pain and metabolic disorders (Loeffler & Steptoe, 2021).

Beyond psychological impact, loneliness is linked to changes in the immune system. Recent studies have shown that lonely individuals exhibit higher levels of chronic inflammation and a compromised immune response, which can lead to increased vulnerability to diseases and infections (Cole et al., 2015). For example, loneliness has been found to be associated with increased production of pro-inflammatory cytokines, which are involved in numerous chronic diseases, including cardiovascular and autoimmune diseases (Jaremka et al., 2014).

In conclusion, loneliness is not just a transient emotional state but a major risk factor that profoundly affects an individual's physical and mental health. Its complex biological effects, from stress system activation to chronic inflammation, highlight the need for early interventions to prevent long-term health consequences.

PERSONAL RESEACH

3. General objectives and hypotheses

h1) Loneliness will be correlated with emotional distress and will significantly predict a component of it.

h2) Maladaptive traits (i.e., attachment and coping) will predict loneliness, and loneliness will mediate the relationship between these traits and emotional distress.

h3) Socio-demographic factors such as age, gender, educational status, and professional status will affect loneliness and perceived mental distress during the pandemic.

4. General materials and methods

Using cross-sectional sampling, data were collected through the Google Forms platform. Due to the restrictive measures imposed by the pandemic, the snowball sampling method was employed to disseminate the questionnaire via social networks. The reported demographic data included: age (discrete variable), gender (dichotomous variable), level of education (nominal variable), professional status (nominal variable), the impact of social distancing (nominal variable), and the use of social networks (discrete variable).

Mental distress was conceptualized as depressive, anxious, and stress symptoms, measured using the Depression, Anxiety, and Stress Scale 21 (DASS-21) (Lovibond & Lovibond, 1995). The DASS-21 scale contains 21 self-reported items. Loneliness was measured using the University of California, Los Angeles (UCLA) Loneliness Scale (UCLA-L) (Russell et al., 1978). Modeled on the conceptualization of loneliness as primarily a subjective experience, this scale uses twenty Likert-type items. In both samples, the UCLA-L scale demonstrated excellent internal consistency (Cronbach's $\alpha \geq .90$). Attachment was measured using the Revised Adult Attachment Scale (R-AAS) (Collins, 1996), a questionnaire in which individuals self-report and provide a graded assessment of their abilities to form meaningful romantic relationships.

The first sample of participants consisted of individuals who completed the online questionnaire between April and May 2020. By mid-May, 180 participants had completed the questionnaire. The majority of these were women (70%), and most reported a level of education at the bachelor's degree level or higher (85%). At the end of the second sampling period (May-September 2021), 141 people completed the online questionnaire. Similar to the first sample, the majority of respondents were female (78.7%), with a high educational level, having at least a bachelor's degree (49.6%), and being employed full-time (80.1%).

5. General statistical analysis

The statistical analysis was conducted using IBM SPSS software, Windows version 23.0, as well as the R statistical package. The statistical analyses included Pearson two-tailed correlation, linear regression, multiple linear regression, and analysis of covariance (ANCOVA), which were detailed in the respective studies. SEM (Structural Equation Modeling) models were constructed using the lavaan package in R to test direct and indirect effects. For indirect effects, a 95% confidence interval based on 5000 bootstrap samples was used to determine their statistical significance. The PROCESS macro (Hayes, 2016) was used for mediation analysis, with a 95% confidence interval based on 5000 bootstrap samples for indirect effects.

6. Study 1 – Adult Attachment And Loneliness During The First Covid-19 Lockdown In Romania

6.1. Objectives and hypotheses

The present study aimed to investigate the impact of attachment insecurity on loneliness and psychological distress experienced during the first period of isolation imposed by the COVID-19 pandemic in Romania. In this regard, the following main hypotheses were formulated: (h1) Insecure attachment will be associated with an increased level of loneliness; (h2) Insecure attachment will be associated with an increased level of psychological distress; (h3) Insecure attachment will be associated with a deterioration of intimacy within romantic relationships; (h4) In couples, romantic intimacy will mediate the relationship between attachment styles and loneliness. The secondary objectives of the study focused on examining the relationship between loneliness and emotional distress, as well as evaluating the impact of various socio-demographic factors.

