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Aggression in Young Adults: A Network Analysis Revealing the Central Role of Franciscan-Inspired Spirituality

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Abstract

Aggression remains a common challenge in young adulthood, yet little is known about how spirituality, forgiveness, and related psychological resources are jointly connected to its different components. This study examined a regularized partial correlation network of life satisfaction, mental well-being, awe/gratitude, nature experience, compassion, Franciscan-inspired spirituality, humility, three dimensions of forgiveness, and four dimensions of aggression among 500 Polish university students aged 19–24 years (58.1% female). Data were collected online in 2024, and the network was estimated using graphical LASSO with extended Bayesian information criterion (EBICglasso). Aggression formed a dense and relatively segregated subnetwork. Franciscan-inspired spirituality was the most strongly connected node, followed by awe/gratitude and humility, but its connectivity reflected links with forgiveness by God, humility, compassion, and awe/gratitude rather than direct associations with aggression. The forgiveness dimensions showed distinct patterns: forgiveness of others was associated with lower physical and verbal aggression, self-forgiveness with lower hostility and higher well-being, and forgiveness by God almost exclusively with Franciscan-inspired spirituality. Strength centrality and edge weights showed good stability, and the network was essentially unchanged after adjustment for age and sex. Overall, spiritual and psychological resources were related to aggression selectively rather than uniformly, suggesting that educational and preventive approaches may be more effective when matched to specific components of aggressive functioning.

Keywords: **Franciscan-inspired spirituality, forgiveness, aggression, awe/gratitude, young adults**

Agresja u młodych dorosłych: Analiza sieci ujawnia centralną rolę duchowości inspirowanej tradycją franciszkańską

Streszczenie

Agresja pozostaje powszechnym problemem w okresie wczesnej dorosłości, jednak niewiele wiadomo o tym, w jaki sposób duchowość, przebaczenie oraz pokrewne zasoby psychologiczne wiążą się z jej poszczególnymi komponentami. W niniejszym badaniu przeprowadzono analizę sieci obejmującą satysfakcję z życia, dobrostan psychiczny, zachwyt/wdzięczność, doświadczanie natury, współczucie, duchowość inspirowaną tradycją franciszkańską, pokorę, trzy wymiary przebaczenia oraz cztery wymiary agresji w grupie 500 polskich studentów w wieku 19–24 lat (58,1% kobiet). Dane zebrano online w 2024 roku, a sieć oszacowano za pomocą graficznego LASSO z rozszerzonym bayesowskim kryterium informacyjnym (EBICglasso). Agresja tworzyła gęstą i względnie odseparowaną podsieć. Najsilniej połączonym węzłem była duchowość inspirowana tradycją franciszkańską, a następnie zachwyt/wdzięczność i pokora. Centralność duchowości inspirowanej tradycją franciszkańską wynikała jednak z jej powiązań z postrzeganym przebaczeniem od Boga, pokorą, współczuciem oraz zachwytem/wdzięcznością, a nie z bezpośrednich związków z agresją. Wymiary przebaczenia wykazywały odmienne wzorce powiązań: przebaczenie innym wiązało się z niższym poziomem agresji fizycznej i werbalnej, przebaczenie sobie z niższym poziomem wrogości i wyższym dobrostanem, natomiast postrzegane przebaczenie od Boga niemal wyłącznie z duchowością inspirowaną tradycją franciszkańską. Centralność siły oraz wagi krawędzi cechowały się dobrą stabilnością, a struktura sieci pozostała zasadniczo niezmieniona po uwzględnieniu wieku i płci. Wyniki wskazują, że zasoby duchowe i psychologiczne wiążą się z agresją w sposób selektywny, a nie jednolity, sugerując tym samym, że działania edukacyjne i profilaktyczne mogą zyskać na skuteczności, gdy są ukierunkowane na konkretne komponenty agresywnego funkcjonowania.

Słowa kluczowe: **duchowość inspirowana tradycją franciszkańską, przebaczenie, agresja, zachwyt/wdzięczność, młodzi dorośli**

1. INTRODUCTION

1.1 Aggression

Aggression remains a challenge to psychological and social adaptation in young adulthood (Surzykiewicz et al., 2024). Although overt aggressive behavior often declines from adolescence into adulthood, individual differences remain, and aggression continues to be associated with difficulties in relationships, emotional functioning, and broader psychosocial adjustment (Cleverley et al., 2012; Nelson et al., 2008). Higher aggression is consistently linked to lower life satisfaction and poorer mental well-being (Liu et al., 2024; Sajjad Shahid et al., 2025). Life satisfaction and mental well-being capture related but distinct aspects of positive functioning, spanning global life evaluation and more immediate affective well-being (Diener et al., 1985; Topp et al., 2015). A prospective multicenter study of people with severe mental disorders similarly found that participants aged 18–29 years displayed significantly higher levels of aggressive behavior than those aged 50 and older (Micciolo et al., 2022). Young adulthood also brings greater demands for independent emotion regulation,

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the formation of close relationships, and adaptation to new educational and social roles (Braet et al., 2026). Research on aggression in this period should therefore consider both the processes that increase aggressive responding and the psychological resources that support more adaptive reactions to frustration and provocation (De Cordova et al., 2019). Identifying which psychological resources are most strongly and broadly connected to lower aggression may therefore be particularly informative for prevention and intervention efforts targeting young adults.

Aggression is not a single, uniform construct. Buss and Perry (1992) distinguished four related but separable components: physical aggression, verbal aggression, anger, and hostility. Physical and verbal aggression refer to behavioral tendencies to express aggression through physical acts or verbal confrontation. Anger reflects the affective component of aggression, including irritability and difficulty regulating emotional reactions, whereas hostility reflects its cognitive component and includes resentment and ill will toward others (Aranowska & Rytel, 2012; Konaszewski, Skalski-Bednarz, Surzykiewicz, et al., 2025). These components may therefore show different patterns of association with psychological resources, because aggressive behavior, negative affect, and hostile cognition do not necessarily arise from the same processes.

