Abstract: Although violent extremist attitudes promote extremist violence, little is known about the process through which these attitudes develop. Therefore, the present study attempted to advance knowledge of their development by exploring the relationships between three basic psychological needs (competence, relatedness, and autonomy), four dimensions of actively open-minded thinking (dogmatism, fact resistance, liberalism, and belief personification), and violent extremist attitudes. This study also aimed at examining whether the dimensions of actively open-minded thinking could account for the relationships between psychological needs and violent extremist attitudes. Five hundred nine adult volunteers (254 females and 255 males, $M_{age} = 33.20$, $SD_{age} = 12.31$) answered online questionnaires that assessed psychological needs, actively open-minded thinking, and violent extremist attitudes. I built and analyzed two structural equation models, and the results revealed that relatedness satisfaction negatively predicted violent extremist attitudes through experiencing lower levels of belief personification (i.e., dichotomized mode of thinking opposing “we/us” to “them”) (Model 1), while relatedness frustration positively predicted violent extremist attitudes through experiencing enhanced sense of belief personification (Model 2). Finally, this study...
highlighted the importance of satisfying people’s need for relatedness and helping them counteract the development of binary attitudes toward others, as preventive strategies against radicalization to violence.

**Subjects:** Sociology & Social Policy; Psychological Science; Social Psychology; Cognitive Psychology

**Keywords:** need for relatedness; critical thinking; belief personification; violence

1. Introduction

Violent extremist attitudes, which can be defined as “beliefs that justify or endorse violence to achieve social, political, religious, or ideological goals” (Nivette et al., 2021, p. 2–3), contribute to the appearance of extremist violence (Wolfowicz et al., 2020). Such attitudes develop through a process, named “radicalization” by Nivette and colleagues (Nivette et al., 2021, 2017), that leads people to consider extremist violence (e.g., committing attacks, kidnapping people) as an effective means to eradicate an important threat (e.g., Agnew & Brezina, 2019). In the present study, I attempted to identify psychosocial factors of violent extremist attitudes through the scope of general strain theory (e.g., Agnew & Brezina, 2019) and self-determination theory (e.g., Ryan & Deci, 2019).

1.1. Psychological needs and violent extremist attitudes

According to general strain theory (e.g., Agnew, 2015; Agnew & Brezina, 2019), violent extremist attitudes reflect a cognitive and affective pattern that can emerge in response to strain, which refers to the experience of important losses or failures in situations of low personal control and/or injustice. In that regard, violent extremist attitudes can take the form of a corrective pattern thought to recover an equitable situation. Evidence of this theory can be provided by studies showing that self-uncertain people identified themselves more strongly with extremist groups and supported more strongly the perpetration of extremist violence (Hogg & Adelman, 2013; Hogg et al., 2013, 2010; see also, Hogg, 2021 for a review). In the same vein, authors revealed that psychological distress, caused by continuous exposure to daily political violence, led to undermine peaceful attitudes (Hirsch-Hoeffer et al., 2016). In all, general strain theory and studies suggest that psychological distress, caused by the frustration of innate psychological needs (e.g., need for control, need for safety), could incite people to support the use of violence.

A largely evidenced framework that addresses the consequences of the satisfaction and dissatisfaction of psychological needs on human functioning is Deci and Ryan’s self-determination theory (e.g., Deci & Ryan, 2008; Ryan & Deci, 2019). According to the theory, when people’s needs for competence (i.e., need to reach outcomes and master one’s activities), relatedness (i.e., need to belong and to be accepted by others), and autonomy (i.e., need to control one’s behavior and to act in line with personal standards and values) are satisfied, people would be autonomously motivated and would display adaptive psychological responses, such as non-defensiveness, openness, flexibility, and well-integrated personal identities (Ryan & Deci, 2019; Weinstein et al., 2011). By contrast, the theory assumes that when people’s needs are frustrated, people would be either control-motivated (i.e., they experience the feeling of being controlled by internal or external pressures) or impersonally motivated (i.e., they experience disinterest, detachment, and passivity), and would display signs of defensiveness, alienation, mental rigidity, and conflictual personal identities (Ryan & Deci, 2019; Weinstein et al., 2011). Combining general strain theory and self-determination theory, I assume that violent extremist attitudes would result from the experience of psychological distress caused by the dissatisfaction of one’s basic psychological needs.

