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Article

Attachment Styles Predict Personal Network Structure Better Than Big Five Traits

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Abstract

Research on individual differences in social network analysis has primarily focused on how personality traits influence individuals' positions and behaviors within social structures. However, attachment research has consistently shown that attachment styles strongly affect how people form and maintain their interpersonal relationships. This study examined how attachment styles relate to different types of individual personal networks. A classification of personal networks was developed based on structural indicators of cohesion, transitivity, and subgroup configuration, among other measures. Density, fragmentation, and centralization emerged as the most discriminant metrics for clustering solutions. Results indicated that attachment styles have greater explanatory power than the Big Five model in accounting for distinct relational configurations. Specifically, secure attachment was associated with dense, noncentralized, and supportive personal networks, whereas avoidant attachment and openness to experience were linked to fragmented, modular, and less supportive networks. Sociodemographic variables showed the highest predictive value for the type of personal network.

Keywords: adult attachment; latent class analysis; personal network typologies; personality; social network analysis

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Introduction

Personal network analysis addresses the patterns of relationships established between social actors. A personal network is made up of the set of contacts or alters with which a focal actor, referred to as the ego, is connected, as well as the existing ties between ego and alters, and the ties among alters (McCarty et al., 2019). Both individual attributes (Kalish & Robins, 2006; Maya-Jariego et al., 2020) and contextual factors such as culture and the various relational settings that people frequent (Grossetti, 2005) shape unique personal networks. These networks can be described in terms of their composition and structure. Compositional measures typically capture information about who is in the network, such as the attributes of alters (e.g., gender, age, or place of residence). In contrast, structural measures focus on how these alters are interconnected and how ties are distributed within the network (McCarty et al., 2019). For example, structural metrics include measures of tie density and centrality, which indicate the prominence of alters within the network. In his thorough examination of the social network literature, Kadushin (2011) emphasized the importance of integrating psychological and sociological perspectives to gain a deeper understanding of social networks. Building on this idea, previous research has primarily focused on the structure of personal networks and has examined how it relates to personality traits, locus of control, self-monitoring, and other psychological attributes (Kalish & Robins, 2006; Orchard et al., 2014).

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In that line of research, the Big Five model is often used. It is a global benchmark for personality assessment (Costa & McCrae, 1985) and as such has often been used in research examining associations between personal or sociocentric network measures and individual psychological differences (Waqas et al., 2025). According to this model, human personality can be described in terms of five major factors, forming patterns of thinking, feeling, and behavior that remain relatively stable over time and consistent across situations, contexts, and cultures. Importantly, these broad factors are hierarchically structured and can be further decomposed into more specific facets, which may provide a more fine-grained understanding of individual differences in social network structure and dynamics. These traits are (1) neuroticism or emotional instability, which is defined by a tendency to evaluate experiences negatively and a greater propensity for dysphoria; (2) extraversion, characterized by sociability as well as higher levels of activity, energy, and dynamism, and a tendency to seek social stimulation; (3) agreeableness, connected to prosociality; (4) openness to experience, defined by an orientation toward change and novelty; and (5) conscientiousness, characterized by an achievement and task orientation. In this sense, considering both the higher-order domains and their underlying facets may be particularly relevant when examining how personality relates to the size, composition, and quality of social ties. Numerous studies have indicated that individual differences are associated with the number and quality of friendly relationships (Asendorpf & Wilpers, 1998; Creed & Funder, 1998; Doeven-Eggens et al., 2008; Kang, 2023; Körner & Altmann, 2023; Wagner et al., 2014; Wrzus et al., 2017; Zhu et al., 2013). Specifically, previous research suggests that personality traits may be differentially associated with basic network properties (e.g.,

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size), compositional aspects of personal networks (e.g., proportion of kin or friends), and structural properties (e.g., density, centrality, or clustering), with traits such as extraversion and agreeableness more consistently linked to larger and more socially active networks, and conscientiousness or neuroticism showing more nuanced associations with network structure (Kalish & Robins, 2006; Pollet et al., 2011; Wrzus et al., 2017).

Despite extensive research on social networks, comparatively less attention has been given to individual differences that may be particularly relevant for network-related measures, such as the relationship between attachment styles and network structure (Bouchard & Maya-Jariego, 2019; Dizdari & Seiler, 2020; Gillath et al., 2011, 2017, 2019; Gillath & Karantzas, 2015; Lee & Gillath, 2016; Webster et al., 2016). Attachment theory offers a robust framework for understanding human affectivity from a relational perspective. According to Bowlby (1969), attachment emerges from an instinctive system with a survival function, in which children internalize early interactions with caregivers as internal working models, that is, beliefs about the self and others. Sensitive caregiving fosters a secure base, enabling exploration and emotional regulation. Attachment styles established in infancy tend to remain stable across the lifespan, influencing emotion regulation and the formation of adult relationships (Cassidy & Shaver, 2017; Gillath et al., 2016; Kafetsios & Nezlek, 2002; Kahn & Antonucci, 1980; Mikulincer & Shaver, 2016; Saltman, 2016). Integrating these insights with social network research, which examines relationships among social entities and, specifically, an individual's personal network, provides a theoretically grounded framework for understanding tie formation and relational patterns.

Among the various frameworks developed for the assessment of adult attachment, the model proposed by Bartholomew and Horowitz (1991) was historically significant for its integrative nature, bridging traditional typological perspective (Hazan & Shaver, 1987; Ravitz et al., 2010; Steele & Steele, 2021) and dimensional approaches (Fraley et al., 2015; Fraley & Waller, 1998; Raby et al., 2021). However, contemporary research largely favours a two-dimensional approach to adult attachment (typically anxiety and avoidance) reflecting the resolution of the typological versus dimensional debate and the shift to continuous measures, mainly after the year 2000 (Fraley & Shaver, 2021). Thus, while the four-category Bartholomew and Horowitz model remains conceptually influential, this study adopts a dimensional perspective compatible with current empirical practice.

Different adult attachment styles have been identified as a function of (a) positive or negative perceptions of self and others and (b) the levels of avoidance and anxiety present in interpersonal relationships (Bartholomew & Horowitz, 1991). Broadly, a distinction is made between secure attachment, which involves a positive model of self and others, and a sense of affective security and comfort in relationships, and three insecure attachment styles: (1) preoccupied attachment, characterized by a positive model of others but a negative view of oneself, emotional dependence, a need for approval, fear of rejection, high anxiety, and low social avoidance; (2) fearful attachment, defined by negative models of both self and others, coupled with a desire for but fear of emotional intimacy, high anxiety, and high social avoidance; and (3) avoidant (or distant) attachment, marked by a positive self-model but a negative view of others, excessive emotional self-sufficiency and discomfort with intimacy.

Previous research indicates that attachment styles are important predictors of how emotions are experienced in relationships (Gillath et al., 2016; Kafetsios & Nezlek, 2002; Simpson et al., 1992), the quality (Hazan & Shaver, 1994) and stability (Gillath et al., 2011; Gillath et al., 2017; Kirkpatrick & Davis, 1994; Lee & Gillath, 2016) of social ties, satisfaction with received social support (Collins & Feeney, 2004), an individual's overall social functioning (Elicker et al., 1992; Fraley & Shaver, 2021; Gillath et al., 2016), and even different profiles of interpersonal problems (Collins & Read, 1990; Kobak & Sceery, 1988) and psychopathologies (Mikulincer & Shaver, 2016; Rholes et al., 2011).