The I³ Theory provides one framework for understanding when aggressive impulses are translated into behavior. According to this model, aggression emerges from the interplay of instigation, impellance, and inhibition (Finkel et al., 2012; Finkel & Hall, 2018; Slotter & Finkel, 2011). Instigation refers to situational triggers that create an urge to aggress, such as provocation or rejection. Impellance refers to dispositional or situational factors that strengthen this urge, while inhibition refers to processes that restrain aggressive responding. Aggression becomes more likely when instigating and impelling forces are strong and inhibitory processes are weak. Slotter and Finkel (2011) also proposed that people may respond more impulsively when they lack sufficient resources or motivation to reconsider their initial appraisal of a situation, whereas available resources may support reappraisal and more thoughtful action. Adaptation in provocative or emotionally difficult situations therefore depends on the balance between the strength of aggressive impulses and the resources available to regulate or redirect them.

A complementary perspective is offered by Fredrickson's (2001) broaden-and-build theory. Positive emotions can broaden momentary patterns of attention, cognition, and action and, over time, contribute to the development of more enduring psychological and social resources. These resources may also reinforce one another, creating upward spirals in which positive emotional experiences support the development of further resources that can later be used in coping and adaptation (Fredrickson & Joiner, 2002).

1.2 Franciscan-Inspired Spirituality

Spirituality may provide a broader framework within which psychological and social resources are organized. Meta-analytic evidence generally shows positive, although modest and heterogeneous, associations between religion or spirituality and life satisfaction, well-being, and prosocial functioning (Garssen et al., 2020; Yaden et al., 2022). Religiosity and spirituality have also been linked with lower levels of some forms of interpersonal violence. A systematic review and meta-analysis found that higher religiosity and spirituality were associated with lower physical and sexual aggression, although this pattern was not observed for domestic violence and appeared more pronounced among adolescents (Gonçalves et al., 2023). At the same time, religiosity is neither necessary nor sufficient for prosocial behavior: religious practice itself is not consistently related to voluntary helping, whereas value-based motives – expressed especially through mindful interaction with others – show a more reliable link (Büssing, Baumann, et al., 2025; Büssing et al., 2022; Oviedo, 2016; Van Cappellen et al., 2016).

Franciscan-inspired spirituality reflects this more relational and practice-oriented form of spirituality. It encompasses lived faith and the search for God as the central motive (attitude), and both peaceful and respectful treatment of others, and commitment to disadvantaged people and creation as the related outcomes (behavior) (Büssing et al., 2017). Rather than referring to private belief alone, it describes an orientation toward God, other people, and the natural world that is expressed through attitudes and behavior. Humility is closely associated with this tradition. In Franciscan thought, it accompanies material and immaterial poverty, fraternity, and a reduced focus on egoistic and self-centered attitudes, while encouraging openness to dependence, service, and care for others (Büssing et al., 2017; Dienberg, 2016; Peters, 1995). Compassion is similarly closely linked to this relational orientation. The Franciscan tradition emphasizes solidarity with poor, disadvantaged, and suffering people and understands compassionate care as a practical expression of spiritual transformation and service (Büssing et al., 2017; Francis, 2015). Compassion thus combines sensitivity to another person's suffering with a motivation to respond with care and support. Awe/gratitude are similarly closely associated with this orientation. At its core is a form of experiential spirituality characterized by a sense of resonance with one's experiences. Awe/gratitude can be understood as perceptual aspects of spirituality that are associated with prosocial engagement and a sense of meaning in life (Büssing, Recchia, & Dienberg, 2018; Büssing et al., 2021; Büssing, Weit, et al., 2024; Stellar et al., 2017). Positive experiences of nature are likewise conceptually compatible with the Franciscan emphasis on reverence and respect for creation, while constituting a distinct psychological construct in their own right (Büssing et al., 2017; Büssing, Weit, et al., 2024; Sohail et al., 2025). Nature is also one of the most common contexts in which experiences of awe/gratitude arise and has been linked with feelings of connectedness and psychological restoration (Büssing et al., 2023; Büssing, Wilhelm, et al., 2025). More broadly, these constructs are examined in positive psychology as character strengths, virtues, or related positive psychological resources and have been associated with well-being, health, and adaptive social functioning (Bock et al., 2025; Krause & Hayward, 2015).

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1.3 Forgiveness

Although forgiveness is not commonly conceptualized in psychological research as a specifically Franciscan construct, the model of relational spirituality and forgiveness (Sandage & Williamson, 2010) places forgiveness within a spiritual-relational context in which individuals interpret transgressions through their relationships with the self, other people, and the sacred (Toussaint et al., 2026). Meta-analytic findings further support a positive association between religion/spirituality and forgiveness, although the magnitude of this relationship differs across forgiveness dimensions (Davis, Worthington, Hook, & Hill, 2013). Within this broader framework, forgiveness may be considered in terms of self-forgiveness, forgiveness of others, and forgiveness by God, also referred to as divine forgiveness (Charzyńska & Heszen, 2013; Toussaint et al., 2001). These dimensions address different relational contexts: self-forgiveness concerns responses to one's own wrongdoing and self-condemnation, forgiveness of others concerns responses toward an offender, whereas forgiveness by God reflects the perceived experience of receiving forgiveness from God (Fincham, 2026; Skalski-Bednarz, Toussaint, Dębski, et al., 2026; Toussaint et al., 2026). Empirical findings indicate that forgiveness is negatively associated with aggression, anger, hostility, and resentment and positively associated with prosocial behavior (Aquino et al., 2006; Ashy et al., 2010; Berry et al., 2005; Karremans & Van Lange, 2005). In a two-wave study of juveniles, reductions in negative emotions toward the offender predicted lower subsequent anger and hostility (Konaszewski, Skalski-Bednarz, Toussaint, et al., 2025). Forgiveness has also been linked with nature connectedness and with awe/gratitude (Surzykiewicz et al., 2023). Although all three forgiveness dimensions may contribute uniquely to well-being and mental health, self-forgiveness has shown especially strong associations in some studies (Fincham & May, 2020). In a Polish–Georgian study, self-forgiveness was associated with lower depressive symptoms in both samples and was the only forgiveness dimension associated with depression in the Polish sample after accounting for forgiveness of others and forgiveness by God; in the Georgian sample, it was also associated with higher quality of life (Skalski-Bednarz et al., 2025). At the same time, self-forgiveness may be especially difficult to attain because the same person occupies the roles of both transgressor and target of moral evaluation (Worthington et al., 2018).