6.2. Materials and methods

Emotional distress was assessed using the total score of the DASS-21 scale, loneliness was assessed using the UCLA-L scale, and attachment style was assessed using the R-AAS scale. These instruments are detailed in Chapter 4.1. Romantic intimacy was assessed with the Intimate Relationships Scale (IRS) (Hetherington & Soeken, 1990), a self-administered instrument that measures changes in intimacy and sexuality across three dimensions. The scale contains 12 items adapted to the context of the restrictions imposed by the pandemic.

6.3. Results

We investigated the influence of demographic factors, relationship status, pet ownership, and working from home on levels of loneliness and mental distress. Multiple regression analysis showed that relationship status has a significant negative effect on loneliness (b = -5.67, SE = 2.22, 95%CI [-10.04; -1.29], p = 0.011), indicating that individuals in a relationship are less likely to experience loneliness. On the other hand, pet ownership, working from home, gender, and education did not have a significant impact on loneliness.

Regarding mental distress, age proved to be a significant predictor (b = -.43, SE = .16, 95%CI [-.75; -.11], p = 0.009), with older individuals reporting lower levels of distress. Other variables, such as gender, relationship status, and pet ownership, did not show significant effects on mental distress.

Pearson correlations highlighted that attachment anxiety has a moderate negative correlation with sexual intimacy (r(79)= -0.35, p < .01) and a significant positive correlation with mental distress (r(180)= 0.56, p < .01), suggesting that individuals with attachment anxiety are more prone to distress. Regression analyses showed that attachment anxiety is a negative predictor of romantic intimacy (b = -0.37, SE = 0.16, β = -0.25, t(3, 75) = -2.24, p < .05), and a positive predictor of loneliness (b = 0.98, SE = 0.13, β = 0.48, t(3, 176) = 7.56, p < .001) and mental distress (b = 1.13, SE = 0.16, β = 0.56, t(3, 176) = 8.40, p < .001). Additionally, attachment dependency had a positive effect on intimacy (b = 0.47, SE = 0.21, β = 0.27, t(3, 75) = 2.21, p < .05) and a negative effect on loneliness (b = -0.61, SE = 0.18, β = -0.22, t(3, 176) = -3.23, p < .01).

The SEM mediation model confirmed that attachment anxiety has a significant effect on intimacy, loneliness, and mental distress. No significant indirect effects were observed between the analyzed variables, underscoring the importance of anxious attachment in determining these negative psychological outcomes.
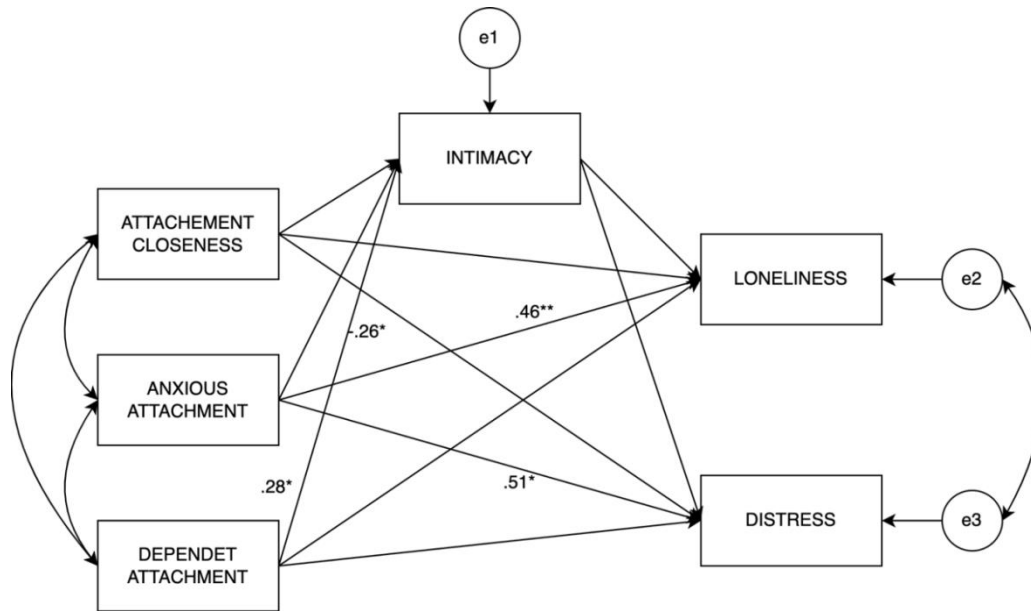

Figure 1. Path diagram of the SEM model. The values in the diagram represent the standardized regression paths. Only significant paths are reported. *p < 0.05; p < 0.001.

