



Attachment theory 2.0: A network analysis of offline and online attachment dimensions, guilt, shame, and self-esteem and their differences between low and high internet users

Giorgio Veneziani, Chiara Ciacchella, Piergiorgio Onorati, Carlo Lai^{*}

Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome, Rome, Italy

ARTICLE INFO

Handling editor: Min Jou

Keywords:

Attachment theory
Guilt
Shame
Self-esteem
Virtual relationships

ABSTRACT

Background: Attachment dimensions, guilt, shame, and self-esteem influence offline and online interactions. In addition, these psychological variables are involved in the amount of time an individual uses the Internet. Few studies have examined the associations between guilt, shame, self-esteem, and attachment dimensions related to friendships and romance in the offline and online contexts, and how these variables differ between low and high Internet Users (IU). The present study explored the associations between guilt, shame, self-esteem, and attachment dimensions related to offline and online relationships and assessed the differences between low and high IU on these psychological variables.

Methods: 213 participants completed online self-report questionnaires.

Results: Attachment dimensions correlated positively with corresponding dimensions across contexts. Guilt was negatively correlated with offline insecure attachment dimensions and positively with online avoidance. Shame proneness was positively correlated, and self-esteem negatively, with insecure attachment dimensions. High IU showed higher anxiety/ambivalence, lower avoidance, and guilt than low users. Avoidance was higher and anxiety/ambivalence was lower in online relationships.

Conclusions: People would maintain the same attachment strategies in offline and online contexts. Guilt, shame, and self-esteem are differently associated with attachment dimensions in offline and online contexts. Lastly, IU showed differences in insecure attachment dimensions and guilt.

1. Introduction

Attachment theory originated as an attempt to understand the nature of the strong emotional bonds between infants and their caregivers and why separation from caregivers can be a major source of distress for infants (Bowlby, 1969, 1973). According to Bowlby (1969), from early experiences with an attachment figure, individuals construct a “mental representation” of the interaction that is thought to shape personality development and guide social behavior (Simpson et al., 1996). Adult attachment studies have reported that mental attachment representation shows individual differences conceptualized through two dimensions called avoidance and anxiety/ambivalence (Brennan et al., 1998; Fraley et al., 2015; Simpson et al., 1992). Specifically, the avoidance dimension consists of discomfort with closeness and dependency or a reluctance to be intimate with others, whereas the anxiety/ambivalence dimension corresponds with fear and vigilance concerning rejection and

abandonment (Brennan et al., 1998; Fraley & Shaver, 2000).

It is necessary to consider that relationships with attachment figures have a specific influence on the development of self-conscious emotions such as shame and guilt (Muris et al., 2014; Muris & Meesters, 2014). Shame involves the perception of being seen by others as having negative personal characteristics or behaviors and promotes withdrawal tendencies, interpersonal separation, and distance (Cohen et al., 2011; Gilbert, 2000; Tangney et al., 2007; Veneziani et al., 2022). The relational nature of shame was previously theorized (Bowlby, 1973; Lewis, 1971), where rejection by a significant other could be a prototypical experience of this self-conscious emotion, as it might be interpreted as a global rejection of the self (Gross & Hansen, 2000; Lewis, 1971). In adulthood, shame was found positively associated with insecure attachment dimensions (Gross & Hansen, 2000; Heflin, 2015; Park & Shields, 2023).

Guilt, differently, emerges from the belief that one has caused

^{*} Corresponding author. Department of Dynamic and Clinical Psychology, and Health Studies, Sapienza University of Rome, Via degli Apuli 1, Rome, 00185, Italy.
E-mail address: carlo.lai@uniroma1.it (C. Lai).

unjustified harm to another person or that one has not behaved altruistically and could serve as a motivation for reparative actions (Ashby et al., 2006; Crossley & Rockett, 2005; Feiring & Taska, 2005; Tangney et al., 2007). Guilt might be an adaptive emotion for interpersonal relationships, implying the need to make amends for a negative action committed (Baumeister et al., 1994). appears to be associated with lower levels of insecurity in attachment bonds (Lopez et al., 1997).

In this context, the relationship with attachment figures is related to the levels of self-esteem (Bylsma et al., 1997; Hazan & Shaver, 1994), defined as the individual's positive or negative attitude toward the self (Rosenberg et al., 1995). Indeed, individuals with high self-esteem present a positive self-representation that leads them to feel more secure regarding their worth and the involvement of others in the relationship (Murray et al., 2000).

As adults have multiple relationships with family members, friends, and romantic partners, these relational domains might meet different needs related to different concerns and expectations in attachment bonds (Overall et al., 2003). Concurrently, in adulthood, there are several relational domains in which different attachment figures may coexist. Depending on the relational domain, different attachment representations may be activated, and these representations seem to be "nested" under a global attachment model formed from early relationships with caregivers, which remain active and partially regulate cognition, emotions, and behavior (Overall et al., 2003; Pierce & Lydon, 2001; Simpson et al., 2002).

Since close relationships are maintained but also initiated through social networking sites, dating apps, or multiplayer online games (Antheunis et al., 2016; Billedo et al., 2015; Lieberman & Schroeder, 2020), research has begun to study online relationships within the theoretical framework of attachment theory (Coulson et al., 2018; Quackenbush et al., 2015; Schönbrodt & Asendorpf, 2012). The attachment framework can be useful for understanding relationships formed online, as it conceptualizes emotional bonds in terms of representations, theorizing that psychological proximity is the central element of close relationships (Coulson et al., 2018; Crowell et al., 2002). In this regard, the online context could offer significant opportunities to fulfill social and relational needs, despite online relationships have previously been considered less strong than offline ones due to less interdependence, lack of self-disclosure, and less variety of topics in conversations, being mainly text-based and lacking facial expressions and physical contact (Buote et al., 2009; Coulson et al., 2018; Lieberman & Schroeder, 2020; Scott et al., 2006).

Online relationships seem to be characterized by similar strengths of attachment bonds, leading to the hypothesis that internal working models could be transferred to online settings (Quackenbush et al., 2015; Schönbrodt & Asendorpf, 2012). However, attachment dimensions of avoidance and anxiety/ambivalence across offline and online relationships have appeared only moderately correlated, suggesting that there may be possible differences in levels of avoidance and anxiety/ambivalence between the two contexts (Coulson et al., 2018; Quackenbush et al., 2015). Moreover, high levels of attachment anxiety/ambivalence were positively associated with the time spent on social networking sites, while attachment avoidance was negatively associated with the frequency of social networking sites usage (Hart et al., 2015; Oldmeadow et al., 2013; Stöven & Herzberg, 2021). Indeed, individuals with anxious attachment might experience discomfort when they are away from their partners, and the use of online communication tools might alleviate the distress by allowing them to interact with their partners at any time (Goodcase et al., 2018). Conversely, avoidant individuals, who are more independent, autonomous, less open in sharing their emotions, and who see others as untrustworthy, might have less interest in building online relationships (Oldmeadow et al., 2013; Stöven & Herzberg, 2021).

The ways how an individual establishes online relationships, and the internet usage, are influenced by several self-evaluation processes (Servidio, 2019; Stöven & Herzberg, 2021). In this regard, self-esteem

can influence the proneness of socializing in online contexts (Kraut et al., 2002; Steinfield et al., 2008). Individuals with low self-esteem might be more likely to build relationships online because they tend to be more susceptible to interpersonal relationships and more dependent on others for approval (Hong et al., 2014; Saiphoo et al., 2020). This may be related to feelings of embarrassment in offline social situations, and thus online communication can be an effective way for them to socialize (Kraut et al., 2002; Saiphoo et al., 2020; Steinfield et al., 2008). It has also been shown that higher levels of social networking site use are associated with lower levels of self-esteem (Saiphoo et al., 2020).

Also noteworthy, self-conscious emotions are a relevant psychological factor that influences the use of online activities to develop social bonds (Casale & Fioravanti, 2017; Denizci Nazlıgül et al., 2022). The online context, being perceived as safer and more protective from the judgment of others, might lead people who tend to feel shame to use computer-mediated communication as an emotional regulation strategy (Casale & Fioravanti, 2017). On the contrary, guilt-prone people did not seem to use online activities to regulate negative emotional states (Denizci Nazlıgül et al., 2022).

Since relationships are increasingly developed and maintained in online environments, studies investigating this type of relationship within the framework of attachment theory and which account for the role of relevant psychological variables are needed (Quackenbush et al., 2015; Schönbrodt & Asendorpf, 2012). Furthermore, previous research investigating online relationships within this framework was based on the responses projected by participants on avatars rather than on established relationships in the online context, or prior research considered only online multiplayer videogames as a virtual environment (Coulson et al., 2018; Quackenbush et al., 2015; Schönbrodt & Asendorpf, 2012). Moreover, it is unclear whether there are differences in the avoidance and anxiety/ambivalence dimensions of attachment between offline relationships with significant others (such as friends and romantic partners) and online relationships. Lastly, to date, no studies have investigated the associations among self-conscious emotions, self-esteem, and attachment dimensions related to online relationships.

Thus, the present study aimed to explore through a network analysis approach the associations among psychological variables (guilt, shame, and self-esteem) and attachment dimensions (avoidance and anxiety/ambivalence) in friendships and romantic relationships experienced in both offline and online contexts. In addition, differences between low and high internet users on the psychological variables and attachment dimensions in friendships and romantic relationships related to offline and online contexts were assessed.

2. Materials and methods

2.1. Procedure

This study was approved by the [edited for blinded review], and it complied with the Declaration of Helsinki adopted by the World Medical Association 2018 (WMA) at the 18th WMA General Assembly (Helsinki, Finland, June 1964) and subsequently amended by the 64th WMA General Assembly (Fortaleza, Brazil, October 2013). Using the Google Forms platform, an online questionnaire was administered in the Italian language through various platforms and social networking sites (Instagram, Telegram, WhatsApp, and Facebook). The inclusion criteria were that participants could read and understand the Italian language and be 18 years or older.