Humility is closely connected with both forgiveness and compassion. It involves a balanced and less self-focused view of oneself, openness to personal limitations, and greater orientation toward others (Davis, Worthington, Hook, Emmons, et al., 2013; Tangney, 2000). Greater humility relates to greater compassion and forgiveness of others, while a nationwide U.S. study also linked humility with forgiveness of both others and oneself (Krause, 2018; Krause & Hayward, 2015; LaBouff et al., 2012). It may also support self-forgiveness by helping individuals acknowledge wrongdoing without resorting either to defensive self-protection or persistent self-condemnation (Onody et al., 2020; Van Tongeren et al., 2019).

1.4 Current Study

Although associations among spirituality, well-being, positive psychological resources, and aggression are well documented, much less is known about how these constructs are connected when considered simultaneously. Traditional bivariate and regression-based analyses provide only limited insight into such a configuration, because an observed association may reflect either a more direct relationship or shared links with other characteristics. Network analysis offers a complementary approach by representing psychological constructs as nodes and their conditional associations as edges, allowing multiple relationships to be examined within the same system (Borsboom & Cramer, 2013; Epskamp et al., 2018). The present study examined a network of life satisfaction, mental well-being, awe/gratitude, nature experience, compassion, Franciscan-inspired spirituality, humility, self-forgiveness, forgiveness of others, forgiveness by God, physical aggression, verbal aggression, anger, and hostility among young adult university students in Poland.

Based on the literature reviewed above, we broadly expected positive associations among spiritual and positive psychological resources, including forgiveness, and negative associations between these resources and aggression. Given its explicitly relational and practice-oriented character, we further expected Franciscan-inspired spirituality to be strongly and broadly connected within this network, rather than a peripheral correlate of well-being. Beyond these general directional expectations, specific connections within and across domains and the relative connectivity of individual constructs were examined exploratorily.

2. MATERIALS AND METHODS

2.1 Participants

Participants were young adult university students aged 19–24 years. Eligibility criteria were current student status, age within the specified range, fluency in Polish, and provision of informed consent. No other inclusion or exclusion criteria were applied. All participants identified as White Caucasian. The final analytic sample consisted of 500 participants recruited through snowball sampling from university communities in Warsaw and their broader social networks. The mean age was 22.91 years *(SD* = 2.02). Regarding sex, 58.1% of participants were female, 39.7% were male, and 2.2% reported another category or did not provide this information. All data were complete, and no participants were excluded from the analyses. Participation was voluntary and anonymous.

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2.2 Procedure

The study received ethical approval and was conducted in accordance with the 1964 Declaration of Helsinki and its later amendments. Data were collected in 2024 using an online survey administered through SurveyMonkey. After providing informed consent, participants completed a battery of self-report questionnaires.

The survey assessed life satisfaction, mental well-being, awe/gratitude, experience of nature, compassion, Franciscan--inspired spirituality, humility, self-forgiveness, forgiveness of others, forgiveness by God, and four dimensions of aggression. Completion of the full survey took approximately 10 minutes.

2.3 Measures

2.3.1 Translations

In some cases, no validated Polish adaptation of the chosen questionnaires existed at the time of data collection. These scales were translated into Polish for the purposes of the present study (i.e. Experience of Nature Scale, Santa Clara Brief Compassion Scale, Franciscan-inspired Spirituality Questionnaire, and the Humility Scale).

A forward–backward translation procedure was conducted by a bilingual research team consisting of two independent translators, to maximize conceptual, semantic, and cultural equivalence between the source and target versions. An independent bilingual researcher subsequently performed a backtranslation of the Polish items into the original language; the forward- and back-translated versions were then compared against the original items, and any discrepancies – for instance, shifts in meaning, tone, or the implications of the response scale – were resolved through discussion within the research team, with an emphasis on functional rather than strictly literal equivalence. Finally, the Polish versions of all items were reviewed by two native Polish speakers to confirm the clarity, naturalness, and cultural appropriateness of the wording, consistent with the guidelines for test adaptation set out by the International Test Commission (2018).

2.3.2 Awe/Gratitude

Self-transcendent feelings of awe/gratitude were measured with the Awe/Gratitude Questionnaire (GrAw-7), developed by Büssing, Recchia, and Baumann (2018) and adapted and standardized into Polish by Konaszewski et al. (2022). The questionnaire focuses on the experiential aspects of being moved and touched by moments or places in nature, on the related tendency to pause amid daily activities, and on the resulting feelings of awe/gratitude. It consists of seven items forming a single factor. Respondents rate each item on a four-point scale ranging from 0 (*never*) to 3 (*regularly*). Unless otherwise indicated, all scales in the present study were scored and reported as mean item scores. A sample item is "I stop and then think of so many things for which I'm really grateful". In the present study, internal consistency was good (α = .82).

2.3.3 Nature Experience

The subjective, affective experience of nature was assessed with the Experience of Nature Scale (ENS), developed by Büssing, Recchia, and Ortiz (2024). The instrument distinguishes three related aspects of how people experience nature: detachment from everyday life and relaxation, fascination with nature and a sense of wonder, and a felt sense of responsibility toward nature, represented by 11 items rated on a five-point scale ranging from 0 (*does not apply at all*) to 4 (*applies completely*). A sample item is "When I am in nature, I feel calm and balanced". In the present sample, internal consistency was excellent (α = .93), and a single factor explained 54.6% of the variance, supporting the use of the scale as a unidimensional composite in the network analysis.

2.3.4 Compassion

Dispositional compassion toward others was measured with the Santa Clara Brief Compassion Scale, developed by Hwang et al. (2008). The scale forms a single factor comprising five items, which in the original validation study accounted for 71% of the variance. Items are rated on a seven-point scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). A sample item is "When I hear about someone (a stranger) going through a difficult time, I feel a great deal of compassion for him or her". In the present sample, internal consistency was excellent (α = .88), and a single factor explained 60.5% of the variance.