1.2. Mediating role of actively open-minded thinking

Based on self-determination theory, research found that autonomously motivated people exerted more cognitive efforts and displayed higher flexibility, thus leading to deeper processing and
conceptual elaborations (Jang et al., 2012; Jang, Kim et al., 2016; Jang, Reeve et al., 2016). Such cognitive benefits would be due to the capability of autonomous functioning to promote self-regulatory processes (e.g., Grolnick & Ryan, 1987; Legault & Inzlicht, 2013). Grolnick and Ryan (1987) observed that autonomously motivated people showed enhanced cognitive processing, conceptual understanding, and mental flexibility, as compared to control-motivated people. Additionally, Legault and Inzlicht (2013) reported that trait autonomy and state-induced autonomy were associated with a lower number of mistakes, which appeared to be accounted for by a higher responsiveness to mistakes, suggesting that the satisfaction of needs would enhance cognitive performance via experiencing higher responsiveness to negative performance feedbacks. In other words, the satisfaction of needs would promote cognitive flexibility and active open-mindedness. In the same vein, compensatory control theory (e.g., Kay et al., 2008) posits that people tend to adopt rigid mental functioning and simplistic reasoning when they experience control reduction in order to restore a sense of perceived control over themselves and their environment. Empirical studies supported this prediction by showing that people low in personal control reported higher preferences for ideological and conspiracy theories than did people high in personal control (e.g., Goode et al., 2017; Rutjens et al., 2010).

Dual-process theories of reasoning (Evans, 2008, 2011; Evans & Stanovich, 2013a, 2013b) presume that reasoning encompasses two sorts of processing, namely Type 1 (producing fast, intuitive, associative, and automatic thinking) and Type 2 (producing slow, deliberative, and reflective thinking). Actively open-minded thinking is thought to belong to Type 2 processing, and thus to promote cognitive performance by reducing biased judgments and mistakes in decision-making (Baron & Sullivan, 2018; Evans & Stanovich, 2013a, 2013b). Actively open-minded thinking is defined as “the tendency to evaluate arguments and evidence without undue bias from one’s own prior beliefs” (Mellers et al., 2015, p. 3). Thus, it refers to the disposition to think reflectively and involves the capability to override “myside” bias (i.e., tendency to generate arguments supporting one’s own opinions and beliefs). Therefore, people high in actively open-minded thinking would be motivated to put effort into their thinking (“active” mindset) by seeking alternatives that challenge their own views (“open-minded” mindset), whereas people low in actively open-minded thinking would tend to defend their own views and to exert less effort to examine evidence. Actively open-minded thinking is characterized by two knowledge-related dimensions, such as dogmatism (i.e., propensity to stick to one’s beliefs and to adopt no opposition willingly) and fact resistance (i.e., propensity to resist to evidence-based information), and two people-related dimensions, such as liberalism (i.e., propensity to adopt tolerant attitudes toward others) and belief personification (i.e., propensity to judge and categorize people based on their opinions; e.g., Svedholm-Hakkinen & Lindeman, 2018).

1.3. Research overview

This study aimed at exploring the relationships between three basic psychological needs (competence, relatedness, and autonomy), four dimensions of actively open-minded thinking (dogmatism, fact resistance, liberalism, and belief personification), and violent extremist attitudes. This study also aimed at examining whether the dimensions of actively open-minded thinking could account for the relationships between the psychological needs and violent extremist attitudes. Based on the above-mentioned rationale, I assume that the satisfaction (or frustration) of psychological needs can increase (or decrease) self-determined perceptions (e.g., personal control) and motivation toward deliberative and reflective thinking (e.g., actively open-minded thinking). Therefore, I suggest that the satisfaction (or frustration) of psychological needs might decrease (or increase) violent extremist attitudes through enhancing (or reducing) actively open-minded thinking.

To examine this general hypothesis, I built and analyzed two structural equation models, with Model 1 and Model 2 involving constructs related to need satisfaction and need frustration, respectively, as independent variables. I separated both sorts of variables to avoid any multicollinearity problem when putting all constructs within in a same model (see, Chen et al., 2015). Based on the general hypothesis, I formulated the following expectations:
Relationships between variables: Any need satisfaction (or need frustration) construct should be negatively (or positively) related to dogmatism, fact resistance, belief personification, and violent extremist attitudes, and positively (or negatively) related to liberalism. Furthermore, because violent extremist attitudes inherently refer to attitudes toward others, I expect such attitudes to be related to people-related dimensions of actively open-minded thinking – i.e., negatively related to liberalism and positively related to belief personification. I remained exploratory on the relationships between the knowledge-related dimensions of actively open-minded thinking (i.e., dogmatism and fact resistance) and violent extremist attitudes.

Mediating effects: Liberalism and belief personification should account for the negative (or positive) relationship between need satisfaction (or need frustration) and violent extremist attitudes. No expectations regarding the mediating effect of dogmatism and fact resistance were formulated.