2.2. Materials

An online questionnaire was created to obtain information about participants' gender, age, marital status, daily hours spent on the Internet, the usage of online relationship tools (e.g., social networking sites, multiplayer online games, and dating apps), level of education, and the participants' psychological characteristics. The following self-

report questionnaires were used.

2.2.1. Attachment dimensions

The Adult Attachment Questionnaire (AAQ) (Simpson et al., 1996) assessed participants' adult attachment dimensions. The AAQ consists of 17 items, mainly derived from Hazan and Shaver's (1987) original descriptions of attachment style, and it asks individuals to indicate how they relate to romantic partners in general (Simpson et al., 1996). A principal-axis factor analysis of the 17 AAQ items followed by a varimax rotation revealed two dimensions (Simpson et al., 1996). The avoidance dimension reflected the tendency to have a negative representation of others and to shy away from closeness and intimacy in relationships (Simpson et al., 1996). In the work of Simpson et al. (1996), items 1, 2, 3, 5, 6, 7, 8, and 9 saturated this dimension and scores on this eight-item index could range from 8 to 56 (Simpson et al., 1996). The anxiety/ambivalence dimension reflected the tendency to have a negative self-representation and excessive preoccupation within relationships with the loss of a partner, abandonment by a partner, and/or the level of commitment to the relationship. Higher scores on items 4, 10, 11, 12, 13, 14, 15, 16, and 17 indicate greater ambivalence. Scores on this nine-item index range from 9 to 63 (Simpson et al., 1996). The AAQ is composed of the following items: (1) "I find it relatively easy to get close to others"; (2) "I'm not very comfortable having to depend on other people"; (3) "I'm comfortable having others depend on me"; (4) "I rarely worry about being abandoned by others"; (5) "I don't like people getting too close to me"; (6) "I'm somewhat uncomfortable being too close to others"; (7) "I find it difficult to trust others completely"; (8) "I'm nervous whenever anyone gets too close to me"; (9) "Others often want me to be more intimate than I feel comfortable being"; (10) "Others often are reluctant to get as close as I would like"; (11) "I often worry that my partner(s) don't really love me"; (12) "I rarely worry about my partner(s) leaving me"; (13) "I often want to merge completely with others, and this desire sometimes scares them away"; (14) "I'm confident others would never hurt me by suddenly ending our relationship"; (15) "I usually want more closeness and intimacy than others do"; (16) "The thought of being left by others rarely enters my mind"; (17) "I'm confident that my partner(s) love me just as much as I love them" (Simpson et al., 1996). As already done in a previous study (Overall et al., 2003), participants completed four versions of the AAQ by answering through a 7-point Likert scale (from 1 = *strongly disagree* to 7 = *strongly agree*) each question while thinking about their close romantic relationship(s) (i.e., attachment to partner), their close friendship relationships (i.e., attachment to friends), and with reference to the context of their exclusively online friendships and romantic close relationships. If the participants had no experience of exclusively online close relationships, they were asked to respond by imagining it. In the present study, the AAQ showed the following reliability values (Cronbach's alphas): avoidance in friendship relationships offline = 0.78; anxiety/ambivalence in friendship relationships offline = 0.87; avoidance in romantic relationships offline = 0.79; anxiety/ambivalence in romantic relationships offline = 0.88; avoidance in friendship relationships online = 0.80; anxiety/ambivalence in friendship relationships online = 0.73; avoidance in romantic relationships online = 0.80; and anxiety/ambivalence in romantic relationships online = 0.79.

2.2.2. Guilt and shame

The Guilt and Shame Proneness (GASP) scale (Cohen et al., 2011) measured participants' propensity to experience guilt and shame. This instrument is a scenario-based scale composed of 16 items and 4 subscales: Guilt-Negative Behavior Evaluation (NBE), Guilt-Repair (GR), Shame-Negative Self-Evaluation (NSE), and Shame-Withdraw (SW). Each item represents a hypothetical everyday scenario or transgression in which participants are asked to imagine being in that situation and then to indicate how likely their experience matches the one described on a 7-point Likert scale (from 1 = *very unlikely* to 7 = *very likely*). In the work of Cohen et al. (2011), EFA showed that a four-factor oblique

model fitted well, with all factor loadings resulting significant. The CFA results for the hypothesized four-factor oblique model showed significant factor loadings, and acceptable fit indices: $\chi^2 = 257.29$, $p < 0.001$, RMSEA = 0.065, CFI = 0.94, TLI = 0.96 (Cohen et al., 2011). The two subscales that relate to guilt are NBE and GR; they assess responses to private transgressions or failures. Specifically, the NBE subscale assesses guilt about an individual's behavior and includes items 1, 9, 14, and 16. GR measures the tendency to act to correct or compensate for the transgression and it's composed of items 2, 5, 11, and 15. The two subscales related to shame are Shame-NSE and SW. Specifically, the NSE subscale assesses the tendency to evaluate the self negatively and includes items 3, 6, 10, and 13. The SW subscale assesses the tendency to hide or retreat after a publicly exposed transgression and includes items 4, 7, 8, and 12. Higher scores on each subscale indicate a greater propensity for guilt and/or shame. The GASP scale is composed of the following items: (1) "After realizing you have received too much change at a store, you decide to keep it because the salesclerk doesn't notice. What is the likelihood that you would feel uncomfortable about keeping the money?"; (2) "You are privately informed that you are the only one in your group that did not make the honor society because you skipped too many days of school. What is the likelihood that this would lead you to become more responsible about attending school?"; (3) "You rip an article out of a journal in the library and take it with you. Your teacher discovers what you did and tells the librarian and your entire class. What is the likelihood that this would make you feel like a bad person?"; (4) "After making a big mistake on an important project at work in which people were depending on you, your boss criticizes you in front of your coworkers. What is the likelihood that you would feign sickness and leave work?"; (5) "You reveal a friend's secret, though your friend never finds out. What is the likelihood that your failure to keep the secret would lead you to exert extra effort to keep secrets in the future?"; (6) "You give a bad presentation at work. Afterward your boss tells your coworkers it was your fault that your company lost the contract. What is the likelihood that you would feel incompetent?"; (7) "A friend tells you that you boast a great deal. What is the likelihood that you would stop spending time with that friend?"; (8) "Your home is very messy and unexpected guests knock on your door and invite themselves in. What is the likelihood that you would avoid the guests until they leave?"; (9) "You secretly commit a felony. What is the likelihood that you would feel remorse about breaking the law?"; (10) "You successfully exaggerate your damages in a lawsuit. Months later, your lies are discovered and you are charged with perjury. What is the likelihood that you would think you are a despicable human being?"; (11) "You strongly defend a point of view in a discussion, and though nobody was aware of it, you realize that you were wrong. What is the likelihood that this would make you think more carefully before you speak?"; (12) "You take office supplies home for personal use and are caught by your boss. What is the likelihood that this would lead you to quit your job?"; (13) "You make a mistake at work and find out a coworker is blamed for the error. Later, your coworker confronts you about your mistake. What is the likelihood that you would feel like a coward?"; (14) "At a coworker's housewarming party, you spill red wine on their new cream-colored carpet. You cover the stain with a chair so that nobody notices your mess. What is the likelihood that you would feel that the way you acted was pathetic?"; (15) "While discussing a heated subject with friends, you suddenly realize you are shouting though nobody seems to notice. What is the likelihood that you would try to act more considerably toward your friends?"; (16) "You lie to people but they never find out about it. What is the likelihood that you would feel terrible about the lies you told?".

In the present study, the GASP scale showed the following reliability values (Cronbach's alphas): Guilt-NBE = 0.67, GR = 0.46, Shame-NSE = 0.69, and SW = 0.60. The Guilt-Repair subscale showed a low α score as the benchmark of the original version of the GASP was set at 0.60 (Cohen et al., 2011). As previously reported, a possible explanation for the low reliability could depend on the scenario-based nature of this

measure, indeed, the alpha coefficients tend to show lower reliability because each item has a unique variance for the scenario and a common variance for the construct underlying the response (Cohen et al., 2011; Tangney & Dearing, 2002).

2.2.3. Self-esteem

The Italian Rosenberg Self-Esteem (RSE) scale (Prezza et al., 1997) measured participants' self-esteem levels. They rated their answers with 10 statements (from 1 = *strongly disagree* to 4 = *strongly agree*), with higher scores indicating higher self-esteem. In the work of Prezza et al. (1997), EFA with axis factorial extraction using the principal component method and varimax rotation revealed two factors. However, CFA showed that a one-dimensional model reported a sufficiently high Rho coefficient (0.84) to consider this model valid (Prezza et al., 1997). The present study used the RSE as a one-dimensional scale, as the use of self-criticism and self-recognition subscales could be optional and not constitute a significant advantage (Prezza et al., 1997; Shahani et al., 1990). The Italian RSE scale is composed of the following items: (1) "I think I'm worth at least as much as the others"; (2) "I feel that I have a number of good qualities"; (3) "I am inclined to think that I am a real failure"; (4) "I am able to do things as well as most other people"; (5) "I feel I do not have much to be proud of"; (6) "I take a positive attitude toward myself"; (7) "On the whole, I am satisfied with myself"; (8) "I wish I could have more respect for myself"; (9) "I certainly feel useless at times"; (10) "At times I think I am no good at all". In the present study, the Italian version of the RSE scale showed a Cronbach's reliability value of 0.90.

3. Statistical analysis

This study's different analyses were performed using the statistical software JASP (v. 0.17.3) (JASP Team, 2023) and RStudio (v. 2022.12.0 + 353) (RStudio Team, 2020). Initially, descriptive analyses were performed. Moreover, the frequency distributions of the AAQ scores related to friendships and romantic relationships in both offline and online contexts, GASP, and the RSE scores were examined for violations of normality.

Subsequently, a network analysis was carried out. With network analysis it is possible to visually explore relationships occurring simultaneously between multiple variables, incorporating advanced statistical analysis tools (Luke & Harris, 2007). A network consists of nodes representing the variables, connected by edges representing statistical relationships. The edges can differ in polarity and strength of the connection (edge weight), showing graphically whether a relationship is positive (blue edges) or negative (red edges) and strong (thick and denser colored edges) or weak (thin and less dense colored edges) (Epskamp et al., 2018). Some research has shown the utility of network analysis in psychological studies (Leonardi et al., 2022; Lombardo et al., 2023).