2.3.5 Franciscan-Inspired Spirituality

Elements of Franciscan-inspired spirituality were assessed using the Franciscan-inspired Spirituality Questionnaire (FraSpir), developed by Büssing et al. (2017). In its original validation, the full 26-item instrument distinguished four related aspects: Living from the Faith/Search for God, Peaceful Attitude/Respectful Treatment, Commitment to the Disadvantaged and Creation, and Attitude of Poverty. For the purposes of the present study, 17 items corresponding to the first three aspects were administered, while the Attitude of Poverty items were omitted because this domain is more specific to Franciscan religious life and has shown limited psychometric performance (Büssing, Recchia, & Dienberg, 2018). Items are rated on a five-point scale ranging from 0 (*does not apply at all*) to 4 (*applies very much*). A sample item is "My faith is a guide for my life". In the present sample, internal consistency was excellent (α = .90), and a single factor explained 57.2% of the variance, supporting the use of the scale as a unidimensional composite in the network analysis.

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2.3.6 Humility

Humility was measured using the Humility Scale developed by Wright et al. (2018), which operationalizes humility along five related facets: a religious form of low self-focus, a cosmic form of low self-focus, an environmental form of low self-focus, high other-focus, and the degree to which a person values humility as a trait. Each facet is represented by five items, for a total of 25 items. Although the original scale used a seven-point response format, items in the present study were rated on a five-point scale ranging from 0 (*does not apply at all*) to 4 (*applies completely*), to maintain consistency with the response format used across the other translated measures. A sample item is "Humility is a virtue". In the present sample, internal consistency was excellent (α = .92), and a single-factor was extracted accounting for 50.9% of the variance in exploratory factor analysis, supporting the use of the scale as a unidimensional composite in the network analysis.

2.3.7 Well-Being

Mental well-being was assessed with the WHO-5 Well-Being Index (Topp et al., 2015), in its Polish adaptation by Cichoń et al. (2020). Rather than assessing a global, reflective judgment about one's life as a whole, the WHO-5 captures the affective and vitality-related component of well-being over the preceding two weeks – the extent to which a person has recently felt cheerful, calm, active, rested, and engaged in daily life. The scale consists of five items forming a single factor, rated on a 6-point scale ranging from 0 (*at no time*) to 5 (*all the time*). A sample item is "I have felt active and vigorous". In the present sample, internal consistency was good (α = .82).

2.3.8 Life Satisfaction

Life satisfaction was measured using the three-item Polish adaptation of the Satisfaction With Life Scale (SWLS-3; Diener et al., 1985), adapted by Skalski-Bednarz, Soraci, et al. (2026) on the basis of Jankowski's (2015) Polish item translations and the abbreviated three-item version originally proposed by Kjell and Diener (2021). The scale forms a single factor comprising three items and is designed to capture the cognitive component of subjective well-being – a global, reflective evaluation of one's life against self-endorsed criteria. Items are rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A sample item is "In most ways my life is close to my ideal". In the present sample, internal consistency was good (α = .84).

2.3.9 Forgiveness

Dispositional forgiveness was measured using the Toussaint Forgiveness Scale (TFS), developed by Toussaint et al. (2001) and adapted into Polish by Charzyńska and Heszen (2013). The scale distinguishes three related but distinct forms of forgiveness – *self-forgiveness*, *forgiveness of others*, and *forgiveness by God* – rated on a five-point scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). A sample item is "I have forgiven those who have hurt me". In the present sample, internal consistency was good for self-forgiveness (two items, α = .78) and for forgiveness of others (three items, α = .79), and excellent for forgiveness by God (two items, α = .90).

2.3.10 Aggression

Trait aggression was assessed using a short form of the Buss–Perry Aggression Questionnaire, comprising 13 items selected according to the criteria established by Bryant and Smith (2001) from the full 29-item Polish adaptation of the questionnaire (Aranowska & Rytel, 2012). The instrument distinguishes four related facets of aggression, reflecting its behavioral, affective, and cognitive components: *physical aggression* and *verbal aggression*, capturing the tendency to express aggression through physical acts or verbal confrontation, respectively; *anger*, capturing the affective, emotional component of aggression (e.g., a quick temper and difficulty controlling one's reactions); and *hostility*, capturing its cognitive component, reflected in feelings of ill will, resentment, and suspicion toward others. Items are rated on a 5-point scale ranging from 0 (*definitely not*) to 4 (*definitely yes*). The anger subscale is represented by four items, while the remaining three subscales are each represented by three items. A sample item is "Given enough provocation, I may hit another person". In the present sample, internal consistency was good for physical aggression (α = .76), verbal aggression (α = .76), anger (α = .84), and hostility (α = .77).

2.4 Statistical Analysis

Analyses were conducted in R (version 4.5.0) using the qgraph and bootnet packages. Prior to network estimation, descriptive statistics (means, standard deviations, skewness, kurtosis) and bivariate Pearson correlations were computed for all 14 study variables. The network was estimated as a regularized partial correlation matrix using the graphical LASSO with extended Bayesian information criterion (EBICglasso) model selection (γ = 0.5), based on Pearson correlations among the composite scores. Given the modest departures from univariate normality observed in the data, Pearson correlations were retained for network estimation. For visualization purposes, nodes were additionally grouped into seven a priori thematic clusters: well-being, gratitude and nature, compassion, spirituality, humility, forgiveness, and aggression.

Node centrality was quantified using standardized strength, computed alongside closeness and betweenness for completeness. Two aspects of the network's robustness were then examined using bootstrap resampling (1,000 iterations for each procedure). First, the precision of individual edge weights was evaluated by constructing 95% bootstrapped confidence

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intervals around each estimated partial correlation. Second, the stability of centrality rankings under reduced sample sizes was examined using a case-dropping bootstrap, from which a correlation stability coefficient (CS) was derived; following Epskamp et al. (2018), values at or above .25. were treated as the minimum acceptable threshold, with values of .50 or higher regarded as indicating good stability.

As a check on potential demographic confounding, age and sex were partialled out of each of the 14 variables using linear regression, and the resulting residuals served as input for a second, independently estimated network. Network similarity before and after this adjustment was then quantified as the Pearson correlation between the two sets of edge weights.

3. RESULTS

3.1 Preliminary Analyses

Descriptive statistics for all 14 composite variables are presented in Table 1. Skewness and kurtosis values were generally within an acceptable range (|skewness| ≤ 1.17, |kurtosis| ≤ 1.23), with physical aggression and nature experience showing the largest deviations. The analytic sample consisted of N = 500 participants. Bivariate Pearson correlations among all variables are reported in Table S1 (supplementary materials).