6.4. Discussion

This study investigated how attachment styles influence romantic intimacy, loneliness, and mental stress in the context of the first lockdown caused by the COVID-19 pandemic in Romania. The 180 participants in the online survey provided essential data to understand how insecure attachment correlates with higher levels of loneliness and mental stress. The results clearly showed that attachment anxiety is a significant predictor of both loneliness and stress, while attachment dependence proved to be a protective factor against loneliness, but not against stress. These findings are consistent with other recent research, which emphasizes the central role of attachment anxiety in amplifying perceptions of stress and loneliness during major crises, such as the pandemic (Moccia et al., 2020; Rollè et al., 2022).

On the other hand, romantic intimacy in couples was significantly affected by attachment styles. Attachment dependence positively contributed to maintaining intimacy, while attachment anxiety had a negative effect, deteriorating the quality of intimate relationships. These relationships are critical during periods of intense stress, such as that generated by the COVID-19 pandemic, where it was observed that insecure attachment styles can compromise the perception of support from one's partner, thereby negatively affecting mental health (Vowels & Carnelley, 2021).

An interesting aspect was the lack of a mediating effect of intimacy on the relationship between attachment and loneliness, suggesting that while intimacy is important, it does not fully explain the subjective experience of loneliness felt by individuals within romantic relationships. This aligns with Weiss's (1975) theories, which differentiate between emotional and social loneliness.

The study also highlighted that demographic variables, such as stable relationships and age, played a protective role. Those in stable relationships reported lower levels of loneliness, while age was a protective factor against mental stress. These results are consistent with other studies that have demonstrated increased vulnerability to loneliness and stress among women and young people (Bu et al., 2020).

The conclusions of this study emphasize the importance of addressing attachment styles in psychological and therapeutic interventions, especially during times of crisis. Attachment is not just a simple risk or protective factor; it profoundly shapes how individuals experience loneliness and stress. In a country like Romania, where the rate of loneliness was already high before the pandemic, these findings become even more relevant. Given the significant impact of loneliness on somatic and mental health, it is essential for therapists to focus more on insecure attachment styles and how they influence stress responses, both at the individual level and within couple dynamics.

7. Study 2 – Lonely during Lockdown: A SEM Analysis of Loneliness, Intimacy, Social Media use and Mental Health During the Covid-19 Pandemic

7.1. Objectives and hypotheses

In this study, we investigated the relationship between loneliness and psychological distress in the context of the first wave of the COVID-19 pandemic in Romania, during the spring of 2020.

We also considered the impact of social distancing measures, the use of social media platforms, and the protective role of romantic intimacy in couples.

The study formulated the following hypotheses: (h1) Loneliness will predict higher scores of mental distress; (h2) The use of social media platforms will predict higher scores of mental distress; (h3) The absence of a partner and social distancing measures will predict higher scores of loneliness and mental distress; (h4) Social media platforms will mediate the relationship between loneliness and mental distress; (h5) (For couples), loneliness will mediate the relationship between romantic intimacy and mental distress.

7.2. Materials and methods

The present study targeted the general population of Romania during the first lockdown period imposed by the COVID-19 pandemic, using the same sample as in Study I. The use of social media was also assessed through a single Likert-type item that asked about the number of social media platforms used, with response options ranging from 1 to 4. Additionally, in the first sample, the impact of social distancing on couples was evaluated using a single-item question. Participants were asked to indicate the extent to which the pandemic affected the frequency of meetings with their romantic partner, with the following response options: (a) not at all, (b) partially affected, (c) strongly affected, and (d) did not have a romantic partner during the pandemic.

7.3. Results

The study used linear regression analyses to explore how loneliness can predict symptoms of depression, anxiety, and stress, as measured by the DASS-21 scale. The results showed that loneliness is a significant predictor for all three forms of mental distress: depression (loneliness: $b = .31$, $SE = 0.02$, $\beta = .68$, $t(175) = 12.85$, $p < .001$), anxiety ($b = .20$, $SE = 0.02$, $\beta = .51$, $t(175) = 7.99$, $p < .001$), and stress (loneliness: $b = .28$, $SE = 0.02$, $\beta = .65$, $t(175) = 11.69$, $p < .001$). The regression model for depression explained 52% of the variance in this construct, indicating that both loneliness and age are significant predictive factors. Similarly, the model for anxiety explained 30% of the variance, with loneliness being a significant predictor. Regarding stress, the model explained 48% of the variance, with loneliness and age again being important predictors.