In the present study, the network was estimated through a Gaussian graphical model (GGM), using the graphical least absolute shrinkage and selection operator (GLASSO) algorithms and the extended Bayesian information criterion (EBIC) (Friedman et al., 2008). Combining GLASSO with EBIC can optimize the ratio between the number of correctly identified edges and the total number of edges for sparse graphs (Epskamp & Fried, 2018). A tuning hyperparameter of 0.25 was set to increase the sensitivity of the network. Moreover, regarding edge weights, a minimum absolute value of 0.03 was considered interpretable (Isvoranu et al., 2017).

Centrality indices were examined to evaluate the relative importance of a node in the context of other nodes (Borgatti, 2005). A central node is a node that has many connections in a network and can affect other nodes to a relatively great extent. In contrast, a peripheral node is on the outskirts of a network and has a few connections, generating less impact on the network (Hevey, 2018). Specifically, indices of strength and expected influence were evaluated in the present study, as they seem to

reflect reasonably accurate centrality estimates for psychological networks (Bringmann et al., 2019; Santos et al., 2018). A so-called strength index indicates how well a node is directly connected to other nodes and reflects the importance of an individual node in a network (Epskamp et al., 2018). The expected influence index for a node is measured by the absolute sum of the weights of the edges associated with it, considering negative edges. It estimates a node's influence on its immediate neighbors (Robinaugh et al., 2016). Afterward, the edge weights accuracy was assessed using non-parametric bootstrapping (2000 replicates, 8 cores) to compute 95% confidence intervals (CIs). The stability of the centrality indices of strength and expected influence were examined by using case-dropping subset bootstrapping (2000 replicates, 8 cores), calculating the centrality stability (CS) coefficient. The CS coefficient is considered acceptable when it is at least 0.25 (Epskamp et al., 2018).

A $2 \times 2 \times 2$ multivariate analysis of variance (MANOVA) with internet usage (low users vs. high users) as a between-subjects factor, relational context (offline vs. online), and type of relationship (friendship vs. romantic) as within-subjects factors, was performed on the avoidance and anxiety/ambivalence attachment dimensions. The assumptions for the MANOVA were assessed with Box's M test, which was not significant (Box's $M = 41.9$; $p = .286$), indicating that there were no significant differences between the covariance matrices. According to Leech et al. (2005), a MANOVA is used when the dependent variables are theoretically related, but this relationship should not be too high (correlation coefficients over 0.80 or 0.90). As shown in Table 1S in Supplementary Materials, in the present study, correlation coefficients (Pearson's r) were lower than 0.80, showing that there were no multicollinearity violations. Subsequently, $2 \times 2 \times 2$ analyses of variance (ANOVAs) with internet usage (low users vs. high users) as a between-subjects factor, relational context (offline vs. online), and type of relationship (friendship vs. romantic) as within-subjects factors, were performed on both avoidance and anxiety/ambivalence attachment dimensions.

A second MANOVA with internet usage (low users vs. high users) as a between-subjects factor was performed on psychological variables (Guilt-NBE, GR, Shame-NSE, SW, and Self-Esteem). The assumption of homogeneity of covariance was assessed by using Box's M test, which was not significant (Box's $M = 16.4$; $p = .382$); moreover, as shown in Supplementary Table 2S, correlation coefficients (Pearson's r) among the psychological variables were lower than 0.80, showing that there were no multicollinearity violations.

Finally, ANOVAs with internet usage (low users vs. high users) as a between-subjects factor were performed on the psychological variables.

4. Results

The total sample included 213 (147 females) participants aged between 18 and 59 years ($M_{\text{age}} = 25.5$; $SD = 6.8$). One hundred eighty-three participants were celibate/maiden (85.9 %), 16 living together with a partner (7.5 %), 12 were married (5.6 %), 1 was separated (0.4 %) and 1 was divorced (0.4 %). All the participants spent at least a minimum of 1 h and a maximum of 10 h on the Internet daily ($M = 3.9$, $SD = 2.2$). Three participants reported that they did not use online relationship tools on a daily basis. Concerning education, 104 of them had completed high school (48.8 %), 80 had obtained a university degree (37.5 %), 26 had obtained a Ph.D. (12.2 %), and 3 had completed elementary school (1.4 %).

Similar to past studies (Deng et al., 2022; McGrath et al., 2016), we used a grouping method based on a median split to define internet usage groups (low internet users and high internet users). In the present study, there were 105 low internet users (77 females and 28 males; between 18 and 59 years old, $M_{\text{age}} = 27.0$, $SD = 7.2$) and 108 high internet users (70 females and 38 males; between 18 and 55 years old, $M_{\text{age}} = 24.0$, $SD = 6.1$).

The Shapiro-Wilk's test was significant for the GASP, RSE scores, and AAQ scores, except for the romantic anxiety/ambivalence attachment

dimension in the online and offline contexts (see [Supplementary Table 3S](#)). However, the distributions were only moderately asymmetrical, with a skewness between 2 and -2, and Kurtosis was between 3 and -3, indicating that extreme values were not very different according to normal data distribution ([Table 3S](#)).

[Fig. 1](#) shows the network structure of the associations among GASP, RSE, and the AAQ scores related to friendships and romantic relationships, in both offline and online contexts. The network was constituted of 13 nodes, 42 of 78 non-zero edges with a sparsity index of 0.462. The weights matrix of associations between the different variables in the network is shown in [Supplementary Table 4S](#).

The strongest connections (partial correlations) were identified in the attachment dimension of avoidance between friendships and romantic relationships in the online context (0.63), followed by a positive connection between Shame-NSE and Guilt-NBE (0.56), a positive association in the attachment dimension of anxiety/ambivalence between friendships and romantic relationships in the online context (0.40), and in the attachment dimension of avoidance between friendships and romantic relationships in the offline context (0.39). Moreover, for both attachment dimensions (avoidance and anxiety/ambivalence) positive associations were found between the two relational contexts (offline and online) for both types of relationships (friendships and romances). Furthermore, for both attachment dimensions, the relationship types (friendships and romances) were positively associated in both offline and online contexts. Moreover, the avoidance dimension in friendships and romantic relationships was positively associated with the anxiety/ambivalence dimension in friendships and romantic relationships, only in the offline context. The anxiety/ambivalence dimension in friendships in the offline context was positively associated with the same dimension in romantic relationships in the online context. The avoidance dimension in romantic relationships was negatively associated with the anxiety/ambivalence dimension in the same type of relationship, only in the online context.

Concerning the psychological variables, GR (guilt-repair) was

negatively associated with the avoidance dimension in friendship relationships and with the anxiety/ambivalence dimension in romantic relationships in the offline context, and positively associated with the avoidance dimension in both types of relationships (friendships and romances) in the online context. Shame-NSE (negative self-evaluation) was positively associated with the avoidance attachment dimension in online romantic relationships and with the anxiety/ambivalence dimension in romantic relationships in both offline and online contexts. SW (shame-withdraw) was positively associated with the avoidance dimension related to both friendships and romantic relationships in the offline context, and with anxiety/ambivalence in friendship relationships in the offline context.

Finally, self-esteem was negatively associated with the anxiety/ambivalence dimension in both types of relationships (friendships and romances) in the offline context, and with the same dimension in online romantic relationships. Moreover, self-esteem was negatively associated with the avoidance dimension in both types of relationships in the offline context.

Regarding the centrality indices ([Fig. 2](#)), the romantic anxiety/ambivalence dimension in the offline context showed the greatest strength index within the network (1.43), followed by the romantic anxiety/ambivalence dimension in the online context (1.19). Shame-NSE showed the greatest expected influence index (0.85), followed by the romantic avoidance dimension in the online context (0.68) and the avoidance attachment dimension in friendship relationships in the online context (0.66).

The accuracy of the edge weight assessment using bootstrapped 95% non-parametric CIs is shown in [Supplementary Fig. 1S](#). The stability of centrality indices (strength and expected influence), evaluated using case-dropping bootstrapping, showed that strength ($CS = 0.44$) and expected influence ($CS = 0.67$) were stable enough ([Fig. 2S](#)). This confirms previous results, which suggest that the indices of strength and expected influence remain stable within psychological networks ([Bringmann et al., 2019](#); [Santos et al., 2018](#)).

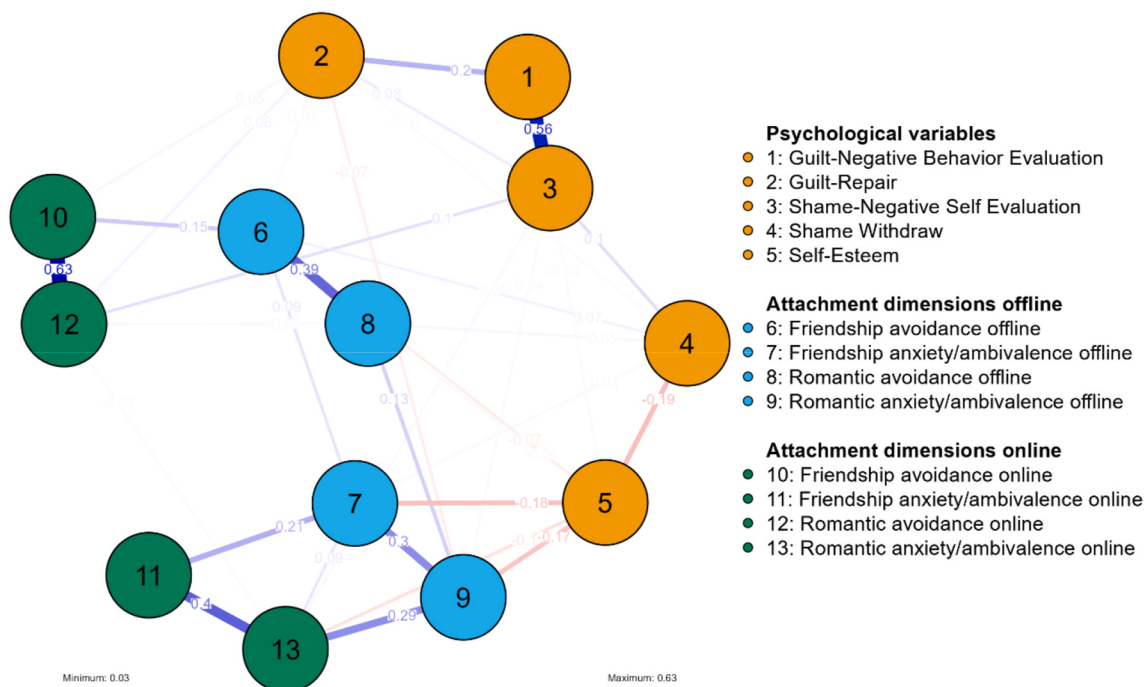


Fig. 1. Network structure (partial correlations) of the associations among Guilt-Negative Behavior Evaluation, Guilt-Repair, Shame-Negative Self-Evaluation, Shame-Withdraw, and Self-Esteem (in ochre); and attachment dimensions (avoidance and anxiety/ambivalence) related to offline (in blue) and online (in green) friendships and romantic relationships.