Table 1

Descriptive Statistics for Study Variables (N = 500)

Variable	*M*	*SD*	Min	Max	Skewness	Kurtosis
Life satisfaction (SWLS-3)	3.97	1.27	1	7	-0.19	-0.22
Well-being (WHO-5)	2.37	1.10	0	5	0.11	-0.74
Awe/Gratitude (GrAw-7)	1.64	0.53	0	3	0.03	0.14
Nature experience (ENS)	2.90	0.80	0	4	-0.93	1.23
Compassion (Santa Clara)	5.22	1.20	1	7	-0.78	0.88
Franciscan-inspired spirituality (FraSpir)	2.34	0.74	0	4	-0.16	-0.41
Humility	2.58	0.66	0	4	-0.46	0.59
Self-forgiveness	1.70	0.98	0	4	0.25	-0.29
Forgiveness of others	2.33	0.88	0	4	-0.19	-0.18
Forgiveness by God	2.13	1.27	0	4	-0.39	-0.83
Physical aggression	0.86	0.94	0	4	1.17	0.84
Verbal aggression	1.61	0.83	0	4	0.53	-0.10
Anger	1.71	1.07	0	4	0.15	-0.82
Hostility	1.71	0.81	0	4	0.22	-0.17

Note. Composite scores used in the present analyses were calculated as mean item scores. In some studies, the SWLS-3 is reported as a sum score; in the present sample, this yielded *M* = 11.91, *SD* = 3.81. The WHO-5 is also commonly expressed on a 0–100 scale; in the present sample, the standardized score was *M* = 47.40, *SD* = 22.00. Likewise, GrAw-7 scores are sometimes transformed to a 0–100 scale for comparability; the respective value in the present sample was *M* = 54.67, *SD* = 17.67.

3.2 Network Structure

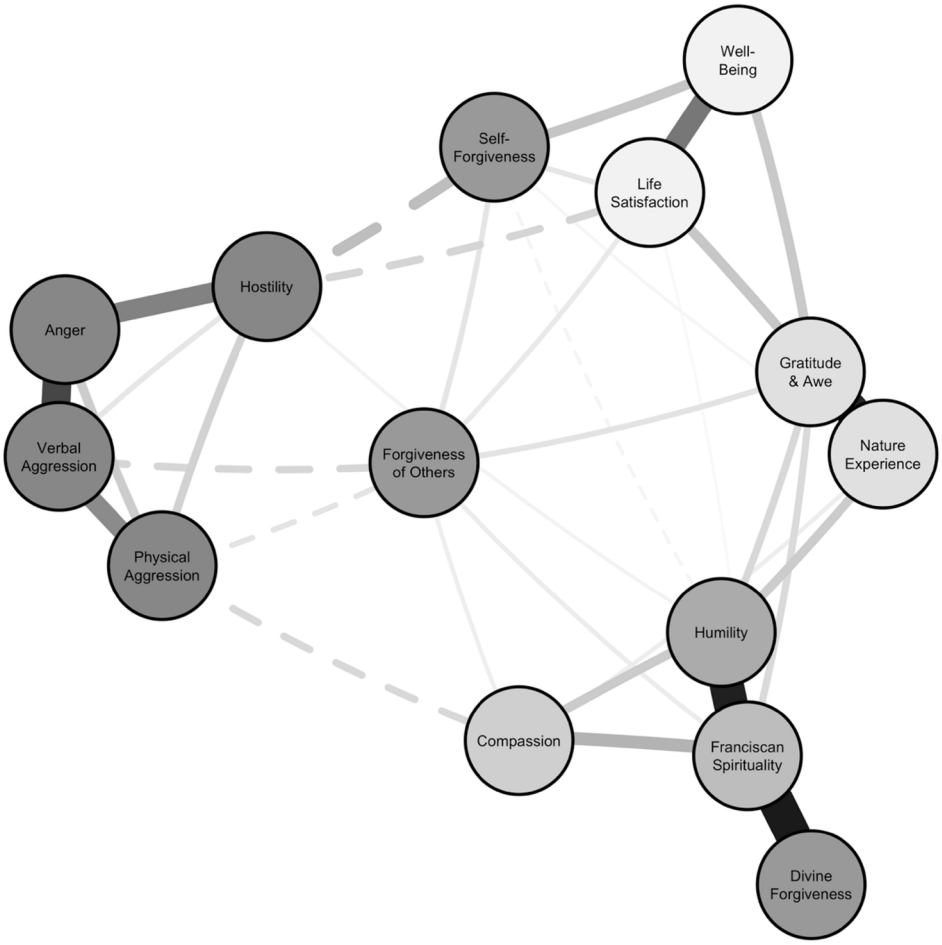
A regularized partial correlation network was estimated using the graphical least absolute shrinkage and selection operator with the extended Bayesian information criterion (EBICglasso; γ = 0.5, default tuning parameter) as implemented in the *qgraph* package (Epskamp et al., 2012) via the *bootnet* package (Epskamp et al., 2018). Nodes represented the 14 composite variables; edges represented regularized partial correlations, controlling for all other variables in the network. A relatively dense network was selected ($\lambda < 0.10 \times \lambda max$), consistent with the moderate-to-strong intercorrelations observed among variables; the smallest edges should therefore be interpreted with appropriate caution (Epskamp et al., 2018).

The estimated network is shown in Figure 1. The full edge-weight matrix (all 47 non-zero regularized partial correlations) is reported in Table S2. The strongest edges in the network were observed between Franciscan-inspired spirituality and forgiveness by God (ω = .46), Franciscan-inspired spirituality and humility (ω = .45), awe/gratitude and nature experience (ω = .44), and verbal aggression and anger (ω = .38). The two well-being indicators, life satisfaction and well-being, were also strongly interconnected (ω = .30), consistent with their conceptual overlap.

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Figure 1

Regularized Partial Correlation Network of Spirituality, Nature Experience, Forgiveness, Aggression, and Well-Being



Note. Edge shading (grayscale intensity) reflects the magnitude of the regularized partial correlation; solid lines indicate positive edges, dashed lines indicate negative edges. Node shading reflects thematic grouping (well-being, awe/gratitude and nature, compassion, spirituality, humility, forgiveness, aggression). The network showed a visually differentiated structure across the a priori thematic groups. A spirituality and virtue cluster comprised Franciscan-inspired spirituality, humility, forgiveness by God, awe/gratitude, nature experience, and compassion, all positively interconnected. A well-being cluster comprised life satisfaction and well-being, which were themselves strongly connected to each other and, more weakly, to the spirituality cluster and to self-forgiveness. An aggression cluster comprised physical aggression, verbal aggression, anger, and hostility, which were densely and exclusively positively interconnected; this cluster was largely segregated from the rest of the network, with hostility and forgiveness of others serving as the only substantive bridges to the remaining nodes.