Another aspect investigated was the relationship between social media use and emotional distress. The analysis showed that social media use significantly predicts depression (b = .95, SE = 0.42, β = .17, t(175) = 2.26, p = .025) and anxiety (b = 1.14, SE = 0.35, β = .24, t(175) = 3.22, p = .002), but not stress, where age was the only significant predictor. Differences in psychological distress and loneliness were also explored based on levels of social distancing. Social distancing had a significant impact on depression (t(173) = 3.14, p = .012) and loneliness (t(173) = 2.98, p = .020), but not on anxiety, with age being an important protective factor against stress.A path analysis to test the indirect effects of loneliness on emotional symptoms through social media use revealed a direct effect of loneliness on depression, anxiety, and stress. Loneliness also had a significant indirect effect on anxiety through social media use, but not on depression or stress.
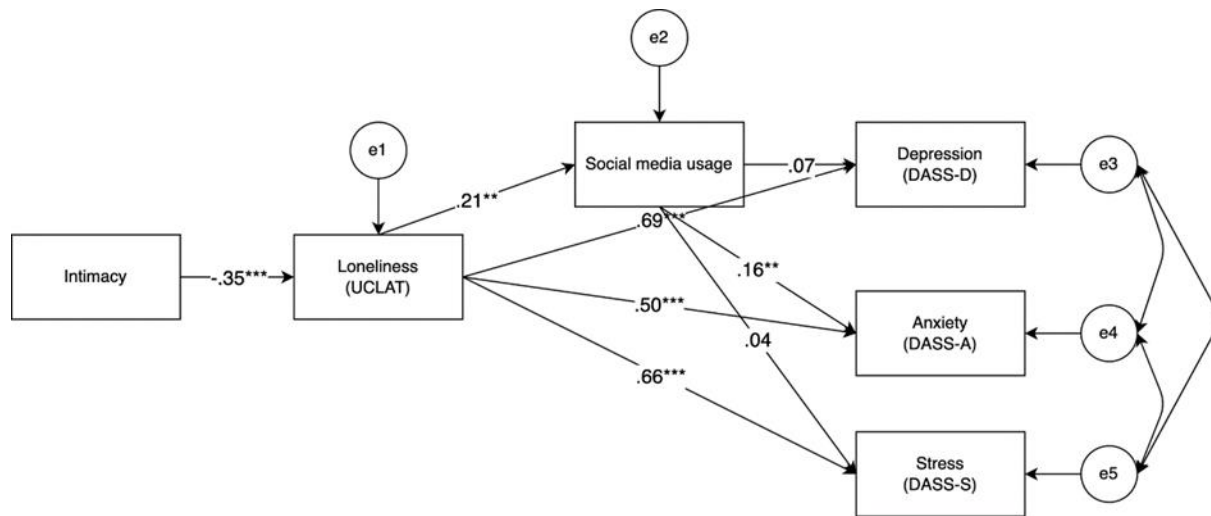

Figure 2. Path model for the indirect effect of intimacy on psychological distress. *Note.* The values indicate standardized coefficients. * indicates p < 0.05, ** indicates p < 0.01, *** indicates p < 0.001.

In a supplementary analysis, the effects of intimacy on loneliness and, indirectly, on psychological distress were examined. The results indicated that low intimacy is associated with an increase in loneliness, which in turn amplifies depression, anxiety, and stress. The indirect effect of intimacy on anxiety through social media use was also significant, although the same effect was not observed for depression and stress.

7.4. Discussion

The main objective of the study was to evaluate the relationship between loneliness and psychological distress symptoms during the COVID-19 pandemic, also exploring the impact of social media use and sexual intimacy. These predictive relationships were analyzed through linear regression models, analysis of covariance, and structural equation modeling, examining both the relationships between variables within the same model and those between different models.

The regression analysis showed that loneliness is a significant predictor of symptoms of depression, anxiety, and stress, even after adjusting for age and gender. These findings support the hypothesis that loneliness predicts psychological distress, consistent with previous research that has highlighted similar correlations between loneliness and distress (Tan et al., 2020; Panicker & Sachdev, 2014; Barroso et al., 2021). In the models for depression and stress, age had a negative but significant predictive effect, confirming that young adults are more vulnerable to mental health symptoms during the pandemic.