Note. Positive associations are represented by blue edges and negative associations are represented by red edges. Thicker and denser colored edges represent stronger associations, and thinner and less dense colored edges represent weaker associations.

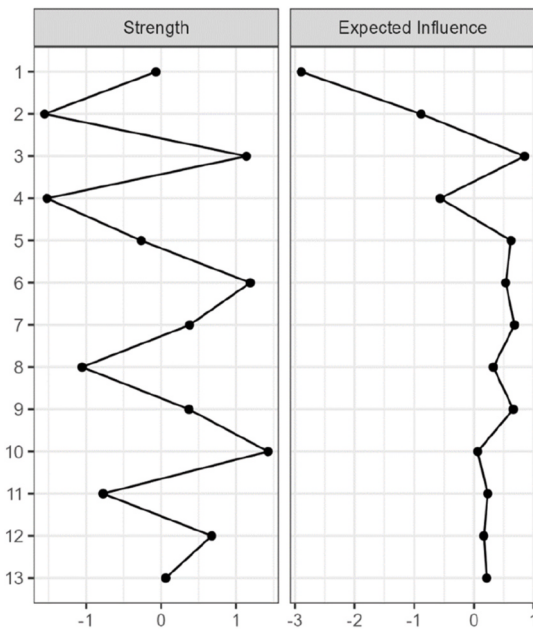


Fig. 2. The plot of centrality indices

Note. 1 = Self-Esteem; 2 = Shame-Withdraw; 3 = Shame-Negative Self-Evaluation; 4 = Guilt-Repair; 5 = Guilt-Negative Behavior Evaluation; 6 = Romantic anxiety/ambivalence online; 7 = Romantic avoidance online; 8 = Friendship anxiety/ambivalence online; 9 = Friendship avoidance online; 10 = Romantic anxiety/ambivalence offline; 11 = Romantic avoidance offline; 12 = Friendship anxiety/ambivalence offline; and 13 = Friendship avoidance offline.

The $2 \times 2 \times 2$ MANOVA performed with internet usage (low internet users vs. high internet users) as a between-subjects factor, and relational context (offline vs. online) and type of relationship (friendship vs. romance) as within-subjects factors on the avoidance and anxiety/ambivalence attachment dimensions showed significant main effects of internet usage (where higher users showed lower levels of avoidance and higher levels of anxiety/ambivalence compared to low users), relational context (where in the online context, avoidance levels were higher and anxiety/ambivalence were lower, compared to the offline context), and type of relationship (where friendship relationships showed lower levels of anxiety/ambivalence dimension compared to romances). Moreover, significant interaction effects of internet usage per relational context (where only in the online context low users showed higher avoidance levels than high users), and relational context per type of relationship (where in online context friendship relationships showed lower levels of avoidance than romances) were found (Table 1).

The MANOVA performed with internet usage (low IU vs. high IU) as a between-subjects factor on psychological variables (Guilt-NBE, GR, Shame-NSE, SW, and self-esteem) was found significant (Table 2).

The ANOVAs performed with internet usage (low IU vs. high IU) as a between-subjects factor on psychological variables showed significant main effects of Guilt-NBE and GR, where low IU showed higher Guilt-NBE and GR scores than high IU (Table 2).

5. Discussion

The present study aimed to explore, through a network analysis approach, the associations among guilt, shame, self-esteem, and attachment dimensions (avoidance and anxiety/ambivalence) in friendships and romantic relationships experienced in offline and online contexts. In addition, it assessed the differences between low and high internet users on the psychological variables and attachment dimensions in friendships and romantic relationships related to offline and online contexts.

The network analysis showed that each attachment dimension

Table 1

The $2 \times 2 \times 2$ multivariate analysis of variance (MANOVA) performed with internet usage (Low IU vs. High IU) as a between-subjects factor, relational context (offline vs. online), and type of relationship (friendship vs. romance) as within-subjects factors on the avoidance and anxiety/ambivalence attachment dimensions. The $2 \times 2 \times 2$ analyses of variance (ANOVAs) with internet usage (Low IU vs. High IU) as a between-subjects factor, relational context (offline vs. online), and type of relationship (friendship vs. romance) as within-subjects factors performed on both avoidance and anxiety/ambivalence attachment dimensions.

			OFF m ±sd	ON m ±sd	F(1,211); p-value; post-hoc (p-value)
Avo	Low IU	Friendship	29.5 ± 9.2	37.1 ± 10.0	Internet usage = 3.1; 0.082 Relational context = 89.8; $p < 0.001$; OFF < ON ($p < 0.001$) Type of relationship = 0.647; 0.422
		Romantic	28.6 ± 10.2	39.0 ± 9.3	
	High IU	Friendship	29.9 ± 8.8	33.7 ± 10.2	Internet usage × Relational context = 7.3; $p = 0.007$; Low IU OFF < Low IU ON ($p < 0.001$), High IU OFF < High IU ON ($p < 0.001$), Low IU ON > High IU ON ($p = 0.002$) Internet usage × Type of relationship = 0.03; $p = 0.859$ Relational context × Type of relationship = 13.2; OFF Friendship < ON Friendship ($p < 0.001$), OFF Romantic < ON Romantic ($p < 0.001$), ON Friendship < ON Romantic ($p = 0.001$)
		Romantic	29.0 ± 9.2	35.2 ± 10.0	
					Internet usage × Relational context × Type of relationship = 0.1; $p = 0.764$
					Internet usage = 1.8; $p = 0.176$
Anx	Low IU	Friendship	31.8 ± 11.5	29.9 ± 9.2	Relational context = 8.2; $p = 0.005$; OFF > ON ($p = 0.004$) Type of relationship = 88.5; < 0.001 ; Friendship < Romantic ($p < 0.001$) Internet usage × Relational context = 0.03; $p = 0.871$ Internet usage × Type of relationship = 0.3; $p = 0.599$ Relational context × Type of relationship = 1.6; $p = 0.209$ Internet usage × Relational context × Type of relationship = 0.4; 0.506
		Romantic	36.3 ± 11.8	34.9 ± 9.8	
	High IU	Friendship	33.5 ± 11.8	30.8 ± 8.9	
		Romantic	38.0 ± 12.5	37.0 ± 10.1	

Note. "Avo" = Avoidance; "Anx" = Anxiety/ambivalence; "IU" = internet users; "OFF" = Offline; "ON" = Online.

Internet usage Wilks = 0.97; $F(2,210) = 3.1$; $p = 0.048$; $\eta^2 = 0.02$.

Relational context Wilks = 0.67; $F(2,210) = 52.3$; $p < 0.001$; $\eta^2 = 0.33$.

Type of relationship Wilks = 0.70; $F(2,210) = 44.1$; $p < 0.001$; $\eta^2 = 0.30$.

Internet usage × Relational context Wilks = 0.96; $F(2,210) = 3.7$; $p = 0.027$; $\eta^2 = 0.03$.

Internet usage × Type of relationship Wilks = 0.99; $F(2,210) = 0.2$; $p = 0.851$; $\eta^2 = 0.001$.

Relational context × Type of relationship Wilks = 0.93; $F(2,210) = 7.4$; $p < 0.001$; $\eta^2 = 0.06$.

Internet usage × Relational context × Type of relationship Wilks = 0.99; $F(2,210) = 0.3$; $p = 0.767$; $\eta^2 = 0.002$.

(avoidance and anxiety/ambivalence) in the offline context, correlated positively with the corresponding one in the online context. This finding confirmed a previous study that showed a positive association between the real and virtual relationships for both the attachment dimensions (Quackenbush et al., 2015), suggesting that there might be a consistency between how people interact with friends and romantic partners in offline contexts and the ways that characterize meaningful relationships online.

Table 2

The multivariate analysis of variance (MANOVA) performed with internet usage (Low IU vs. High IU) as a between-subjects factor on psychological variables (Guilt-NBE, Guilt Repair, Shame-NSE, Shame-Withdraw, and Self-Esteem), and the analyses of variance (ANOVAs) with internet usage (Low IU vs. High IU) as a between-subjects factor performed on the psychological variables (Guilt-NBE, Guilt Repair, Shame-NSE, Shame-Withdraw, and Self-Esteem).

	Low IU <i>M</i> ± <i>SD</i>	High IU <i>M</i> ± <i>SD</i>	<i>F</i> (2, 77)	<i>p</i>	Post-hoc
Guilt-NBE	22.1 ± 4.5	20.0 ± 5.6	8.303	0.004	Low IU > High IU <i>p</i> = 0.004
Guilt-Repair	23.5 ± 3.4	21.8 ± 4.1	11.124	0.001	Low IU > High IU <i>p</i> = 0.001
Shame-NSE	23.8 ± 4.3	23.1 ± 4.8	1.156	0.283	
Shame-Withdraw	11.7 ± 5.3	12.9 ± 4.6	2.949	0.087	
Self-esteem	26.7 ± 7.2	26.7 ± 7.6	0.001	0.978	

Note. Guilt-NBE = Guilt-Negative Behavior Evaluation; Shame-NSE = Shame-Negative Self-Evaluation; “IU” = Internet Users. Internet usage Wilk’s = 0.91; *F*(5, 207) = 3.9; *p* = 0.002; η^2 = 0.09.