The four aggression-related nodes formed a densely interconnected subcluster: all six pairwise edges among physical aggression, verbal aggression, anger, and hostility were positive and non-trivial (ω = .10 to .38), with the strongest being verbal aggression–anger (ω = .38), anger–hostility (ω = .27), and physical aggression–verbal aggression (ω = .26).

A second, positively interconnected cluster comprised the spirituality- and virtue-related nodes: beyond the two edges reported above, Franciscan-inspired spirituality was also connected to compassion (ω = .19) and awe/gratitude (ω = .12), while humility was further connected to compassion (ω = .14), nature experience (ω = .14), awe/gratitude (ω = .12), and – more weakly – hostility (ω = .07) and forgiveness by God (ω = .03).

Well-being showed direct positive associations with several nodes beyond life satisfaction: well-being with self-forgiveness (ω = .15) and awe/gratitude (ω = .15); life satisfaction with awe/gratitude (ω = .15), self-forgiveness (ω = .10), forgiveness of others (ω = .09), and Franciscan-inspired spirituality (ω = .06). Life satisfaction was also negatively associated with hostility (ω = -.13), the strongest direct link between well-being and the aggression cluster.

Regarding forgiveness, the three forgiveness dimensions showed distinct connectivity patterns. Forgiveness of others was the only forgiveness-related node with direct negative associations with the aggression cluster (verbal aggression, ω = -.12; physical aggression, ω = -.10), and was additionally connected to awe/gratitude (ω = .10), compassion (ω = .08), Franciscan-inspired spirituality (ω = .09), self-forgiveness (ω = .10), and life satisfaction (ω = .09). Self-forgiveness showed negligible direct ties to spirituality (Franciscan-inspired spirituality, ω = .00) but was negatively associated with hostility

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(ω = -.17) and humility (ω = -.07), and positively with well-being indicators. Forgiveness by God showed the narrowest connectivity of the three, linking almost exclusively to Franciscan-inspired spirituality (ω = .46), with only negligible ties elsewhere (humility, ω = .03; hostility, ω = .03; life satisfaction, ω = .03; compassion, ω = -.03).

Hostility was the only aggression node with substantive connections outside the aggression cluster (self-forgiveness, ω = -.17; life satisfaction, ω = -.13; humility, ω = .07), whereas physical aggression, verbal aggression, and anger connected to the rest of the network only through compassion (ω = -.12 and -.04) and forgiveness of others (ω = -.10 and -.12), and via very weak residual edges (|ω| ≤ .03) elsewhere.

3.3 Centrality

Node centrality was evaluated using strength (Table 2), closeness, and betweenness (Figure S1; Table S3). Given the case-dropping bootstrap results (see *Network Accuracy and Stability* below), only strength centrality met the recommended stability threshold and is interpreted here. Franciscan-inspired spirituality showed the highest node strength by a substantial margin, indicating that it was the most strongly and extensively connected construct in the network, followed by awe/gratitude and humility.

Table 2

Node Strength Centrality (Standardized)

Node	*Strength (z)*
Franciscan-inspired spirituality	2.54
Awe/Gratitude	1.10
Humility	0.83
Verbal aggression	0.33
Hostility	0.26
Life satisfaction	0.08
Anger	-0.05
Physical aggression	-0.36
Nature experience	-0.39
Forgiveness of others	-0.54
Compassion	-0.58
Self-forgiveness	-0.83
Well-being	-1.09
Forgiveness by God	-1.30

3.4 Network Accuracy and Stability

Edge weight accuracy was assessed via non-parametric bootstrapping (1,000 replications; Epskamp et al., 2018). Bootstrapped confidence intervals for edge weights are shown in Figure S2. Confidence intervals for the largest edges (e.g., Franciscan-inspired spirituality–forgiveness by God, Franciscan-inspired spirituality–humility, awe/gratitude –nature experience, and the aggression-cluster edges) did not overlap with zero, indicating these estimates showed comparatively good precision. Confidence intervals for edges close to zero substantially overlapped one another, indicating that the relative ordering of the smallest edges should not be over-interpreted.

The stability of centrality estimates was assessed using the case-dropping subset bootstrap (1,000 replications; Figure S3). Correlation stability (CS) coefficients were .75 for strength, .21 for betweenness, and .05 for closeness. Following the recommended minimum threshold of .25 (preferably ≥ .50; Epskamp et al., 2018), strength centrality showed excellent stability and was retained for interpretation, whereas betweenness and closeness fell below the acceptable threshold and were not interpreted in the present study. The same case-dropping procedure also yielded a CS coefficient of .75 for the edge weights themselves, indicating that the overall pattern of connections in the network was likewise robust to reductions in sample size.

To rule out confounding by basic demographic characteristics, we re-estimated the network after partialling out age and sex from each composite variable (linear regression residuals) and compared the resulting edge weights to those of the original network. The two networks were highly similar (r = .99 for the correlation between edge-weight vectors; mean absolute difference = 0.01, maximum = 0.05), indicating that the reported network structure was not substantially confounded by age or sex.

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As a sensitivity analysis, we re-estimated the network after replacing the Franciscan-inspired spirituality composite with its three constituent subscales (Living from the Faith/Search for God, Peaceful Attitude/Respectful Treatment, and Commitment to the Disadvantaged and Creation; N = 474; Table S5). The Faith subscale emerged as the second most central node in the resulting 16-node network, connecting almost exclusively to forgiveness by God (ω = .66) and humility, whereas the Peaceful subscale was instead linked to interpersonal constructs – compassion, forgiveness of others, and (negatively) physical aggression – and the Commitment subscale showed markedly lower overall centrality. These facet-level differences provide additional nuance to the findings obtained for the overall Franciscan-inspired spirituality construct, while the broader network structure remained largely unchanged.