Different attachment styles may serve as one of the key mechanisms underlying individual differences in the structural characteristics of personal networks. Attachment theory aligns closely with the use of structural network measures, as both focus on the nature and dynamics of connections to others, rather than on the attributes or properties of the individuals within those networks.

Overview of this study

Previous literature shows that attachment style is a reliable predictor of the type of social expectations and experiences individuals develop in adulthood, playing a crucial role in the establishment of close, satisfying, and lasting relationships (Cassidy & Shaver, 2017; Mikulincer & Shaver, 2016). On the other hand, some research points to a small-to-moderate contribution of the Big Five model to the way networks are structured, mostly based on cross-sectional studies (see review by Selden & Goodie, 2018).

In this paper, we explore the connection between the Big Five personality traits, adult attachment styles, and the structure of the individual interpersonal environment using personal network typologies. Personal network typologies can be defined as configurations or profiles of networks that group individuals according to shared patterns across multiple structural and compositional indicators and, consistent with previous studies (Maya-Jariego, 2021), are empirically derived from the data. Typologies enable us to systematically describe and compare personal networks by identifying covariations between sets of network characteristics based on a series of indicators or criterion variables (Maya-Jariego, 2021). This consideration of indicators in an aggregated view provides an advantage over the study of isolated indicators, as it allows for a more comprehensive investigation of the personal network structure rather than focusing on a few structural metrics (Maya-Jariego, 2022), which are also usually inherently interdependent.

Therefore, to investigate the relationship between personal network typology and psychological individual differences, firstly we need to address the clustering patterns of personal networks based on their network characteristics, represented by a range of network metrics. This initial analysis should provide valuable information about the inherent structural variations among personal networks. The proposal of typologies sheds light on the dimensions of inter-individual variability that underlie the configuration of personal networks, making some types more frequent than others. Different configurations of personal networks correspond to the distinct ways people engage with and sustain relationships. Simultaneously, it facilitates an overview of the relational structure and its characteristics.

We hypothesize that attachment styles are more strongly associated with the typology of personal networks than the Big Five personality traits. This expectation is grounded in the idea that attachment orientations directly shape individuals' relational goals, expectations, and emotion-regulation strategies in close relationships, which in turn influence how social ties are initiated, maintained, and organized over time. In contrast, the Big Five traits capture broad, decontextualized tendencies that are less directly linked to the formation and structuring of personal relationships. Accordingly, we expect attachment styles to explain a greater

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proportion of variance in personal network typologies than the Big Five personality traits. Furthermore, we anticipate that attachment styles will remain significant predictors of different personal network types even when controlling for the Big Five traits and sociodemographic variables. However, we treat the specific associations between individual attachment styles and particular structural properties of personal networks as exploratory and therefore do not advance precise predictions at this level. Figure 1 schematically presents the types of attachment analyzed and the relational mechanisms through which they may shape the structural properties of personal networks. The complete representation of the central hypothesis underlying this framework is provided in the Supplementary Appendix (Figure A.1).

Method

Participants

A total of 305 individuals participated in the study, including 201 women and 104 men, with a mean age of 48.2 years (SD = 17.42). A detailed overview of the sample characteristics is provided in Table 1. Data were collected through interviewer-administered face-to-face surveys, each lasting approximately 90 minutes, conducted throughout 2022. The data were collected as part of a larger study on mobility and sense of community in adjacent urban neighborhoods (Maya-Jariego et al., 2023). Information was obtained from four neighbourhoods in Seville (Spain) and one neighbourhood in Barranquilla (Colombia). In both contexts, respondents were selected using a quota-guided approach based on gender and age, with proportional allocation according to population data from the municipal census. Participants were recruited through informal interactions with passers-by in public spaces who were aged 18 years or older. Participation was voluntary, written informed consent was obtained prior to data collection, and confidentiality was strictly maintained. Participants were informed of their right to withdraw from the study at any time.

Table 1. Descriptive statistics of the sociodemographic characteristics of the participants (N = 305)

	N = 305	
	M	*SD*
Age	48.2	17.4
	F	%
Sex		
Male	104	34.1
Female	201	65.9
Country of residence		
Spain	225	73.8
Colombia	80	26.2
Educational formation		
Non-tertiary education	227	74.4
Tertiary education	62	20.3
No studies	16	5.3
Professional status		
Active	145	47.7
Unemployed	74	24.2
Retired	60	19.8
Students	25	8.3

Measures

Participants completed a personality inventory, an adult attachment scale, and a personal network instrument. Questions related to sociodemographic variables were also included. Personality traits were assessed using the Spanish adaptation of the NEO Five Factor Inventory (NEO-FFI; Aluja et al., 2005; Costa & McCrae, 1999), a 60-item instrument rated on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*) that assesses five personality dimensions: extraversion, agreeableness, openness to experience, neuroticism, and conscientiousness. Neuroticism reflects emotional instability and negative affect (e.g., "Sometimes things seem too bleak and hopeless to me"); extraversion captures sociability and positive emotionality (e.g., "I really enjoy talking with people"); openness to experience refers to intellectual curiosity and

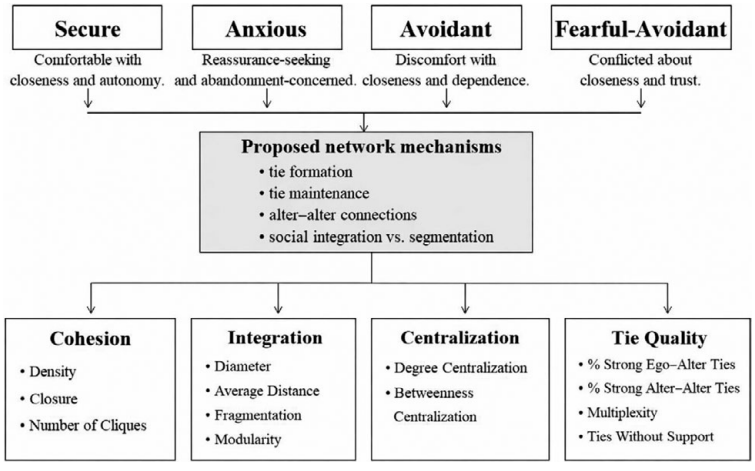


Figure 1. Attachment types, relational mechanisms, and the structural properties of personal networks. We hypothesize that different attachment types shape relational mechanisms involved in relationship formation, tie maintenance, and processes of relational segregation and integration, among others. These mechanisms, in turn, are expected to be reflected in the structural properties of personal networks, as captured by indicators of structural cohesion, relational integration, centralization, and relationship quality.

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aesthetic sensitivity (e.g., "I have a wide variety of intellectual interests"); agreeableness assesses interpersonal trust and a forgiving disposition (e.g., "I tend to think the best of people"); and conscientiousness reflects self-discipline and goal orientation (e.g., "I work hard to achieve my goals"). In the present study, the internal consistency was acceptable, with reliability coefficients for the individual dimensions of .81 for extraversion, .67 for agreeableness, .65 for openness to experience, .79 for neuroticism, and .75 for conscientiousness.