Although many studies suggest that women are more at risk for psychological distress during the pandemic (Kolakowsky-Hayner et al., 2022; Bu et al., 2020; Ausín et al., 2021), in this study, gender did not have a significant effect on loneliness or distress. This can be explained by the asymmetric gender distribution in the sample or selection bias.

The second set of analyses examined the relationship between social media use and psychological distress. The results showed that a higher number of platforms used predicted depressive and anxious symptoms, which is consistent with studies associating social media use with psychological distress (Huang et al., 2023; Hunt et al., 2018; Cunningham et al., 2021). However, the interpretation of these results is limited by the quantitative approach of the study, as it does not capture the qualitative aspects of social media use.

In the context of the pandemic, lockdown measures forced individuals to rely more on their partners for emotional support or, in the case of those without a partner, to face the lack of this support, which exacerbated loneliness and distress. Although the hypothesis that greater separation would increase distress was partially supported, significant differences were observed

only in the case of depressive symptoms and loneliness between couples unaffected by distancing and individuals without a partner. The developed SEM models highlighted complex relationships between loneliness, social media use, and psychological distress, suggesting that sexual intimacy plays a protective role against perceived isolation.

The study's limitations include the sampling method and the demographic distribution of the participants, which reduce the ability to generalize the results. However, the study makes an important contribution to understanding the impact of the pandemic on loneliness and psychological distress, particularly in the context of Romania.

8. Study 3 – Attachment and Coping in the Second Pandemic Year: The Impact on Loneliness and Emotional Distress

8.1. Objectives and hypotheses
Our study targeted the general population of Romania during the period between the third and fourth waves of the COVID-19 pandemic, with the primary objectives of investigating: (i) attachment, adaptation, and their relationship with loneliness and emotional stress; (ii) the mediating role of loneliness between the dimensions of attachment and emotional stress. Additionally, the study also pursued secondary objectives, such as measuring the impact of gender and age on these variables.

8.2. Materials and methods

The population of Romania in the second year of the COVID-19 pandemic was the target of this study. Using a cross-sectional model, data were collected between April 2021 and September 2021 through an online questionnaire. The final sample consisted of 141 participants.

Emotional distress was conceptualized as the total score obtained on the DASS-21 scale, summing the subscores for the three scales. Its internal validity in our sample was excellent. Coping strategies were assessed using the B-COPE Inventory (Brief COPE Inventory) (Carver, 1997), an abbreviated form of the original inventory, which contained 60 items. The B-COPE

scale uses 28 items. Consistent with other studies on coping strategies used during the pandemic (Fluharty, Bu, Steptoe & Fancourt, 2021), we used the four-factor model proposed by Bose and colleagues (2015), which reduces the number of scale dimensions to just four: problem-focused coping, emotion-focused coping, avoidant coping, and socially-supported coping.

8.3. Results

The study conducted a series of t-tests to analyze gender differences in age, loneliness, mental distress, attachment dimensions, and coping styles. The results revealed significant differences only in coping mechanisms, where men scored lower than women. These differences were evident across all analyzed coping dimensions: problem-focused coping ($t(139)=-2.45$, $p = .014$), emotion-focused coping ($t(139) = -2.60$, $p = .010$), avoidant coping ($t(139) = -2.29$, $p= .023$), and socially supported coping ($t(139) = -2.11$, $p = .036$), suggesting that women employ a broader range of coping strategies. In contrast, no significant gender differences were identified in loneliness, emotional distress, or attachment dimensions.

The correlational analysis showed that loneliness is strongly correlated with emotional distress ($r(139) = .70$, $p < .001$) and with the dimensions of anxious attachment ($r(139) = .63$, $p < .001$) and avoidant attachment ($r(139) = .51$, $p < .001$). Positive correlations were also found between loneliness and problem-focused coping styles ($r(139) = .21$, $p < .013$) and socially supported coping ($r(139) = .20$, $p < .016$). Mental distress was also correlated with anxious attachment ($r(139) = .53$, $p < .001$) and avoidant attachment ($r(139) = .41$, $p < .001$), as well as with problem-focused coping ($r(139) = .24$, $p = .004$) and socially supported coping ($r(139) = .26$, $p = .002$).