4. DISCUSSION

The present network showed a differentiated structure rather than a simple opposition between positive resources and aggression. Franciscan-inspired spirituality was the most strongly connected construct, followed by awe/gratitude and humility, whereas the aggression dimensions formed a dense and comparatively segregated group. Consistent with our first expectation, spirituality- and virtue-related resources formed a densely interconnected cluster. The three forms of forgiveness occupied markedly different positions: forgiveness of others was linked most clearly with behavioral aggression, self-forgiveness with hostility and well-being, and forgiveness by God almost exclusively with Franciscan-inspired spirituality. These patterns remained essentially unchanged after adjustment for age and sex, supporting the robustness of the overall structure. Centrality here describes structural connectivity and should not be interpreted as evidence that Franciscan-inspired spirituality causally influences the other constructs.

The high strength of Franciscan-inspired spirituality appears to reflect its simultaneous connection with several distinct relational domains rather than a direct negative association with aggression. Its strongest edges were with forgiveness by God and humility, followed by compassion and awe/gratitude, in keeping with earlier work linking Franciscan-inspired attitudes with compassion, altruistic orientation, and prosocial engagement (Büssing et al., 2017; Büssing, Recchia, & Dienberg, 2018). The particularly strong spirituality–forgiveness by God connection mirrors network findings in a large U.S. college sample, where feeling forgiven by God was strongly associated with ritualistic and theistic spirituality and emerged as one of the stronger bridges between spirituality and forgiveness-related constructs (Skalski-Bednarz, Prusak, et al., 2026). This convergence across different operationalizations suggests that perceived forgiveness by God may be especially closely embedded in the religious–spiritual domain rather than functioning simply as another general forgiveness disposition. These findings diverge, however, from experimental work on offense-specific forgiveness by God. Ludwig et al. (2026) found that situationally experienced forgiveness by God was associated with downstream processes involving both self-forgiveness and a gratitude–humility pathway. In the present trait-level network, by contrast, forgiveness by God showed little unique connectivity beyond Franciscan-inspired spirituality once the broader system was considered. One possible explanation is that forgiveness by God may function differently as a dispositional orientation, reflecting a cultivated attitude rather than an offense-specific experience. The former may primarily reflect a relatively stable sacred relational orientation, whereas the latter may elicit more immediate cognitive and affective responses to a specific transgression. This distinction should not be taken to imply that dispositional forgiveness dimensions are independent of one another, however, as associations among different forgiveness dispositions have also been observed in previous research (Fincham & May, 2020; Skalski-Bednarz, 2024). Rather, the present findings suggest that their direct conditional associations may become substantially weaker once broader spiritual and psychological resources are considered simultaneously.

The facet-level sensitivity analysis further showed that the aggregate Franciscan-inspired spirituality score concealed substantial heterogeneity. Living from the Faith/Search for God as a valued attitude was connected primarily with forgiveness by God and humility, whereas Peaceful Attitude/Respectful Treatment, reflecting a related behavioral orientation, was associated with humility, compassion, forgiveness of others, and lower physical aggression. Commitment to the Disadvantaged and Creation was substantially less central. This pattern can be understood in terms of two partly distinct relational dimensions within spiritual functioning. A vertical dimension concerns the individual's relationship with God, whereas a horizontal dimension concerns functioning in relation to oneself, other people, and the broader world. Although theoretically distinguishable, these dimensions may function as interconnected components of an integrated spiritual system (Surzykiewicz et al., 2025). Conceptually, this differentiation also echoes the vertical/horizontal distinction embedded in the relational spirituality and forgiveness model discussed above (Sandage & Williamson, 2010). Although the Franciscan-spirituality facets were not designed to map onto these dimensions, the present pattern is comparable: Faith/Search for God occupied a predominantly vertical position, whereas Peaceful Attitude/Respectful Treatment showed a more horizontal one. The lower centrality of Commitment to the Disadvantaged and Creation further indicates that these components should not be assumed to contribute equally to the overall network position of Franciscan-inspired spirituality. The high centrality of the composite appears to arise from the integration of distinct sacred and interpersonal relational orientations rather than from a single undifferentiated spirituality effect.

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Awe/Gratitude emerged as the second most central node and showed broad connectivity with nature experience, well-being, humility, Franciscan-inspired spirituality, and forgiveness of others. This fits Büssing's account of wondering awe as a perceptive aspect of spirituality that can also occur outside explicit religiosity (Büssing, 2021; Büssing, Weit, et al., 2024). Further findings showed that awe/gratitude predicted well-being more strongly than nature experience itself and mediated the association between nature experience and well-being (Büssing, Wilhelm, et al., 2025). The present network similarly suggests that awe/gratitude may be more broadly integrated into the psychological system than nature experience alone, linking experiential, spiritual, interpersonal, and well-being domains.

Although humility showed the third-highest strength and was positioned close to Franciscan-inspired spirituality, compassion, awe/gratitude, and nature experience, reflecting its role as a relational virtue, it was not uniformly associated with more adaptive outcomes once the remaining resources were controlled. Its small positive edge with hostility and small negative edge with self-forgiveness should be interpreted cautiously, particularly because the latter confidence interval included zero. These residual associations may reflect suppression produced by the considerable shared variance among humility, Franciscan-inspired spirituality, awe/gratitude, and compassion rather than substantive adverse effects of humility. This interpretation fits better with previous evidence linking humility to lower defensiveness and greater self-forgiveness following transgressions (Onody et al., 2020).

The forgiveness dimensions showed clearly differentiated positions in the network. Forgiveness of others retained negative conditional associations with physical and verbal aggression, but not with anger or hostility. Such a divergence may reflect a distinction between outwardly directed aggressive behavior and more intrapersonal affective and cognitive aspects of aggression. Physical and verbal aggression are expressed directly toward other people, making them conceptually closer to forgiveness within interpersonal relationships, whereas anger and hostility concern emotional arousal and negative evaluative tendencies that may be more closely tied to self-regulation and self-evaluation (Aranowska & Rytel, 2012; Buss & Perry, 1992). In line with this interpretation, self-forgiveness showed its clearest negative association with hostility and positive links with mental well-being and life satisfaction, in line with evidence that self-forgiveness is more strongly related to mental health and quality of life than other forgiveness dimensions (Fincham & May, 2020; Skalski-Bednarz et al., 2025). This also echoes findings suggesting that self-forgiveness is associated with lower discrepancies between the actual and ideal self (Skalski-Bednarz, Toussaint, Uram, et al., 2026), further pointing to its closer connection with self-evaluative processes. A different pattern was observed in longitudinal research on offense-specific emotional forgiveness, where reductions in negative emotions toward an offender predicted lower subsequent anger and hostility, but not physical or verbal aggression (Konaszewski, Skalski-Bednarz, Toussaint, et al., 2025). These differences may reflect variation in both the target and form of forgiveness: dispositional forgiveness of others may be more closely related to interpersonal expressions of aggression, whereas self-forgiveness may be more relevant to internally directed evaluative and affective processes. Forgiveness by God, in turn, remained largely confined to the sacred relational domain through its strong association with Franciscan-inspired spirituality.