Second, the *Adult Attachment Questionnaire* (Melero & Cantero, 2008) was used to assess adult attachment. This standardized instrument, validated for the Spanish population, has shown satisfactory psychometric properties in terms of reliability and validity. It evaluates attachment through four factors corresponding to classical attachment styles: preoccupied attachment, characterized by low self-esteem, need for approval, and fear of rejection (e.g., "Often, even when I am with people important to me, I feel lonely or unloved"); fearful attachment, associated with hostility in conflict resolution, resentment, and possessiveness (e.g., "I am very possessive in all my relationships"); secure attachment, reflecting emotional expressiveness and comfort with intimacy (e.g., "I find it easy to express my feelings and emotions"); and avoidant/dismissing attachment, characterized by emotional self-sufficiency and discomfort with closeness (e.g., "I value my independence above all"). The questionnaire consists of 40 items (10 per factor), rated on a 6-point Likert scale ranging from 1 (*Strongly disagree*) to 6 (*Strongly agree*). In the present study, the overall internal consistency of the attachment questionnaire was good ($\alpha = .80$). Factor scores allow both the identification of discrete attachment profiles and the positioning of individuals along continuous dimensions, providing a hybrid approach consistent with recent dimensional models (Fraley et al., 2015; Raby et al., 2021). Its validity has been supported by previous research in adult attachment (Benítez et al., 2017; Morales-Vives et al., 2021; Novo et al., 2016).

Third, a personal network analysis research design was employed. To obtain the personal network a name generator with a fixed number of alters was used with the aim to facilitate standardization, comparability, and data management (Maya Jariego, 2018). Participants were asked to generate a list of 30 people with whom they interact most regularly throughout the week. Alters could be relatives, friends, colleagues, neighbors, or others. The strength of the tie between ego and alter was measured on a scale from 1 (*acquaintances*) to 4 (*intimate*), and among alters on a scale from 0 (*do not know each other*) to 4 (*have a strong tie*) based on the respondents' self-reported perception. The use of a fixed number of alters facilitates standardization and comparison across personal networks (Maya Jariego, 2018). Each respondent (ego) provided systematic information on alter-to-alter relationships, allowing for analysis of the structural properties of the interpersonal environment.

Finally, the multiplicity and types of support provided were investigated using the Arizona Social Support Interview Schedule (ASSIS) (Barrera, 1980). It consisted of 6 items which examine six categories of support: (1) intimate interaction, (2) material aid, (3) advice and information, (4) feedback, (5) behavioral assistance, and (6) positive social interaction. This instrument has been widely used in Spain with immigrant and general populations, with excellent validity and reliability results. The first application was conducted with African immigrants in Andalusia (Martínez et al., 1996), and the Spanish version was subsequently validated with socially at-risk groups (López et al., 2007). In addition to efficiently describing types of social support, it integrates well as a name generator for assessing personal networks (Maya-Jariego & Holgado, 2015). In this study, we used the ASSIS to assess multiplicity and count the number of support providers, enabling the calculation of a multiplicity indicator based on the number of support types provided by each alter.

Data Analysis

Network and Statistical Analysis

To gain insights into the structure of each personal network, we computed 13 structural indicators, as outlined in Table 2. Each personal network is inherently a network, offering a wide range of metrics to describe its structural properties. For this study, we selected the most relevant metrics based on previous research on individual differences in personal network structures, and expert knowledge. As described in Table 2, the selected indicators cover the main dimensions of variability in personal networks, such as structural cohesion, fragmentation, and relational integration (Maya-Jariego, 2021).

We used R software (R version 4.0.3, R Core Team, 2020) and *igraph* package (Csardi & Nepusz, 2006). Based on previous research, we selected indicators of density, centralization, fragmentation, number of cliques, and number of components (Bidart et al., 2018; Maya-Jariego, 2021; Maya-Jariego & González-Tinoco, 2023), as well as indicators of social support (Cheng et al., 2009; Fiori et al., 2008; Friedman & Kennedy, 2021; Li & Zhang, 2015; Park et al, 2016, 2018) and the proportion of intimate ties (Fiori et al., 2008; Litwin, 1995; Litwin & Landau, 2000). All metrics were computed excluding ego, except for the strength of ego–alter ties.

Firstly, we explored the connection between structural indicators and Big Five, attachment styles, and three sociodemographic variables (age, gender, and country of residence) using bivariate relationships based on Spearman's correlations. The suitability of the nonparametric Spearman's correlation test is justified by the nature of our data, which are not normally distributed but showing a high skewness typical for network-based measures. Out of the 13 indicators analyzed, only the measures of closure, degree centralization, and the percentage of strong alter–alter ties show *p*-values above .05 in the Kolmogorov–Smirnov test. Secondly, to uncover personal network typologies we performed latent profile analysis (LPA) (Van Lissa et al., 2024) with *mclust* R package (Fraley et al., 2012; Scrucca et al., 2016). This package uses finite Gaussian mixture models to perform clustering and model-based classification by expectation-maximization algorithm.

Finally, we examined the influence of the Big Five, attachment styles, and sociodemographic variables (age, gender, and country of residence) on the clustering patterns of personal networks by running multinomial regressions, with assigned clusters as dependent variables. Gender and country residence had two possible values (male = 1, female = 2; Spain = 1, Colombia = 2, respectively) and were transformed to numerical indicators. See Supplementary Material for additional information on transformation of variables.

Power analysis

Previous research on associations between ego-network characteristics and psychological attributes typically reports effect sizes around $r \approx .30$ (for a review, see Maya-Jariego et al., 2020). A priori, detecting a correlation of this magnitude with 80% power (two-tailed $\alpha = .05$) would require approximately $N = 85$ participants (Fisher-*z* method). Our sample of $N = 305$ therefore provides >99% power to detect effects of this size and approximately 94% power for a smaller effect of $r = .20$. The smallest detectable correlation with

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Table 2. Structural personal network metrics used in the study