Regression analyses highlighted that the dimensions of anxious and avoidant attachment are significant predictors of loneliness, explaining 43.3% of its variance. Anxious attachment was also a significant predictor of emotional distress ($b = 1.07$, $SE = .17$, $\beta = .50$, $t(137) = 6.29$, $p < .001$), explaining 30.9% of the variance. In contrast, avoidant attachment did not have a significant effect on emotional distress. Coping styles were also analyzed as predictors of loneliness and emotional distress. Problem-focused coping ($b = 1.03$, $SE = .36$, $\beta = .33$, $t(135) = 2.79$, $p = .006$), emotion-focused coping ($b = -.34$, $SE = .14$, $\beta = -.38$, $t(135) = -2.42$, $p = .015$), and socially supported coping ($b = .39$, $SE = .16$, $\beta = .28$, $t(135) = 2.38$, $p = .019$) significantly

predicted loneliness, although these factors explained only a small part of the variance. In the case of emotional distress, problem-focused coping (b = .91, SE = .34, β = .30, t(135) = 2.67, p = .008) and socially supported coping (b = .61, SE = .15, β = .45, t(135) = 3.93, p < .001), along with age, were significant factors, explaining 18.8% of the variance.

Model 1

Attachment anxiety → .53** → Emotional distress

Loneliness

.63** .60**

Attachment anxiety → .14 → Emotional distress

Model 2

Attachment avoidance → .41** → Emotional distress

Loneliness

.51** .66**

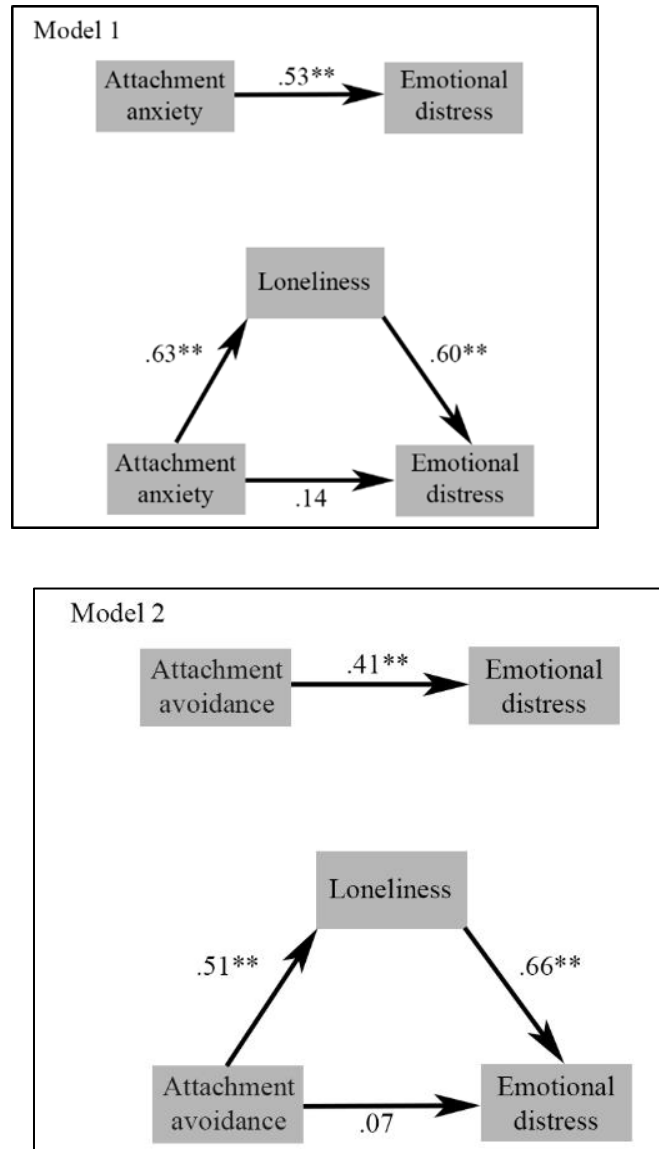Attachment avoidance → .07 → Emotional distress

*Figure 3. Model 1: Mediation model between anxious attachment and emotional distress, with loneliness as the mediator, Model 2: Mediation model between avoidant attachment and emotional distress, with loneliness as the mediator, ** represents p < .01*

The mediation analysis showed that loneliness fully mediates the relationship between anxious attachment and mental distress, as well as between avoidant attachment and mental

distress. Thus, anxious and avoidant attachment no longer directly predict emotional distress when loneliness is taken into account.