The aggression dimensions formed a compact and relatively segregated subnetwork, with only a few direct links to the positive-resource domain. Thus, our broad expectation that positive psychological and spiritual resources would be negatively associated with aggression received only partial support. Hostility showed the clearest connections outside the aggression cluster, through negative associations with self-forgiveness and life satisfaction, whereas physical and verbal aggression were linked mainly with forgiveness of others and compassion. These latter resources are explicitly other-oriented, which fits their closer association with outwardly expressed forms of aggression. The generally weak cross-domain edges suggest, however, that positive resources should not be understood as simple inverse indicators of aggression or as uniformly protective across its components. Rather, their relevance appears to be specific to the form of aggression considered: interpersonal resources were more closely related to overt aggressive behavior, whereas self-forgiveness and life satisfaction were more closely tied to hostile cognition. This more differentiated pattern qualifies broader evidence that adaptive psychological resources tend to accompany lower aggression; for example, person-centered research has shown that resilient personality profiles are characterized by lower aggression, whereas less adaptive profiles show the opposite pattern (Konaszewski, Skalski-Bednarz, Urbanek, et al., 2025).

The two indicators of well-being were strongly connected but showed somewhat different external associations. Mental well-being was linked primarily with self-forgiveness and awe/gratitude, whereas life satisfaction was additionally associated with forgiveness of others and hostility. This partly corresponds with findings from France, where forgiveness of others, rather than self-forgiveness, was more strongly related to life satisfaction, while self-forgiveness was associated with general perceived health (Toussaint et al., 2023). The present findings therefore suggest some differentiation between affective well-being and broader cognitive evaluations of life.

4.1 Educational Implications

The findings have several implications for education, particularly for programs aimed at supporting social-emotional development and preventing aggression in young adults. The network suggests that potentially protective resources are not interchangeable: forgiveness of others and compassion were more closely related to outwardly expressed aggression, whereas self-forgiveness and life satisfaction were more closely associated with hostility. Educational programs may therefore benefit from matching resources to different aspects of aggressive functioning rather than treating aggression as a unitary outcome.

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Work on interpersonal conflict may emphasize perspective taking, compassion, forgiveness, and constructive responses to transgression, whereas hostility may require greater attention to self-evaluation, resentment, self-forgiveness, and the interpretation of difficult social experiences. This distinction is supported by the pattern of associations observed in the present network.

The findings also suggest a broader role for values- and meaning-oriented education. Franciscan-inspired spirituality, understood as an ethical orientation grounded in experiences of and the search for the Sacred in everyday life, was highly connected with humility, compassion, awe/gratitude, and forgiveness by God. Importantly, the facet-level structure indicated that these connections extended beyond explicitly religious content, suggesting that the construct encompasses broader interpersonal and experiential dimensions. Peaceful Attitude/Respectful Treatment was linked with compassion, forgiveness of others, and lower physical aggression, whereas Faith/Search for God was primarily embedded in the sacred relational domain. In religious education, these findings support approaches that connect spiritual formation with concrete interpersonal practices rather than focusing on beliefs alone. In more pluralistic or secular educational settings, similar aims may be pursued through reflection on respect, humility, compassion, gratitude, forgiveness, and attentive engagement with other people and nature. Awe/Gratitude may be especially relevant in this regard, as it showed connections across experiential, interpersonal, spiritual, and well-being domains. Such practices could be incorporated into mentoring, conflict-resolution activities, reflective writing, service learning, or guided encounters with nature. Because the present study was cross-sectional and the direct links between positive resources and aggression were generally modest, these applications should be viewed as educational directions to be tested rather than established intervention effects.

4.2 Limitations

The cross-sectional, self-report design precludes causal interpretation and may inflate associations through shared method variance and socially desirable responding. The sample was limited to Polish university students aged 19–24 years, several measures were translated or modified, some forgiveness dimensions were assessed with only two or three items, and composite scores may conceal meaningful within-construct differences, as illustrated by the Franciscan-inspired spirituality sensitivity analysis. The present network concerns relatively stable dispositions rather than aggression in specific situations. The Buss–Perry (1992) framework is useful for distinguishing physical aggression, verbal aggression, anger, and hostility, but self-report scores primarily capture general aggressive tendencies and may not adequately reflect when, toward whom, or under what circumstances aggression is expressed; its factor structure and the distinctiveness of some subscales have also varied across samples and adaptations. Thus, even when dispositional resources are strongly interconnected, situational factors such as provocation, relationship context, perceived injustice, or immediate regulatory demands may be more proximal determinants of aggressive behavior. Future longitudinal and event-based studies should therefore combine dispositional measures with assessments of concrete interpersonal situations and repeated observations of aggressive responding.

5. CONCLUSIONS

The present findings show that positive psychological and spiritual resources are related to aggression in a selective rather than uniform way. Franciscan-inspired spirituality occupied the most connected position in the network, while awe/gratitude and humility also showed broad links across positive-functioning domains. Forgiveness dimensions were clearly differentiated: forgiveness of others related more closely to outward aggression, self-forgiveness to hostility and well-being, and forgiveness by God to the sacred relational domain. These findings support educational approaches that address specific relational and self-regulatory resources rather than treating aggression or positive functioning as unitary constructs.

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Data Availability Statement. The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.
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.
Ethics Approval. All procedures involving human participants were conducted in accordance with the ethical standards of the relevant institutional research ethics committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The study received approval from the appropriate institutional ethics committee.
Consent to Participate. Informed consent was obtained from all individual participants included in the study.

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SUPPLEMENTARY MATERIAL

Supplementary data for this article can be found online.

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