Structural measure of personal networks (Abbreviation)	Description	Relevance
Density (Den)	The ratio of the actual number of connections between alters in personal networks to the total possible number of connections	High density often results in a higher level of communication, information flow, and social influence among members, and it fosters a sense of community. However, extremely high density can also lead to echo chambers, limiting exposure to diverse perspectives.
Closure (transitivity) (Clo)	The number of nonvacuous transitive triples divided by the number of paths of length two	Closure is linked to transitivity, which is a property that makes sense in the context of triads of nodes. Two actors who do not know each other would be more likely to link if they have a common contact. Closure provides an understanding of dynamics, information flow, and social capital within the network.
Number of cliques (N_cliq)	The set of three or more nodes in which all nodes are directly connected to each other.	Cliques foster social cohesion, information and communication flow, social capital, sense of belonging and community, identity, and social support. Also, the study of cliques could provide valuable insights into the influence and opinion formation processes and about homophily mechanisms within the network.
Diameter (Dm)	The length of the shortest distance between the two most distant nodes in the network	Diameter provides a better understanding of connectivity and social influence within the network. A larger diameter implies that information diffusion and communication efficiency may be compromised.
Average distance (Avg.D)	The average shortest path length between all pairs of nodes in the network	This metric provides valuable insights into the overall connectivity, information flow, communication efficiency, and social capital within the network. A shorter average distance is linked with direct interactions between nodes and more efficient networks in terms of communication and resource diffusion.
Fragmentation (Frag)	The proportion of pairs of nodes that cannot reach each other	Fragmentation is linked with the presence of subgroups with a lack of communication between them or the existence of isolated nodes within the network. It speaks about disconnection or even social segregation. Exploring fragmentation could be useful for the identification of communication barriers and structural holes in the network, and for the proposal of strategies for building bridges looking for brokers who can foster social integration and resource flow.
Modularity (Modular)	The strength of division of a network into clusters	This measure brings us closer to the study of communities or social circles within the network. It provides a better understanding of communication flow, community identification, and dynamics and relationships among the nodes within the modules.
Degree centralization	The extent to which the ties of a given network are concentrated on a single node or group of actors; this metric assesses how centralized the distribution of connections between nodes are in the network; it quantifies the extent to which some nodes have significantly more connections than others.	Degree centralization provides a better understanding of the way the connections are distributed in the network. It helps to identify key actors, those who have a powerful position in the network in terms of potential control of the access to information and resources, or social influence.
Betweenness centralization	The extent to which the betweenness centrality of nodes is concentrated on a subset of nodes within the network.	This metric is useful to know the degree in which the control over the interactions or resources is equally or unequally distributed within the network. A high betweenness centralization means that the influence or control in terms of network communication or resource flow is concentrated on a few actors. Higher values are related to the presence of one dominant broker and a few structural holes in the network.
Percentage of strong ego–alter ties	Percentage of alters with whom ego has an intimate bond (that is a tie with a strength of 3 or 4 on a scale of 1 to 4)	It is a measure of the degree of intimacy of the network considering ego–alter ties. This provides information on whether it is a network consisting mostly of tight or peripheral ties. Since in this research, we control for the size of the network, which is fixed at 30 alters, this measure is particularly valuable. Moreover, it is a metric, a priori, especially connected to personality attributes and attachment styles.
Percentage of strong alter-alter ties	Percentage of dyads linked by a strong bond (that is percentage of dyads whose tie was rated as 3 or 4, on a scale between 0 and 4)	It is a measure of the degree of intimacy of the network considering alter-alter ties.

(*Continued*)

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Table 2. (*Continued*)

Structural measure of personal networks (Abbreviation)	Description	Relevance
Multiplexity	Mean of different types of ties per ties that provide at least one type of social support	Previous research has linked the multiplicity of social support to a relational pattern based on secure attachment.
Number of ties without any of six types of support	Number of ties that are not providers of any of the measured types of social support	This is a complementary measure to the previous one. It gives us information about alters that have not been recognized by ego as support providers.

80% power is $r \approx .16$, indicating that the study was well powered to identify theoretically meaningful associations.

The main analyses employed multinomial logistic regression with four outcome categories (ego-network types) and psychological traits, attachment styles, and some sociodemographic variables as predictors. To approximate power for this analysis, we used the effect size measure $f^2 = R^2/(1 - R^2)$ as implemented in multiple and multinomial regression contexts (Cohen, 2013). A medium effect of $r = .30$ corresponds to $f^2 \approx 0.09$, and a small effect of $r = .20$ corresponds to $f^2 \approx 0.04$. Power analyses based on this range indicate that with $N = 305$, $\alpha = .05$, and up to 8–10 predictors (Model 3 investigating the predictive power of Big Five personality traits and Attachment Styles contains nine predictors, while the final Model 4 additionally controlled for three sociodemographic variables), the study retains greater than .90 power to detect medium-sized effects and ≈ .80 power to detect small-to-moderate effects in a multinomial logistic model with four outcome categories (Cohen, 2013; Hsieh, 1989). Thus, our sample size was sufficient to detect the magnitude of associations commonly reported between psychological attributes and ego-network characteristics.

Ethics and informed consent statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. The activities were subject to Regulation (EU) 2016/679 on the protection of personal data, as well as to Organic Law 3/2018, of December 5, on the Protection of Personal Data and Guarantee of Digital Rights. Prior to participation, all participants were provided with detailed information about the study's objectives, procedures, and their rights, including the right to withdraw at any time without any repercussions. Informed consent was obtained from all participants before the surveys were conducted. Confidentiality and anonymity were strictly maintained throughout the study, and the collected data were securely stored and used solely for research purposes. They were fully informed about the objectives and procedures of the research, the voluntary nature of their participation, and their right to withdraw at any time without any consequences.

Results

Correlations

In Figure 2, we present the correlations between the personality variables, the attachment styles, the three sociodemographic variables—age, gender, and country of residence—and the 13 structural indicators of the personal networks for each participant. The results show that sociodemographic variables—especially country where respondents reside—were more associated with the structural properties of personal networks than attachment types, and in turn more so than personality variables. It also seems that anxious attachment styles (preoccupied and fearful types) were more associated than avoidant attachment style with personal networks.

More specifically, while neuroticism and preoccupied attachment were negatively correlated with the proportion of close ties in the network—both in relation to ego and among alters—extraversion was positively correlated. On the other hand, while agreeableness, conscientiousness, and secure attachment were positively related to a higher percentage of close connections between ego and alters, fearful attachment was negatively related. Concerning the support related personal network measures, while higher scores on extraversion and secure attachment were related to a higher proportion of support providers in the network, preoccupied attachment style was related to a lower number of social support providers.

Latent Profile Analysis

Second, latent profile analysis based on the 13 structural indicators were run. We used multivariate mixture model "VEV," which means that the parametrizations of within-group covariance matrix have ellipsoidal distribution, variable volume, equal shape, and variable orientation. Analysis started with one class, adding additional classes up to nine. The model fit was assessed for all solutions, and the four-class solution was the optimal based on the Bayesian information criterion (BIC) and the integrated complete-data likelihood (ICL) criterion. Summary of the model is $N = 292$ ($df = 383$); log-likelihood = −186.452; $BIC = -2547.101$, $ICL = -2547.64$.

Table 3 and Figure 3 summarize the four clusters identified. Cluster 1 stands out as having the highest scores in fragmentation, modularity, and average distance, and the lowest ones in density, number of cliques, and number of support providers (about half of the network actors did not provide any support). This is the least cohesive type, with highly fragmented and modular personal networks, and the lowest number of support providers.

Cluster 2 was the least prevalent one in our sample. It hosts the densest personal networks, with the highest number of cliques, transitive triads, strong ego–alter ties, and support providers. They are also the least centralized networks (both in degree centralization and betweenness centralization), and with the lowest modularity, average distance, and diameter. It is the most cohesive, least centralized cluster with the highest proportion of support providers.

Cluster 3 is formed by slightly more centralized networks, both in terms of degree centralization and betweenness centralization, with the largest diameter, and the lowest transitivity. These networks are highly centralized, wide, and cliquish. Finally, Cluster 4, which is also the biggest cluster, is made of cohesive personal networks that tend to have medium average values in most network measures.

Comparing clusters, we found no differences regarding gender ($\chi^2 = 5.94$; $df = 3$, $p = .11$) although the lowest percentage of women are in Cluster 4 (59.4%) and highest in Cluster 2 (80.5%).