8.4. Discussion

This study, conducted in the second year of the COVID-19 pandemic, investigated the relationship between loneliness, emotional distress, and attachment styles, also considering coping strategies. Despite the challenging context, the results highlighted some significant trends, as well as some unexpected findings.

The correlation analysis showed that age had a minimal but significant effect on emotional distress and attachment anxiety. However, when age was analyzed alongside attachment styles, it was no longer a significant predictor of emotional distress, suggesting that attachment style plays a crucial role in the emotional vulnerability of young adults. These findings are consistent with the literature, which emphasizes that young adults are more susceptible to mental health symptoms under intense stress conditions.

Gender differences were not significant in terms of loneliness, emotional distress, or attachment dimensions, contrary to expectations. This could be explained by the asymmetric gender distribution in the sample and the demographic characteristics of the participants, most of whom were young women with a high level of education.

The regression analyses demonstrated that insecure attachment styles, particularly attachment anxiety, are strong predictors of loneliness and emotional distress. Attachment anxiety predicted nearly half of the variance in loneliness and emotional distress, while attachment avoidance was a significant predictor only for loneliness. These results support the idea that insecure attachment plays a central role in how individuals perceive and respond to loneliness and emotional stress, with significant effects on mental health.

Furthermore, the mediation analysis revealed that attachment anxiety predicts emotional distress entirely through loneliness, suggesting that loneliness plays a crucial mediating role between attachment anxiety and emotional distress. In contrast, attachment avoidance had a smaller effect on emotional distress, but this effect was also mediated by loneliness.

Regarding coping strategies, problem-focused approaches and social support were associated with an increase in loneliness and emotional distress, which contrasts with the traditional perception of these strategies as beneficial. This suggests that in the context of the pandemic, these strategies may not be as effective and could even contribute to increased perceived stress due to restrictions and the lack of social interactions.

9. Conclusions and personal contributions

This study assessed the impact of loneliness on psychological well-being during the COVID-19 pandemic, focusing on demographic and structural risk factors. The study included two groups of participants: the first group (180 participants) completed the questionnaire during the strict lockdown in March-April 2020, and the second group (141 participants) completed it between May-September 2021, during a period between two pandemic waves.

The hypotheses considered loneliness as a central symptom and identified socio-demographic and structural risk factors that could increase individuals' vulnerability, especially during crises. The studies revealed significant links between loneliness and emotional distress, regardless of the pandemic period:

1. **Strong Correlation:** Loneliness showed a strong correlation with mental distress.
2. **Explaining Affective Symptoms:** Perceived loneliness explained nearly half of the depressive, anxious, and stress symptoms.
3. **Persistence of Effect:** This effect persisted even after adjusting for age and gender.
4. **Mediation of Social Media Use:** The use of multiple social media platforms mediated the relationship between loneliness and anxiety, but not other affective dimensions.
5. **Insecure Attachment as a Risk Factor:** Insecure attachment styles (anxious and avoidant) were risk factors for loneliness and predictors of emotional distress.
6. **Mediation by Loneliness:** The effect of insecure attachment on emotional distress was mediated by loneliness.
7. **Impact of Coping Styles:** The effectiveness of coping styles depended on the available social support; problem-focused and socially-supported coping were risk factors for loneliness and mental distress in the second year of the pandemic.

8. **Romantic Intimacy as a Protective Factor:** Romantic intimacy emerged as a protective factor against loneliness, although this effect disappeared when attachment dimensions were included in the analysis.

9. **Age as a Protective Factor:** Age was a protective factor and predictor of mental distress.

10. **Gender Was Not a Risk Factor:** Gender did not emerge as a risk factor in this study.

11. **Loneliness Among Those Without a Partner:** Individuals without a romantic partner showed higher levels of loneliness and depression compared to those minimally affected by the pandemic.

The strengths of these studies include: A) Inclusion of romantic intimacy as a factor. B) Dimensional evaluation of loneliness. C) Evaluation of adult attachment using non-narrative methods. D) Use of SEM modeling, the most appropriate statistical technique for cross-sectional studies with interconnected variables.

However, the studies also had limitations: A) Convenience sampling, "snowball" type, vulnerable to selection bias. B) Cross-sectional design, which limits causal inferences. C) Asymmetric sample distributions, affecting the generalizability of the results.

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