Moreover, the results of the present study showed consistency between the different relationship types (friendships and romances) for both attachment dimensions (avoidance and anxiety/ambivalence) in both offline and online relational contexts. Previous research found positive correlations between friendships and romances in both attachment dimensions (Furman et al., 2002; Klohnen et al., 2005). It was argued that relationships with caregivers would be the foundation for the ability to be close and intimate with others, at the same time, friendship would contribute the most to the development of reciprocity and mutual intimacy, which are central to romantic relationships, making the two relational domains similar to each other (Furman et al., 2002). The similarities between relational domains found also in the online context add further evidence to support the idea that attachment representations from the offline world transfer to the online world, rather than developing independently (Quackenbush et al., 2015; Siniuk-Warchulska et al., 2023).

Positive associations were also found between the two dimensions of attachment (avoidance and anxiety/ambivalence) for both types of relationships, but only in the offline context. This result aligns with previous studies that discovered an oblique relationship between the two attachment dimensions (Cameron et al., 2012; Fraley et al., 2011), and there is a need to consider that Bowlby himself (1973) argued that the two dimensions might be orthogonal in theory but oblique in practice. Surprisingly, in the online context, avoidance and anxiety/ambivalence in romances were negatively associated. Considering that the online context is characterized by a greater propensity to deceive (Guadagno et al., 2012) and less trust in relationships, compared to the offline context (Griffiths et al., 2011), a global and less flexible representation of attachment relationships could be activated in such relationships, which could act as a default representation that individuals are likely to use most frequently with unknown and ambiguous relational partners (Overall et al., 2003).

Moreover, among attachment dimensions, the centrality indices showed that avoidance and anxiety/ambivalence in romantic relationships, in the online context, were among the nodes most directly connected to the other nodes, and those that most activated other nodes in the network. These results suggested that these dimensions could be particularly relevant in the ways individuals interact online.

The MANOVA results showed that, in the online context, anxiety/ambivalence levels were generally lower and avoidance levels higher than offline context. The present study seems to confirm previous results according to which offline relationships could be characterized by greater anxiety/ambivalence than online relationships (Coulson et al., 2018). It could be that anxiety/ambivalence decreases due to less

importance being attributed to relationships in which there is no physical presence and elements such as exchanging a smile, touching, and modulating the sound of voice to convey emotions (Lieberman & Schroeder, 2020). Furthermore, it was possible to suppose that the propensity of avoidant individuals to have a negative view of others and the tendency to withdraw from closeness and intimacy in relationships (Simpson et al., 1996) could be increased due to the distance and boundaries intrinsic to virtual relationships. Additionally, in the online context, avoidance levels were higher toward romantic partners than friends. Usually, a romantic relationship requires greater intimacy compared to friendships (Caron et al., 2012; Grabill & Kerns, 2000), and experiencing such relationships exclusively online may not fully satisfy this need, potentially explaining the higher levels of avoidance.

The findings also showed that levels of anxiety/ambivalence were generally higher for romantic relationships, suggesting that individuals adopt hyperactivation strategies of attachment to maintain closeness more with romantic partners than with friends, probably due to an increased fear of rejection (Davis & Todd, 1982; Fraley & Davis, 1997; Hazan & Shaver, 1987).

Regarding the relationships between self-conscious emotions and the attachment dimensions, the network analysis showed that the tendency to perform reparative actions - related to guilt - showed negative associations with insecure dimensions (both avoidance and anxiety) in the offline context. This finding confirms previous literature which reported a negative association between attachment insecurity and guilt (Akbag & Imamoglu, 2010; Lopez et al., 1997). Noteworthy, the present study showed also positive associations between guilt and avoidance dimension in the online context. In this regard, it could be hypothesized that online communication might reduce understanding of others’ thoughts and feelings (Lieberman & Schroeder, 2020), and guilt-prone individuals would perhaps maintain a greater distance in online relationships.

In the present study, shame resulting from a negative evaluation of self was positively associated with both insecure attachment dimensions (avoidance and anxiety/ambivalence) online and with anxiety/ambivalence in the offline context, whilst the withdrawal tendency showed positive associations with insecure attachment dimensions only in the offline context. These results confirmed the empirical research that found positive associations between shame and insecure attachment (Muris et al., 2014; Muris & Meesters, 2014; Wei et al., 2005). A recent study found a positive association between anxious, but not avoidant, childhood attachment and shame in adulthood (Park & Shields, 2023). It has been proposed that individuals with anxious attachment might use hyperactivation strategies that would intensify negative emotions, leading to difficulties in repressing negative affect (Mikulincer & Shaver, 2003; Pereg & Mikulincer, 2004) such as shame (Park & Shields, 2023). On the other hand, avoidant individuals would engage in deactivation strategies (Mikulincer & Shaver, 2003; Pereg & Mikulincer, 2004), and suppress negative memories and affects, so that they would feel less shame (Park & Shields, 2023). Interestingly, the present study adds further insights regarding these associations. The emotional dimension of shame (NSE) was positively associated with avoidance in online relationships, while the behavioral aspect of shame (SW) was positively associated with avoidance in the offline context. Individuals with an avoidant attachment style might act out withdrawal as a strategy to cope with shame in face-to-face relationships (Asgarizadeh et al., 2023). Differently, it could be speculated that, in online relationships, the physical distance may foster less recourse to deactivation strategies, promoting greater awareness of emotional experiences, such as shame. Consistently, the association between withdrawal tendency and insecure attachment might be more relevant in the offline context as this inclination would have the function of mitigating a painful experience by distancing and isolating oneself from a physical situation that creates distress (Asgarizadeh et al., 2023).

The network analysis also showed that self-esteem was negatively associated with both attachment dimensions in the offline context, and

with anxiety/ambivalence online. The result of the present study coincides with previous research that reported negative associations between self-esteem and insecure attachment (Ainsworth, 1990; Griffin & Bartholomew, 1994), where a good self-view and feeling valued by others might cause people to prefer establishing meaningful relationships offline (Servidio, 2019), as well as in online settings.

Concerning the differences between high and low internet users, the MANOVAs revealed that high internet users showed higher anxiety/ambivalence, lower avoidance, and lower guilt levels (Guilt-NBE and GR), compared to low internet users. These results might reinforce the validity of previous findings that reported how the frequency of social networking sites use and time spent on the internet were positively associated with the anxiety/ambivalence dimension and negatively with the avoidance dimension (Carvalho et al., 2023; Goodcase et al., 2018; Hart et al., 2015; Oldmeadow et al., 2013; Stöven & Herzberg, 2021). Indeed, individuals with high anxiety/ambivalence could use social networking sites to cope with low and unstable self-esteem (Foster et al., 2007), and to mitigate the fear of abandonment due to the high perceived availability of others, allowing engaging with the partner at any time (Coffey et al., 2022; Goodcase et al., 2018; Stöven & Herzberg, 2021). Conversely, people with high levels of avoidance might tend not to disclose private information and engage less in self-presentations online, being less open about communicating and interacting with others through online platforms and dating apps (Chin et al., 2019; Morey et al., 2013; Oldmeadow et al., 2013; Stöven & Herzberg, 2021). Concerning guilt, excessive internet usage might lead guilt-prone people to experience high levels of guilt and thus curb this behavior (Luqman et al., 2020). In this regard, the use of media and the use of social networking sites, when considered a meaningless activity by those who practice them, can lead to feelings of guilt (Kubey & Csikszentmihalyi, 1990; Sagioglou & Greitemeyer, 2014).

The present study suggests several implications. From a theoretical perspective, the results partly answered the question left open by a previous study on possible variations in attachment dimensions between the real and virtual worlds (Quackenbush et al., 2015) showing that, in online contexts, levels of avoidance and anxiety/ambivalence might change. These aspects could also be clinically relevant. It has previously been hypothesized that in online psychotherapy, therapeutic alliances tend to be less strong than those built in face-to-face interactions (Norwood et al., 2018). It can be argued that interventions conducted in virtual environments might have different impacts depending on the different relational strategies enacted online. On the one hand, virtual settings might hinder therapeutic alliance for individuals who tend to not get close in relationships due to the greater tendency toward avoidance and withdrawal that characterize the online context. Indeed, individuals who are ashamed might prefer to remain detached from the clinician, potentially developing poorer therapeutic relationships (Black et al., 2013; Hersoug et al., 2001, 2009). On the other hand, individuals with high levels of anxiety/ambivalence might perceive greater safety in the online context, and this could also be considered in virtual settings. Considering the findings related to self-conscious emotions, clinical works with individuals with an insecure attachment could focus on improving the functional aspects of guilt, associated with its regulatory and reparative aspects (Amodio et al., 2007; Mikulincer & Shaver, 2005; Ruckstaetter et al., 2017). Regarding shame, considering that the online context seemed to promote awareness of emotional experiences for individuals with avoidant attachment, online psychotherapy could be a possible way to work through shame-related emotional states in these individuals. Clinicians and developers of platforms designed for relational virtual environments should consider these aspects to ensure that these environments can be more useable by people with different socio-emotional attitudes and relational styles.

Concerning the internet usage, those who use it more, being more familiar with the technology, might benefit from virtual therapeutic settings, potentially forming a better working alliance (Norwood et al., 2018). Concurrently, considering that higher internet use was associated

with lower guilt, the promotion of the evaluative and reparative processes, related to guilt feelings, could be effective in buffering excessive internet use.