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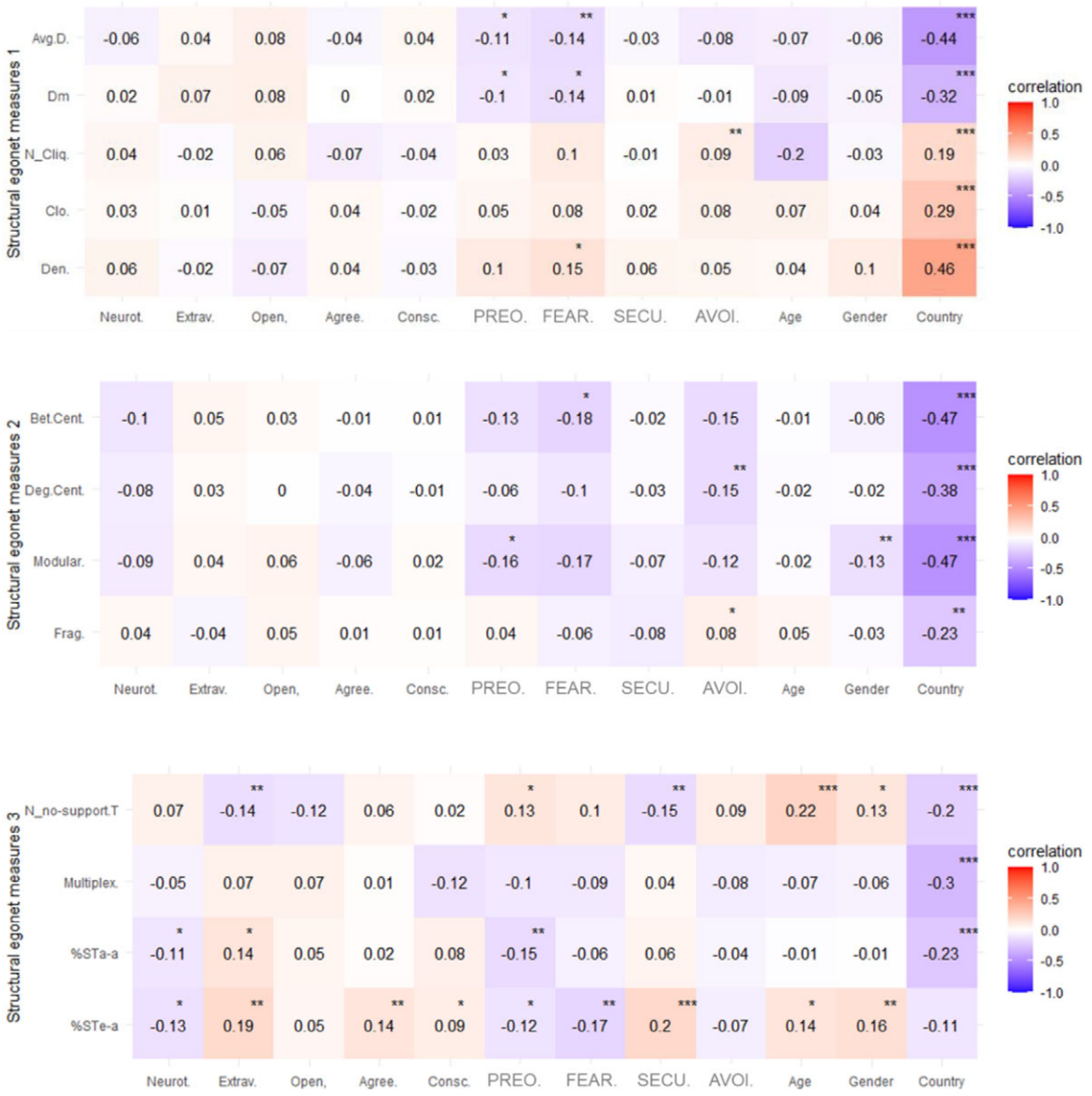


Figure 2. Spearman's correlation coefficients between 13 structural ego-network indicators and Big five personality traits, four attachment styles and age, gender (1 = male; 2 = female), and country (1 = Spain; 2 = Colombia). Abbreviations: X-axis: Neurot. = neuroticism; Extrav. = extraversion; Open. = openness; Agree. = Agreeableness; Consc. = conscientiousness; PREO = preoccupied attachment style; FEAR. = fearful attachment style; SECU. = secure attachment style; AVOI. = avoidant attachment style. Y-axis 1: Avg.D = average distance; Dm = diameter; N_cliq = number of cliques; Clo. = closure; Den. = density. Y-axis 2: Bet.Cent = betweenness centralization; Deg.Cent = degree centralization; Modular. = modularity; Frag. = fragmentation. Y-axis 3: N_no_support.T = number of ties without any of six types of support; Multiplex. = multiplexity; %STe-a = percentage of strong ties between ego and alters; %Sta-a = percentage of strong ties between alters.

Table 3. Distribution of cases and final cluster centres based on 13 structural indicators (N = 292)

Cluster	Description	N (%)
Cluster 1	Fragmented and modular networks with low support and strength	70 (24%)
Cluster 2	Cohesive and not centralized networks with high support and strength	41 (14%)
Cluster 3	Centralized, wide and cliquish networks	80 (27.4%)
Cluster 4	"Average" networks	101 (34.6%)

There was also no difference regarding age (Kruskal–Wallis χ^2 = 5.32; df = 3; p = .15). However, the clusters differed regarding the country of residence of the ego (χ^2 = 66.61; df = 3, p < .001) with the highest percentage of individuals that are residents of Colombia in Cluster 2 (75.61%) and lowest in Cluster 1 (10%).

Figure 4 shows the association between probabilities to belong to each cluster and all ego attributes. All coefficients were of modest size (<0.2) for all attributes except for country of residence. Higher scores in all three insecure attachment styles were associated with a higher probability of being in Cluster 2 (most

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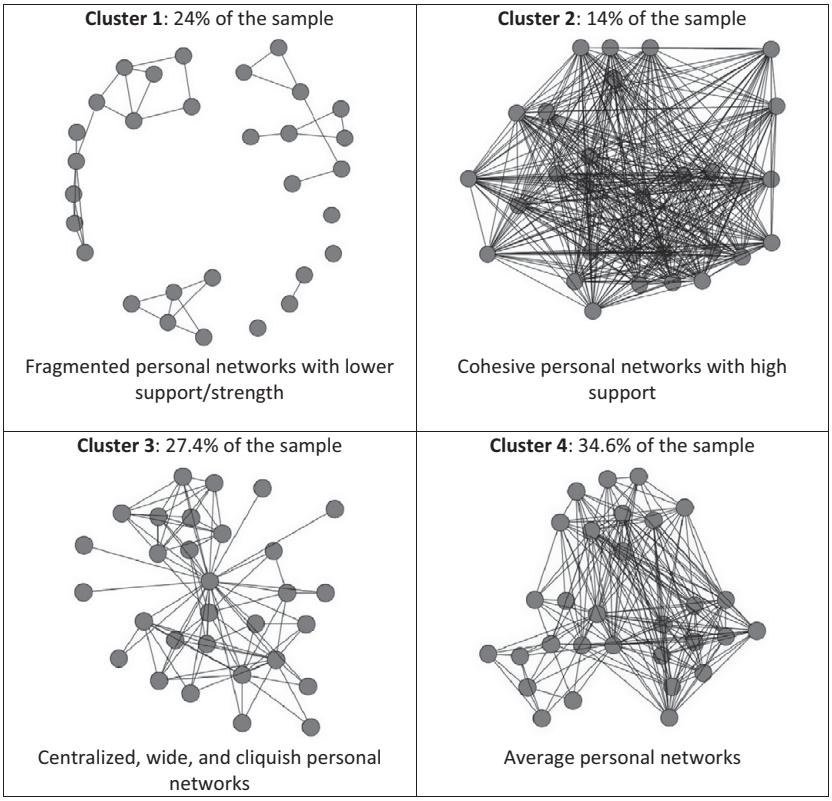


Figure 3. Illustration of the clusters.

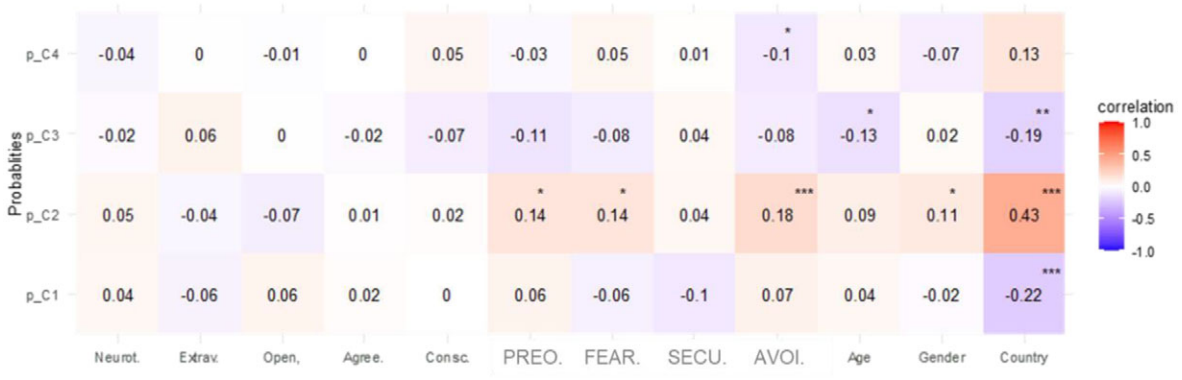


Figure 4. Associations between probability of belonging to a cluster and attributes (Spearman's correlation). Abbreviations: X-axis: Neurot. = neuroticism; Extrav. = extraversion; Open. = openness; Agree. = agreeableness; Consc. = conscientiousness; PREO. = preoccupied attachment style; FEAR. = fearful attachment style; SECU. = secure attachment style; AVOI. = avoidant attachment style. Y-axis 1: p_C4 = probability of belonging to the fourth cluster; p_C3 = probability of belonging to the third cluster; p_C2 = probability of belonging to the second cluster; p_C1 = probability of belonging to the first cluster.

cohesive), while lower scores in avoidant attachment style were associated with being in Cluster 4 (average group). Age and the probability of being in Cluster 3 were inversely related, while gender (female) was associated with being in Cluster 2. Living in Spain was associated with Clusters 1 (most fragmented) and 3 (most centralized) and living in Colombia with Cluster 2.

Multinomial Regressions

Table 4 displays the results from four multinomial regression models examining the relationship between clusters based on network metrics and predictor variables, including personality traits (Model 1), attachment styles (Model 2), both personality traits and attachment styles (Model 3) and one model controlling for socio-demographic factors (age, gender, and country of residence).

Individuals with higher levels of openness were less likely to belong to the most cohesive cluster (Cluster 2, $p = .067$). In contrast, neuroticism, extraversion, agreeableness, and conscientiousness did not show a significant association with cluster membership. Regarding attachment styles (Model 2), higher scores on fearful and secure types were associated with a greater probability of belonging to the most cohesive cluster (Cluster 2). When demographic

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Table 4. Nominal regressions for all models, dependent variable: Network type (cluster) based on network metrics

Model 1: Personality traits			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
Cluster 2	(Intercept)	0.55 [0.01, 20.47]	.744
	Neuroticism	1.01 [0.96, 1.07]	.623
	Extraversion	1.02 [0.96, 1.08]	.483
	Openness	0.94 [0.88, 1]	**.067**
	Agreeableness	1 [0.94, 1.07]	.943
	Conscientiousness	1.02 [0.96, 1.09]	.464
Cluster 3	(Intercept)	5.39 [0.27, 108.99]	.272
	Neuroticism	0.98 [0.94, 1.03]	.404
	Extraversion	1.03 [0.98, 1.08]	.211
	Openness	0.98 [0.93, 1.04]	.485
	Agreeableness	0.99 [0.93, 1.04]	.609
	Conscientiousness	0.97 [0.92, 1.02]	.197
Cluster 4	(Intercept)	3.12 [0.18, 53.99]	.435
	Neuroticism	0.98 [0.94, 1.02]	.396
	Extraversion	1.02 [0.98, 1.07]	.38
	Openness	0.98 [0.93, 1.03]	.39
	Agreeableness	0.98 [0.93, 1.03]	.461
	Conscientiousness	1.01 [0.96, 1.06]	.767
	Cox-Snell pseudo-R^2	.04	
Model 2: Attachment styles			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
Cluster 2	(Intercept)	0 [0–0, 13]	.002
	Preoccupied A.S.	1.01 [0.96, 1.05]	.816
	Fearful A.S.	1.05 [0.99, 1.12]	**.076**
	Secure A.S.	1.06 [1–1, 13]	**.061**
	Avoidant A.S.	1.04 [0.97, 1.12]	.282
Cluster 3	(Intercept)	1.19 [0.06, 25.29]	.912
	Preoccupied A.S.	0.97 [0.94, 1.01]	.134
	Fearful A.S.	1.02 [0.98, 1.07]	.343
	Secure A.S.	1.02 [0.97, 1.08]	.359
	Avoidant A.S.	0.96 [0.9, 1.03]	.242
Cluster 4	(Intercept)	0.98 [0.05, 17.83]	.99
	Preoccupied A.S.	0.98 [0.95, 1.02]	.273
	Fearful A.S.	1.05 [1, 1.1]	**.055**
	Secure A.S.	1.02 [0.97, 1.07]	.387
	Avoidant A.S.	0.94 [0.88, 1]	**.047**
	Cox-Snell pseudo-R^2	.1	
Model 3: Personality traits & Attachment styles			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
Cluster 2	(Intercept)	0 [0–0, 19]	.009
	Neuroticism	0.98 [0.92, 1.05]	.619

(*Continued*)

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Table 4. (*Continued*)