Despite the interesting results found in the present study, some limitations should be highlighted. There is a need to recognize that recent studies have severely criticized the validity of centrality hypotheses in cross-sectional studies (Bos et al., 2017; Neal et al., 2022; Spiller et al., 2020). Consequently, results derived from centrality indices should be considered with caution. Another limitation was that not all participants had certainly experienced a close relationship exclusively online, so in case they had not, they were asked to complete the AAQ o while imagining how they would have felt in that specific type of relationship. In this regard, the answers given by imagining relationships could be different compared to those given by thinking about relationships experienced in the offline context. Caution is also justified by the limited knowledge of the sample. The participants chose to contribute voluntarily to the study and the only inclusion criteria were related to understanding the Italian language and age. Consequently, the generalization of the results could be limited, constituting a limitation for the cross-cultural validity of the study. Lastly, due to the use of self-report questionnaires to measure the variables, the participants' responses were vulnerable to the social desirability bias.

6. Conclusions

In conclusion, the present study suggests that a global model of attachment would guide representations of relationships in offline and online contexts and in friendship and romantic relationships. At the same time, relationships in the online context would seem to be characterized by higher levels of avoidance and lower levels of anxiety/ambivalence, probably because of the greater distance that characterizes the virtual context. Interestingly, online avoidance strategies would be particularly evident in romantic relationships rather than friendship, probably due to the greater emotional involvement typical of relationships with romantic partners. Regarding internet usage, the present study showed that high internet users had greater levels of anxiety in relationships than low users. In this regard, the internet may provide a refuge where some individuals can more effectively manage dysfunctional relationship strategies. Moreover, the findings suggest that individuals with a marked tendency to repair negative behaviors could show greater avoidant strategies when the physical experience is lacking as in online context. Furthermore, the associations between self-evaluation processes with insecure attachment dimensions in the offline context were maintained in the online ones. This could support the idea about the stability of self-representations underlying self-conscious emotions, which would remain consistent even in online contexts. On the contrary, the withdrawal tendencies were associated with the insecure attachment dimensions only in the offline context.

Future researchers could adopt longitudinal designs to verify the predictive role of the variables examined in the network analysis. Moreover, it is necessary to replicate the results on a larger sample, in other countries, and use a multi-method approach to measure psychological variables. Lastly, future studies could explore additional aspects of attachment dimensions in online relationships, specifying in which online platform (e.g., dating apps, social networking sites, multiplayer games) a relationship was initiated and developed.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. Open access funding provided by University of Rome La Sapienza within the CRUI Agreement.

CRediT authorship contribution statement

Giorgio Veneziani: Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Chiara Ciacchella:** Conceptualization, Methodology, Writing – original draft. **Piergiorgio Onorati:** Conceptualization, Writing – original draft, Writing – review & editing. **Carlo Lai:** Conceptualization, Data curation, Project administration, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Acknowledgments

We thank all the people who participated in this research and contributed to it.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chb.2024.108195>.

References

- Ainsworth, M. D. S. (1990). Some considerations regarding theory and assessment relevant to attachments beyond infancy. In M. Greenberg, D. Cicchetti, & M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 463–488). Chicago: University of Chicago Press.
- Akbag, M., & Imamoglu, S. E. (2010). The prediction of gender and attachment styles on shame, guilt, and loneliness. *Educational Sciences: Theory and Practice*, 10(2), 669–682.
- Amodio, D. M., Devine, P. G., & Harmon-Jones, E. (2007). A dynamic model of guilt: Implications for motivation and self-regulation in the context of prejudice. *Psychological science*, 18(6), 524–530. <https://doi.org/10.1111/j.1467-9280.2007.01933.x>
- Antheunis, M. L., Schouten, A. P., & Krahmer, E. (2016). The role of social networking sites in early adolescents' social lives. *The Journal of Early Adolescence*, 36(3), 348–371. <https://doi.org/10.1177/0272431614564060>
- Asgarizadeh, A., Sharp, C., & Ghanbari, S. (2023). Shame-coping clusters: Comparisons regarding attachment insecurities, mentalizing deficits, and personality pathology, controlling for general emotion dysregulation. *Borderline Personality Disorder and Emotion Dysregulation*, 10(1), 1–13. <https://doi.org/10.1186/s40479-023-00231-2>
- Ashby, J. S., Rice, K. G., & Martin, J. L. (2006). Perfectionism, shame, and depressive symptoms. *Journal of Counseling and Development*, 84(2), 148–156. <https://psycnet.apa.org/doi/10.1002/j.1556-6678.2006.tb00390.x>
- Baumeister, R. F., Stillwell, A. M., & Heatherton, T. F. (1994). Guilt: An interpersonal approach. *Psychological Bulletin*, 115(2), 243. <https://doi.org/10.1037/0033-2909.115.2.243>
- Billedo, C. J., Kerkhof, P., & Finkenauer, C. (2015). The use of social networking sites for relationship maintenance in long-distance and geographically close romantic relationships. *Cyberpsychology, Behavior, and Social Networking*, 18(3), 152–157. <https://psycnet.apa.org/doi/10.1089/cyber.2014.0469>
- Black, R. S., Curran, D., & Dyer, K. F. (2013). The impact of shame on the therapeutic alliance and intimate relationships. *Journal of clinical psychology*, 69(6), 646–654. <https://doi.org/10.1002/jclp.21959>
- Borgatti, S. P. (2005). Centrality and network flow. *Social Networks*, 27(1), 55–71. <https://doi.org/10.1016/j.socnet.2004.11.008>
- Bos, F. M., Snippe, E., de Vos, S., Hartmann, J. A., Simons, C. J. P., van der Krieke, L., de Jonge, P., & Wichers, M. (2017). Can we jump from cross-sectional to dynamic interpretations of networks? Implications for the network perspective in psychiatry. *Psychotherapy and Psychosomatics*, 86(3), 175–177. <https://doi.org/10.1159/000453583>
- Bowlby, J. (1969). *Attachment and loss: Attachment* (Vol. 1). New York: Basic Books.
- Bowlby, J. (1973). *Attachment and loss: Separation: Anxiety and anger* (Vol. 2). New York: Basic Books.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson, & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). The Guilford Press.
- Bringmann, L. F., Elmer, T., Epskamp, S., Krause, R. W., Schoch, D., Wichers, M., Wigman, J. T. W., & Snippe, E. (2019). What do centrality measures measure in psychological networks? *Journal of Abnormal Psychology*, 128(8), 892–903. <https://doi.org/10.1037/abn0000446>
- Buote, V. M., Wood, E., & Pratt, M. (2009). Exploring similarities and differences between online and offline friendships: The role of attachment style. *Computers in Human Behavior*, 25(2), 560–567. <https://doi.org/10.1016/j.chb.2008.12.022>
- Bylsma, W. H., Cozzarelli, C., & Sumer, N. (1997). Relation between adult attachment styles and global self-esteem. *Basic and Applied Social Psychology*, 19(1), 1–16. https://doi.org/10.1207/s15324834baspp1901_1
- Cameron, J. J., Finnegan, H., & Morry, M. M. (2012). Orthogonal dreams in an oblique world: A meta-analysis of the association between attachment anxiety and avoidance. *Journal of Research in Personality*, 46(5), 472–476. <https://doi.org/10.1016/j.jrp.2012.05.001>
- Caron, A., Lafontaine, M. F., Bureau, J. F., Levesque, C., & Johnson, S. M. (2012). Comparisons of close relationships: An evaluation of relationship quality and patterns of attachment to parents, friends, and romantic partners in young adults. *Canadian Journal of Behavioural Science*, 44(4), 245. <https://psycnet.apa.org/doi/10.1037/a0028013>
- Carvalho, C. B., Cabral, J. M., Teixeira, M., Cordeiro, F., Costa, R., & Arrozo, A. M. (2023). “Belonging without being”: Relationships between problematic gaming, internet use, and social group attachment in adolescence. *Computers in Human Behavior*, Article 107932. <https://doi.org/10.1016/j.chb.2023.107932>
- Casale, S., & Fioravanti, G. (2017). Shame experiences and problematic social networking sites use: An unexplored association. *Clinical Neuropsychiatry*, 14(1), 44–48.
- Chin, K., Edelstein, R. S., & Vernon, P. A. (2019). Attached to dating apps: Attachment orientations and preferences for dating apps. *Mobile Media & Communication*, 7(1), 41–59. <https://doi.org/10.1177/2050157918770696>
- Coffey, J. K., Bond, D. K., Stern, J. A., & Van Why, N. (2022). Sexual experiences and attachment styles in online and offline dating contexts. *International Journal of Sexual Health*, 34(4), 665–678. <https://doi.org/10.1080/19317611.2022.2110349>
- Cohen, T. R., Wolf, S. T., Panter, A. T., & Insko, C. A. (2011). Introducing the GASP scale: A new measure of guilt and shame proneness. *Journal of Personality and Social Psychology*, 100(5), 947. <https://psycnet.apa.org/doi/10.1037/a0022641>
- Coulson, M. C., Oskis, A., Meredith, J., & Gould, R. L. (2018). Attachment, attraction and communication in real and virtual worlds: A study of massively multiplayer online gamers. *Computers in Human Behavior*, 87, 49–57. <https://doi.org/10.1016/j.chb.2018.05.017>
- Crossley, D., & Rockett, K. (2005). The experience of shame in older psychiatric patients: A preliminary enquiry. *Aging & Mental Health*, 9(4), 368–373. <https://doi.org/10.1080/13607860500131252>
- Crowell, J. A., Treboux, D., Gao, Y., Fyffe, C., Pan, H., & Waters, E. (2002). Assessing secure base behavior in adulthood: Development of a measure, links to adult attachment representations and relations to couples' communication and reports of relationships. *Developmental Psychology*, 38(5), 679–693. <https://doi.org/10.1037/0012-1649.38.5.679>
- Davis, K. E., & Todd, M. J. (1982). Friendship and love relationships. In K. E. Davis, & T. O. Mitchell (Eds.), *Advances in descriptive psychology* (Vol. 2, pp. 79–122). Greenwich, CT: JAI Press.
- Deng, X., Chen, X., Zhang, L., Gao, Q., Li, X., & An, S. (2022). Adolescent social anxiety undermines adolescent-parent interbrain synchrony during emotional processing: A hyperscanning study. *International Journal of Clinical and Health Psychology*, 22(3), Article 100329. <https://doi.org/10.1016/j.ijchp.2022.100329>
- Denizci Nazlıgül, M., Koçyiğit, Ö., & Merdan Yıldız, E. D. (2022). Problematic social media use for mood modification: Its associations with shame, guilt, anger, and difficulties in emotion regulation. *Addicta-The Turkish Journal on Addictions*, 9(1). <https://doi.org/10.5152/ADDICTA.2021.21009>
- Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods*, 50, 195–212. <https://doi.org/10.3758/s13428-017-0862-1>
- Epskamp, S., & Fried, E. I. (2018). A tutorial on regularized partial correlation networks. *Psychological Methods*, 23(4), 617–634. <https://doi.org/10.1037/met0000167>
- Feiring, C., & Taska, L. S. (2005). The persistence of shame following sexual abuse: A longitudinal look at risk and recovery. *Child Maltreatment*, 10(4), 337–349. <https://doi.org/10.1177/1077559505276686>
- Foster, J. D., Kernis, M. H., & Goldman, B. M. (2007). Linking adult attachment to self-esteem stability. *Self and Identity*, 6(1), 64–73. <https://doi.org/10.1080/1529886060083213>
- Fraley, R. C., & Davis, K. E. (1997). Attachment formation and transfer in young adults' close friendships and romantic relationships. *Personal Relationships*, 4(2), 131–144. <https://doi.org/10.1111/j.1475-6811.1997.tb00135.x>
- Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships—relationship structures questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment*, 23(3), 615–625. <https://doi.org/10.1037/a0022898>
- Fraley, R. C., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional? A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology*, 109(2), 354. <https://doi.org/10.1037/pspp0000027>
- Fraley, R. C., & Shaver, P. R. (2000). Adult romantic attachment: Theoretical developments, emerging controversies, and unanswered questions. *Review of General Psychology*, 4(2), 132–154. <https://doi.org/10.1037/1089-2680.4.2.132>
- Friedman, J., Hastie, T., & Tibshirani, R. (2008). Sparse inverse covariance estimation with the graphical lasso. *Biostatistics*, 9(3), 432–441. <https://doi.org/10.1093/biostatistics/kxm045>