Model 3: Personality traits & Attachment styles			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
	Extraversion	0.97 [0.9, 1.04]	.389
	Openness	0.93 [0.86, 0.99]	**.035**
	Agreeableness	1.04 [0.96, 1.13]	.299
	Conscientiousness	1.02 [0.96, 1.09]	.536
	Preoccupied A.S.	1.01 [0.96, 1.06]	.687
	Fearful A.S.	1.07 [1, 1.14]	**.051**
	Secure A.S.	1.1 [1.01, 1.2]	**.021**
	Avoidant A.S.	1.06 [0.98, 1.15]	.12
Cluster 3	(Intercept)	12.11 [0.19, 780.37]	.241
	Neuroticism	1 [0.95, 1.05]	.859
	Extraversion	1.01 [0.95, 1.07]	.721
	Openness	0.98 [0.93, 1.04]	.55
	Agreeableness	0.98 [0.92, 1.04]	.455
	Conscientiousness	0.97 [0.92, 1.02]	.187
	Preoccupied A.S.	0.97 [0.93, 1.01]	.179
	Fearful A.S.	1.02 [0.96, 1.07]	.565
	Secure A.S.	1.03 [0.96, 1.1]	.411
	Avoidant A.S.	0.96 [0.9, 1.03]	.239
Cluster 4	(Intercept)	2.57 [0.05, 127.97]	.636
	Neuroticism	0.98 [0.93, 1.03]	.427
	Extraversion	0.99 [0.94, 1.05]	.814
	Openness	0.99 [0.93, 1.04]	.591
	Agreeableness	0.98 [0.92, 1.04]	.474
	Conscientiousness	1 [0.96, 1.06]	.858
	Preoccupied A.S.	0.99 [0.95, 1.03]	.606
	Fearful A.S.	1.04 [0.99, 1.1]	.103
	Secure A.S.	1.03 [0.97, 1.1]	.316
	Avoidant A.S.	0.94 [0.88, 1]	**.048**
	Cox-Snell pseudo-R^2	.15	
Model 4: Personality traits, Attachment styles, & sociodemographic variables			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
Cluster 2	(Intercept)	0.01 [0–2, 87]	.106
	Age	1.04 [1.01, 1.07]	**.015**
	Gender (Female)	1.49 [0.48, 4.63]	.488
	Country (Colombia)	68.64 [17.59, 267.83]	**< .001**
	Neuroticism	0.97 [0.9, 1.05]	.506
	Extraversion	1.02 [0.93, 1.11]	.665
	Openness	0.91 [0.84, 0.99]	**.031**
	Agreeableness	1.01 [0.91, 1.11]	.892
	Conscientiousness	0.98 [0.9, 1.06]	.552
	Preoccupied A.S.	1.01 [0.96, 1.08]	.626

(*Continued*)

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Table 4. (*Continued*)

Model 4: Personality traits, Attachment styles, & sociodemographic variables			
Network typology Cluster (Ref = Cluster 1)	Variable	OR (95% CI)	*p*
	Fearful A.S.	1.01 [0.93, 1.09]	.851
	Secure A.S.	1.08 [0.99, 1.19]	**.091**
	Avoidant A.S.	0.98 [0.89, 1.07]	.623
Cluster 3	(Intercept)	36.81 [0.39, 3453.33]	.12
	Age	0.99 [0.96, 1.01]	.246
	Gender (Female)	1.17 [0.55, 2.46]	.688
	Country (Colombia)	1.93 [0.62, 6.05]	.259
	Neuroticism	0.99 [0.94, 1.04]	.767
	Extraversion	1 [0.95, 1.06]	.899
	Openness	0.98 [0.93, 1.04]	.516
	Agreeableness	0.98 [0.92, 1.05]	.629
	Conscientiousness	0.97 [0.92, 1.02]	.254
	Preoccupied A.S.	0.97 [0.93, 1.01]	.163
	Fearful A.S.	1.01 [0.95, 1.06]	.797
	Secure A.S.	1.02 [0.96, 1.09]	.518
	Avoidant A.S.	0.95 [0.89, 1.02]	.132
Cluster 4	(Intercept)	7.93 [0.11, 584.85]	.345
	Age	1.01 [0.99, 1.03]	.335
	Gender (Female)	0.7 [0.34, 1.44]	.33
	Country (olombia)	8.22 [2.84, 23.77]	**< .001**
	Neuroticism	0.98 [0.93, 1.03]	.478
	Extraversion	1.01 [0.95, 1.07]	.846
	Openness	0.98 [0.93, 1.04]	.517
	Agreeableness	0.97 [0.91, 1.04]	.39
	Conscientiousness	0.99 [0.94, 1.04]	.739
	Preoccupied A.S.	0.99 [0.95, 1.03]	.486
	Fearful A.S.	1.02 [0.97, 1.08]	.345
	Secure A.S.	1.03 [0.96, 1.1]	.372
	Avoidant A.S.	0.9 [0.84, 0.97]	**.003**
	Cox-Snell pseudo-R^2	.35	

Abbreviations: OR = Odds Ratio, CI = Confidence Intervals, *p* = *p* value; A.S. = Attachment Style.
Note. Reference groups: Gender = male; Country = Spain.
Bold *p*-values = < .1

variables were controlled, only secure attachment style remained significant. Higher scores on avoidant style implied a greater probability of belonging to Cluster 1, which was more fragmented.

According to Model 4, older participants were more likely to belong to the most cohesive cluster, while participants from Colombia were more likely to belong to the most cohesive cluster and the average cluster.

The Cox–Snell pseudo-R^2 values provide an indication of model fit. Model 1, which includes personality traits only, explained a small proportion (4%) of the variance in network typology, and the fit was not significantly better than the intercept-only model. Model 2, including attachment styles, explained approximately 10% of the variance and showed improved model fit compared to the intercept-only model. Model 3, with both personality traits and attachment styles, explained around 15% of the clustering variance. Finally, the comprehensive Model 4, including personality traits, attachment styles, age, gender, and country, accounted for an additional 20% of clustering variance, resulting in a total explained variance of 35%, indicating that the added demographic variables significantly contribute to explaining the clustering patterns.

Discussion

Over the past decade, there has been a noteworthy increase in the volume of research that integrate the exploration of individual differences with the analysis of the structural properties of personal

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networks. This reflects a shift in the approach to the phenomenon, which seems to move away from a more structuralist perspective to recognize that social actors have agency and play a leading role in the construction of their relational environment. It has been common to use the Big Five model to explore how the five traits predict the shape of the interpersonal environment, using personality as an antecedent of network structure. The Big Five framework offers a broad and straightforward approach to examining the role of individual psychological differences in social network research.

However, psychology as a field is rich in theories and measures of other individual differences that may provide a more suitable foundation for integrating psychological and social network research. Among these, attachment styles represent a particularly promising - yet still underutilized—framework for understanding social networks. Although a number of studies have examined this connection (e.g., Bouchard & Maya-Jariego, 2019; Dizdari & Seiler, 2020; Gillath et al., 2011; Gillath et al., 2017; Gillath et al., 2019; Gillath & Karantzas, 2015; Lee & Gillath, 2016; Webster et al., 2016), their application remains relatively limited. This gap in the literature is quite striking given that attachment styles are explicitly relational constructs, directly shaping how individuals form, maintain, and perceive relationships. As such, they influence behaviors such as closeness, trust, and reliance on others, which are critical for understanding network features like density, centrality, and clustering. In contrast, the Big Five traits are broader and less specific to interpersonal relationships.

Our study combines social network methodology with insights into individual psychological differences. It represents a contribution to the body of knowledge that explores the dimensions of interindividual variability in socialization patterns by using individual differences in attachment styles that have inherently relational focus as social network approach. We therefore anticipated that attachment styles would have a greater predictive power than personality traits in shaping personal interaction patterns and, by extension, the type of personal network's structure. This expectation is supported by the results of our research.

In the classification of personal networks, we observed that some indicators were more relevant to differentiate the types of networks. These are the measures of density, fragmentation, and centralization. These measures are related to how many alters know each other, how easily—in network terms—alters can reach each other, and the existence of alters that are disproportionately central in one's network, respectively. Density and fragmentation measure the connectivity of the interpersonal environment and the ease with which information spreads. Centralization indicates that one or a few alters are more dominant in terms of connectivity. Different types of personal networks reflect the diverse ways in which individuals navigate, organize, and manage their interpersonal relationships. Our classification revealed four types: (1) fragmented and modular networks, with a comparatively lower number of support providers; (2) networks characterized by high density and low centralization, featuring a high proportion of support providers; (3) networks that display a relatively higher centralization; and (4) "typical" networks leaning towards average values.

These results are consistent with those of Bidart et al. (2018) and Maya-Jariego (2021), who also obtained classifications that differentiated between highly cohesive networks; networks organized in groups, with some alters with high centrality and fragmented networks that typically have more components. In one of the cases, an intermediate cluster was also obtained, with average values in several structural indicators (Maya-Jariego, 2021). In our case, the latter could be related to the heterogeneity of the sample or the fact of having an extensive list of criterion variables.

Regression analyses revealed that individuals with secure attachment style were more likely to have cohesive-non centralized networks, with a high number of support providers. This is consistent with Bouchard and Maya-Jariego (2019), who found the association of secure attachment style and dense networks, and with the foundations of attachment theory, which holds that those who have developed a security-based attachment are able to seek support in times of need, confident that others will be available to help them regulate their emotions (Ainsworth et al., 1978; Brennan et al., 1998; Fraley & Waller, 1998; Gillath et al., 2016; Mikulincer & Shaver, 2016; Seiffge-Krenke & Beyers, 2005). On the opposite end, people with an avoidant attachment style showed a higher probability of fragmented and less supportive networks. This pattern may align with previous findings indicating that avoidant attachment is linked to a reduced tendency to maintain social ties (Gillath et al., 2011) and lower levels of network density (Gillath et al., 2017; Zhao et al., 2024). These associations suggest that individuals with higher levels of attachment avoidance may be more likely to form social networks characterized by weaker ties and less structural cohesion. This behavioral dynamic may be explained by their tendency to isolate themselves from potential sources of support (Anders & Tucker, 2000; Collins & Feeney, 2004; Gillath et al., 2016) and to reject social contact due to the belief that others will be intrusive or unavailable in times of need (Brennan et al., 1998; Feeney et al., 1994; Lee & Gillath, 2016). Furthermore, it should be noted that the trait of openness to experience is more prone to fragmented—less supportive networks. This is in line with the literature, which shows less stability of ties (Wagner et al., 2014; Wrzus et al., 2017) and greater variability in the social contexts of open-minded people (Fang et al., 2015; Landis, 2016).

Our findings highlight the great importance of sociodemographic variables, aligning with the theoretical understanding that social networks are deeply context dependent. At the same time, they also underscore the significant role of individual psychological differences—particularly attachment styles—in shaping the structure of personal networks. This dual influence invites further reflection on the broader contextual and cultural factors in which psychological tendencies are embedded.

Emerging research indicates that the effects of attachment on social networks are not culturally neutral. Rather, cultural contexts shape both the development and behavioral consequences of attachment orientations (Kafetsios & Kateri, 2020; Strand, 2020). This perspective suggests that cultural contexts may amplify or attenuate the influence of attachment depending on their alignment with prevailing norms and values (Friedman et al., 2010). For example, attachment avoidance may be more compatible with individualistic cultures that emphasize autonomy, whereas attachment anxiety may align more closely with collectivist cultures that value closeness and interdependence. Consistent with this view, Zhao et al. (2024) show that culture and attachment interact to predict key social network characteristics, including density, tie strength, and support. Together, these findings suggest that attachment and culture operate as interdependent systems that mutually shape and stabilize social behavior over time (Strand, 2020).

The attachment behavioral system has evolved as an adaptive mechanism where distinct attachment patterns offer specific advantages depending on the developmental and cultural contexts. Variations in the cultural understanding of attachment security correspond to behavioral patterns that facilitate survival or adaptation to social life. These patterns emerge in response to the

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distinct adaptive demands that each cultural context places on individuals (Kafetsios & Kateri, 2020; Mesman et al., 2016; Sakman & Sümer, 2024; Strand, 2020). These insights highlight the value of an integrative framework that considers both individual and contextual factors for understanding the dynamics of personal networks across diverse sociocultural environments.

This type of evidence can be useful in clinical intervention contexts, both for diagnostic purposes and for facilitating interpersonal environments that enhance subjective well-being. Indeed, network visualization strategies have recently been incorporated successfully into clinical practice, helping patients recognize the value of social support and the unique features of their interpersonal networks (Nicaise et al., 2022), and acting as a trigger for behavioral change (Kennedy et al., 2022). As the results indicate, individuals with some forms of insecure attachment could constitute a risk group in the development of less supportive networks and therefore constitute a group for preferential intervention.

Limitations and Future Research

The sample used entails limitations in terms of generalizability, size, and heterogeneity. In particular, there are notable differences in gender distribution, country of origin, and sample composition (e.g., a higher proportion of unemployed participants in Colombia and retired individuals in Spain), which may introduce bias and limit the comparability of results across subsamples. It should also be considered that classifications often depend partly on the characteristics of the sample. Additionally, setting a fixed number of alters in the name generator when applying the personal networks instrument may influence the structure of the personal network. Furthermore, it is common to find an "average" category, which acts as a "catch-all." In future research, it would be of interest to develop methodologies for classifying personal networks that address both the aforementioned limitations and test the robustness of our findings in different cultural contexts and in larger, more representative samples.

The effect sizes were not very large although they correspond to those typically observed in studies examining the relationship between personality variables and social network properties. Nevertheless, the results were examined using multiple analytical strategies (including latent class analysis and multinomial regressions) to strengthen the validity of the conclusions. In fact, it is worth noting that although the clusters may exhibit some imbalance in terms of gender or country of residence, the association between secure attachment and more cohesive networks remains significant in the regression models. Future research could extend these findings by employing larger and more diverse samples, longitudinal designs, or additional variables to further clarify the mechanisms linking personality and social network characteristics.

Conclusion

Understanding how people organize their social worlds is central to the study of personal relationships. This research shows that attachment styles, more than broad personality traits, shape the structural patterns of individuals' personal networks. Secure attachment fosters cohesive and supportive relational environments whereas avoidant attachment relates to fragmented ones. These findings suggest that emotionally grounded, relational constructs such as attachment may better explain how personal networks take shape than traditional personality frameworks.

This study enhances our understanding of how individual differences relate to the structure of personal networks using typologies. Three structural personal network measures emerged as central in clustering solutions: density, fragmentation, and centralization. We approached the investigation of the associations between individual personality-related differences and network typologies based on their structural properties, revealing that attachment styles played a more important role in characterising personal networks than personality traits. Notably, the contribution of the country of residence surpassed other predictors, enhancing the predictive power of psychological attributes and suggesting the importance of cultural differences and context, well known to be among the pivotal factors affecting the structure of personal network (e.g., Chase et al., 2024; Grossetti, 2005; Kilonzi & Ota, 2019). Our study indicated that secure attachment style and living in Colombia were associated with dense, supportive, but not centralized, personal networks. In contrast, the avoidant attachment style, openness to experience, and living in Spain were linked to fragmented and less supportive networks. These findings highlight the importance of context and cultural norms in shaping their relational environment and have substantial potential for assessing social cohesion and community integration.

Supplementary material. To view supplementary material for this article, please visit http://doi.org/10.1017/SJP.2026.10048.

Data availability statement. Data will be made available on request.

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Author contribution. E. G.-T. and I. M.-J. developed the concept of the study. E. G.-T. collected data, and S. L. conducted statistical analyses. E. G.-T., S. L., and I. M.-J. wrote, edited, and provided critical revisions to the manuscript. All the authors have approved the final version of the manuscript for submission.

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