- Furman, W., Simon, V. A., Shaffer, L., & Boucheay, H. A. (2002). Adolescents' working models and styles for relationships with parents, friends, and romantic partners. *Child Development*, 73(1), 241–255. <https://doi.org/10.1111/1467-8624.00403>
- Gilbert, P. (2000). The relationship of shame, social anxiety and depression: The role of the evaluation of social rank. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, 7(3), 174–189. [https://doi.org/10.1002/1099-0879\(200007\)7:3%3C174::AID-CPP236%3E3.0.CO;2-U](https://doi.org/10.1002/1099-0879(200007)7:3%3C174::AID-CPP236%3E3.0.CO;2-U)
- Goodcase, E. T., Nalbone, D. P., Hecker, L. L., & Latty, C. (2018). The role of attachment anxiety and avoidance in communication modality and relationship quality of romantic relationships initiated online. *American Journal of Family Therapy*, 46(2), 168–183. <https://doi.org/10.1080/01926187.2018.1461032>
- Grabill, C. M., & Kerns, K. A. (2000). Attachment style and intimacy in friendship. *Personal Relationships*, 7(4), 363–378. <https://doi.org/10.1111/j.1475-6811.2000.tb00022.x>
- Griffin, D. W., & Bartholomew, K. (1994). Models of the self and other: Fundamental dimensions underlying measures of adult attachment. *Journal of Personality and Social Psychology*, 67(3), 430. <https://psycnet.apa.org/doi/10.1037/0022-3514.67.3.430>
- Griffiths, M., Hussain, Z., Grüsser, S. M., Thalemann, R., Cole, H., Davies, M. N., & Chappell, D. (2011). Social interactions in online gaming. *International Journal of Game-Based Learning*, 1(4), 20–36. <https://doi.org/10.4018/978-1-4666-1864-0.ch006>
- Gross, C. A., & Hansen, N. E. (2000). Clarifying the experience of shame: The role of attachment style, gender, and investment in relatedness. *Personality and Individual Differences*, 28(5), 897–907. [https://doi.org/10.1016/S0191-8869\(99\)00148-8](https://doi.org/10.1016/S0191-8869(99)00148-8)
- Guadagno, R. E., Okdie, B. M., & Kruse, S. A. (2012). Dating deception: Gender, online dating, and exaggerated self-presentation. *Computers in Human Behavior*, 28(2), 642–647. <https://doi.org/10.1016/j.chb.2011.11.010>
- Hart, J., Nailling, E., Bizer, G. Y., & Collins, C. K. (2015). Attachment theory as a framework for explaining engagement with Facebook. *Personality and Individual Differences*, 77, 33–40. <https://doi.org/10.1016/j.paid.2014.12.016>
- Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology*, 52(3), 511–524. <https://psycnet.apa.org/doi/10.1037/0022-3514.52.3.511>
- Hazan, C., & Shaver, P. R. (1994). Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*, 5(1), 1–22. https://doi.org/10.1207/s15327965pli0501_1
- Hefflin, S. (2015). *Attachment and shame-coping style: A relationship mediated by fear of compassion?* (order No. 3712407). Available from Psychology Database, 1705541220.
- Hersoug, A. G., Høglend, P., Havik, O. E., Von Der Lippe, A., & Monsen, J. T. (2009). Pretreatment patient characteristics related to the level and development of working alliance in long-term psychotherapy. *Psychotherapy Research*, 19, 172–180. <https://doi.org/10.1080/10503300802657374>
- Hersoug, A. G., Høglend, P., Monsen, J. T., & Havik, O. E. (2001). Quality of working alliance in psychotherapy: Therapist variables and patient/therapist similarity as predictors. *The Journal of Psychotherapy Practice and Research*, 10(4), 205. PMID: PMC3330657 PMID: 11696646.
- Hevey, D. (2018). Network analysis: A brief overview and tutorial. *Health Psychology and Behavioral Medicine*, 6(1), 301–328. [10.1080%2F21642850.2018.1521283](https://doi.org/10.1080%2F21642850.2018.1521283)
- Hong, F. Y., Huang, D. H., Lin, H. Y., & Chiu, S. L. (2014). Analysis of the psychological traits, Facebook usage, and Facebook addition model of Taiwanese university students. *Telematics and Informatics*, 31(4), 597–606. <https://doi.org/10.1016/j.tele.2014.01.001>
- Isvoranu, A. M., van Borkulo, C. D., Boyette, L. L., Wigman, J. T., Vinkers, C. H., Borsboom, D., & Group Investigators. (2017). A network approach to psychosis: Pathways between childhood trauma and psychotic symptoms. *Schizophrenia Bulletin*, 43(1), 187–196. <https://doi.org/10.1093/schbul/sbw055>
- JASP Team. (2023). *JASP (version 0.17.3)* [computer software].
- Klohn, E. C., Weller, J. A., Luo, S., & Choe, M. (2005). Organization and predictive power of general and relationship-specific attachment models: One for all, and all for one? *Personality and Social Psychology Bulletin*, 31(12), 1665–1682. <https://psycnet.apa.org/doi/10.1177/0146167205278307>
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58(1), 49–74. <https://doi.org/10.1111/1540-4560.00248>
- Kubey, R. W., & Csikszentmihalyi, M. (1990). Television as escape: Subjective experience before an evening of heavy viewing. *Communication Reports*, 3(2), 92–100. <https://doi.org/10.1080/08934219009367509>
- Leech, N. L., Barrett, K. C., Morgan, G. A., Clay, J. N., & Quick, D. (2005). *SPSS for intermediate statistics: Use and interpretation*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., Publishers.
- Leonardi, J., Gazzillo, F., Gorman, B. S., & Kealy, D. (2022). Understanding interpersonal guilt: Associations with attachment, altruism, and personality pathology. *Scandinavian Journal of Psychology*, 63(6), 573–580. <https://doi.org/10.1111/sjop.12854>
- Lewis, H. B. (1971). Shame and guilt in neurosis. *The Psychoanalytic Review*, 58(3), 419.
- Lieberman, A., & Schroeder, J. (2020). Two social lives: How differences between online and offline interaction influence social outcomes. *Current Opinion in Psychology*, 31, 16–21. <https://doi.org/10.1016/j.copsyc.2019.06.022>
- Lombardo, L., Veneziani, G., Giraldo, E., Morelli, E., Durante, S., Aceto, P., & Lai, C. (2023). How attachment style, mentalization and preparedness for death are associated with pre-loss grief symptoms' severity: A network analysis study in caregivers of terminally ill cancer patients. *Death Studies*, 1–13. <https://doi.org/10.1080/07481187.2023.2246022>
- Lopez, F. G., Gover, M. R., Leskela, J., Sauer, E. M., Schirmer, L., & Wyssmann, J. (1997). Attachment styles, shame, guilt, and collaborative problem-solving orientations. *Personal Relationships*, 4(2), 187–199. <https://doi.org/10.1111/j.1475-6811.1997.tb00138.x>
- Luke, D. A., & Harris, J. K. (2007). Network analysis in public health: History, methods, and applications. *Annual Review of Public Health*, 28, 69–93. <https://doi.org/10.1146/annurev.publhealth.28.021406.144132>
- Luqman, A., Masood, A., Weng, Q., Ali, A., & Rasheed, M. I. (2020). Linking excessive SNS use, technological friction, strain, and discontinuance: The moderating role of guilt. *Information Systems Management*, 37(2), 94–112. <https://doi.org/10.1080/10580530.2020.1732527>
- McGrath, L. M., Oates, J. M., Dai, Y. G., Dodd, H. F., Waxler, J., Clements, C. C., ... Smoller, J. W. (2016). Attention bias to emotional faces varies by IQ and anxiety in Williams syndrome. *Journal of Autism and Developmental Disorders*, 46, 2174–2185. <https://doi.org/10.1007/s10803-016-2748-y>
- Mikulincer, M., & Shaver, P. R. (2003). The attachment behavioral system in adulthood: Activation, psychodynamics, and interpersonal processes. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 35, pp. 53–152). Elsevier Academic Press. [https://doi.org/10.1016/S0065-2601\(03\)01002-5](https://doi.org/10.1016/S0065-2601(03)01002-5)
- Mikulincer, M., & Shaver, P. R. (2005). Attachment theory and emotions in close relationships: Exploring the attachment-related dynamics of emotional reactions to relational events. *Personal Relationships*, 12(2), 149–168. <https://doi.org/10.1111/j.1350-4126.2005.00108.x>
- Morey, J. N., Gentzler, A. L., Creasy, B., Oberhauser, A. M., & Westerman, D. (2013). Young adults' use of communication technology within their romantic relationships and associations with attachment style. *Computers in Human Behavior*, 29(4), 1771–1778. <https://doi.org/10.1016/j.chb.2013.02.019>
- Muris, P., & Meesters, C. (2014). Small or big in the eyes of the other: On the developmental psychopathology of self-conscious emotions as shame, guilt, and pride. *Clinical Child and Family Psychology Review*, 17, 19–40. <https://doi.org/10.1007/s10567-013-0137-z>
- Muris, P., Meesters, C., Cima, M., Verhagen, M., Brochard, N., Sanders, A., ... Meesters, V. (2014). Bound to feel bad about oneself: Relations between attachment and the self-conscious emotions of guilt and shame in children and adolescents. *Journal of Child and Family Studies*, 23, 1278–1288. <https://doi.org/10.1007/s10826-013-9817-z>
- Murray, S. L., Holmes, J. G., & Griffin, D. W. (2000). Self-esteem and the quest for felt security: How perceived regard regulates attachment processes. *Journal of Personality and Social Psychology*, 78(3), 478. <https://doi.org/10.1037/0022-3514.78.3.478>
- Neal, Z. P., Forbes, M. K., Neal, J. W., Brusco, M. J., Krueger, R., Markon, K., Steinley, D., Wasserman, S., & Wright, A. G. C. (2022). Critiques of network analysis of multivariate data in psychological science. *Nature Reviews Methods Primers*, 2(1), 90. <https://doi.org/10.1038/s43586-022-00177-9>
- Norwood, C., Moghaddam, N. G., Malins, S., & Sabin-Farrell, R. (2018). Working alliance and outcome effectiveness in videoconferencing psychotherapy: A systematic review and noninferiority meta-analysis. *Clinical Psychology & Psychotherapy*, 25(6), 797–808. <https://doi.org/10.1002/cpp.2315>
- Oldmeadow, J. A., Quinn, S., & Kowert, R. (2013). Attachment style, social skills, and Facebook use amongst adults. *Computers in Human Behavior*, 29(3), 1142–1149. <https://doi.org/10.1016/j.chb.2012.10.006>
- Overall, N. C., Fletcher, G. J., & Friesen, M. D. (2003). Mapping the intimate relationship mind: Comparisons between three models of attachment representations. *Personality and Social Psychology Bulletin*, 29(12), 1479–1493. <https://doi.org/10.1177/0146167203251519>
- Park, C. J., & Shields, J. (2023). Childhood attachment insecurity and shame-proneness in adulthood: Implications for clinical social work practice. *Journal of Human Behavior in the Social Environment*, 1–17. <https://doi.org/10.1080/1091359.2023.2237091>
- Pereg, D., & Mikulincer, M. (2004). Attachment style and the regulation of negative affect: Exploring individual differences in mood congruency effects on memory and judgment. *Personality and Social Psychology Bulletin*, 30(1), 67–80. <https://doi.org/10.1177/0146167203258852>
- Pierce, T., & Lydon, J. E. (2001). Global and specific relational models in the experience of social interactions. *Journal of Personality and Social Psychology*, 80(4), 613. <https://psycnet.apa.org/doi/10.1037/0022-3514.80.4.613>
- Prezza, M., Trombaccia, F. R., & Armento, L. (1997). La scala dell'autostima di Rosenberg: Traduzione e validazione italiana [The Rosenberg self-esteem scale: Italian translation and validation]. *Bollettino di Psicologia Applicata*, 223, 35–44.
- Quackenbush, D., Allen, J. G., & Fowler, J. C. (2015). Comparison of attachments in real-world and virtual-world relationships. *Psychiatry*, 78(4), 317–327. <https://doi.org/10.1080/00332747.2015.1092854>
- Robinaugh, D. J., Millner, A. J., & McNally, R. J. (2016). Identifying highly influential nodes in the complicated grief network. *Journal of Abnormal Psychology*, 125(6), 747. [10.1037%2Ffab0000181](https://doi.org/10.1037%2Ffab0000181)
- Rosenberg, M., Schooler, C., Schoenbach, C., & Rosenberg, F. (1995). Global self-esteem and specific self-esteem: Different concepts, different outcomes. *American Sociological Review*, 141–156. <https://doi.org/10.2307/2096350>
- RStudio Team. (2020). *RStudio: Integrated development for R*. RStudio. Boston, MA: PBC. URL <http://www.rstudio.com/>.
- Ruckstaetter, J., Sells, J., Newmeyer, M. D., & Zink, D. (2017). Parental apologies, empathy, shame, guilt, and attachment: A path analysis. *Journal of Counseling and Development*, 95(4), 389–400. <https://doi.org/10.1002/jcad.12154>
- Sagioglou, C., & Greitemeyer, T. (2014). Facebook's emotional consequences: Why Facebook causes a decrease in mood and why people still use it. *Computers in Human Behavior*, 35, 359–363. <https://doi.org/10.1016/j.chb.2014.03.003>
- Saiphoo, A. N., Halevi, L. D., & Vahedi, Z. (2020). Social networking site use and self-esteem: A meta-analytic review. *Personality and Individual Differences*, 153, Article 109639. <https://doi.org/10.1016/j.paid.2019.109639>

- Santos, H. P., Jr., Kossakowski, J. J., Schwartz, T. A., Beeber, L., & Fried, E. I. (2018). Longitudinal network structure of depression symptoms and self-efficacy in low-income mothers. *PLoS One*, 13(1), Article e0191675. <https://doi.org/10.1371/journal.pone.0191675>
- Schönbrodt, F. D., & Asendorpf, J. B. (2012). Attachment dynamics in a virtual world. *Journal of Personality*, 80(2), 429–463. <https://doi.org/10.1111/j.1467-6494.2011.00736.x>
- Scott, V. M., Mottarella, K. E., & Lavooy, M. J. (2006). Does virtual intimacy exist? A brief exploration into reported levels of intimacy in online relationships. *CyberPsychology and Behavior*, 9(6), 759–761. <https://doi.org/10.1089/cpb.2006.9.759>
- Servidio, R. (2019). A discriminant analysis to predict the impact of personality traits, self-esteem, and time spent online on different levels of internet addiction risk among university students. *Studia Psychologica*, 61(1), 56–70. <https://psycnet.apa.org/doi/10.21909/sp.2019.01.772>
- Shahani, C., Dipboye, R. L., & Phillips, A. P. (1990). Global self-esteem as a correlate of work-related attitudes: A question of dimensionality. *Journal of Personality Assessment*, 54(1–2), 276–288. <https://doi.org/10.1080/00223891.1990.9673993>
- Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology*, 62(3), 434. <https://psycnet.apa.org/doi/10.1037/0022-3514.62.3.434>
- Simpson, J. A., Rholes, W. S., Oriña, M. M., & Grich, J. (2002). Working models of attachment, support giving, and support seeking in a stressful situation. *Personality and Social Psychology Bulletin*, 28(5), 598–608. <https://doi.org/10.1177/0146167202288004>
- Simpson, J. A., Rholes, W. S., & Phillips, D. (1996). Conflict in close relationships: An attachment perspective. *Journal of Personality and Social Psychology*, 71(5), 899. <https://psycnet.apa.org/doi/10.1037/0022-3514.71.5.899>
- Sitnik-Warchulska, K., Izydorczyk, B., & Wajda, Z. (2023). *E-Attachment and online communication: The changing context of the clinical diagnosis and psychological treatment*. Taylor & Francis. <https://doi.org/10.4324/9781003221043-3> (Chapter 2).
- Spiller, T. R., Levi, O., Neria, Y., Suarez-Jimenez, B., BarHaim, Y., & Lazarov, A. (2020). On the validity of the centrality hypothesis in cross-sectional between-subject networks of psychopathology. *BMC Medicine*, 18(1), 297. <https://doi.org/10.1186/s12916-020-01740-5>
- Steinfeld, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology*, 29(6), 434–445. <https://doi.org/10.1016/j.appdev.2008.07.002>
- Stöven, L. M., & Herzberg, P. Y. (2021). Relationship 2.0: A systematic review of associations between the use of social network sites and attachment style. *Journal of Social and Personal Relationships*, 38(3), 1103–1128. <https://doi.org/10.1177/0265407520982671>
- Tangney, J. P., & Dearing, R. L. (2002). *Shame and guilt*. Guilford Press. <https://doi.org/10.4135/9781412950664.n388>
- Tangney, J. P., Stuewig, J., & Mashek, D. J. (2007). Moral emotions and moral behavior. *Annual Review of Psychology*, 58, 345. <https://doi.org/10.1146/annurev.psych.56.091103.070145>
- Veneziani, G., Giacchella, C., Campedelli, V., & Lai, C. (2022). The mediation role of shame proneness in the association between perceived parenting and the severity of addictive behaviors: Risk or protective factor? *Current Psychology*, 1–10. <https://doi.org/10.1007/s12144-022-03684-w>
- Wei, M., Shaffer, P. A., Young, S. K., & Zakalik, R. A. (2005). Adult attachment, shame, depression, and loneliness: The mediation role of basic psychological needs satisfaction. *Journal of Counseling Psychology*, 52(4), 591. <https://doi.org/10.1037/0022-0167.52.4.591>
- World Medical Association. (2018). 64th WMA general assembly Fortaleza Brazil, october 2013. In *WMA declaration of helsinki-ethical principles for medical research involving human subjects*.