2. Method

2.1. Participants

Five hundred nine individuals, recruited from the United States (254 females, 49.9%, and 255 males, 50.1%; \( M_{\text{age}} = 33.20, SD_{\text{age}} = 12.31 \), from 18 to 78 years old), voluntarily participated in the study. To take part in the study, they had to be equal to or above 18 years old. They were recruited from a crowdsourcing online platform (ClickWorker), and they reported to be African American (\( n = 67, 13.2\% \)), Asian American (\( n = 40, 7.9\% \)), Caucasian American (\( n = 329, 64.6\% \)), Hispanic/Latino American (\( n = 42, 8.3\% \)), or other (\( n = 31, 6.1\% \)).

2.2. Study design and procedure

I conducted this study in accordance with the Declaration of Helsinki. Before making the decision to take part in the study, participants read information about the study. Firstly, they read that the goal of the study was to explore the relationships between feelings and attitudes, and that their participation would consist in answering several questions. Secondly, they read that participants' data would remain anonymous and confidential, and that they would be securely stored. Thirdly, they read that every participant would receive a compensation of 0.30 USD after taking part in the study—importantly, they were asked not to take part in the study if they felt uncomfortable with this compensation. When they accepted to partake in the study, they had to provide their online informed consent. Lastly, when they agreed to respond to the questions, they were reminded that their responses would be completely anonymous and confidential, and thus they were encouraged to answer the questions honestly and spontaneously. The volunteers started answering the questionnaires in the following order: (a) demographics, (b) psychological needs, (c) actively open-minded thinking, and (d) violent extremist attitudes. After completing the survey, they were thanked for their contribution to the study.

2.3. Measures

2.3.1. Basic psychological needs

I used the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015) to assess participants’ psychological needs. The questionnaire was composed of six subscales (i.e., autonomy satisfaction, relatedness satisfaction, competence satisfaction, autonomy frustration, relatedness frustration, and competence frustration), which included four items each. One item example for autonomy satisfaction was “I feel a sense of choice and freedom in the things I undertake” (\( \alpha = .78 \)). One item example for relatedness satisfaction was “I feel that the people I care about also care about me” (\( \alpha = .88 \)). One item example for competence satisfaction was “I feel capable at what I do” (\( \alpha = .90 \)). One item example for autonomy frustration was “I feel forced to do many things I wouldn’t choose to do” (\( \alpha = .81 \)). One item example for relatedness frustration was “I feel excluded from the group I want to belong to” (\( \alpha = .86 \)). One item example for competence
frustration was “I feel insecure about my abilities” (α = .87). The items were assessed on a 5-point Likert-type scale ranging from “1” (“completely untrue”) to “5” (“completely true”).

2.3.2. Actively open-minded thinking
I used Svedholm-Hakkinen and Lindeman’s (2018) multidimensional scale (AOT17) to assess actively open-minded thinking, which represents a shortened version of the AOT41 (Stanavich & West, 1997). The AOT17 is composed of the 5-item dogmatism subscale (“I believe that loyalty to one’s ideals and principles is more important than ‘open-mindedness’”, α = .78), the 3-item fact resistance subscale (“One should disregard evidence that conflicts with your established beliefs”, α = .80), the 3-item liberalism subscale (“A person should always consider new possibilities”, α = .72), and the 3-item belief personification subscale (“I tend to classify people as either for me or against me”, α = .68). Initially, AOT17 was composed of 17 items, but the psychometric analyses conducted by the authors led to shorten the questionnaire to 14 items. Participants rated the items on a 6-point Likert-type scale ranging from “1” (“strongly disagree”) to “6” (“strongly agree”).

2.3.3. Violent extremist attitudes
Violent extremist attitudes were assessed via the 4-item Violent Extremist Attitudes Scale (Nivette et al., 2017; e.g., “It’s sometimes necessary to use violence, commit attacks, or kidnap people to fight for a better world”, α = .86). Participants answered the items on a 4-point Likert-type scale ranging from “1” (“fully untrue”) to “4” (“fully true”).

3. Results

3.1. Relationships between variables
To examine the relationships between all the variables under study, I performed Pearson’s r correlation analyses (IBM SPSS 26 software) (small effect: r = .10 to .29, moderate effect: r = .30 to .49, large effect: r = .50 to 1; see, Cohen, 1992). Descriptive statistics and bivariate correlation results are reported in Table 1. Firstly, the correlation analyses showed that: (a) all need satisfaction variables were positively related to liberalism (r = .16 to .21, p < .001) and negatively related to violent extremist attitudes (r = −.10 to −.13, p < .05); (b) relatedness satisfaction was negatively related to belief personification (r = −.17, p < .001); and (c) autonomy satisfaction was positively related to dogmatism and fact resistance (r = .16, p < .001; see, Table 1). Secondly, the analyses revealed that: (a) all need frustration variables were positively related to dogmatism (r = .12 to .23, p < .01), belief personification (r = .30 to .45, p < .001), and violent extremist attitudes (r = .20 to .31, p < .001); and (b) relatedness frustration was positively related to fact resistance (r = .11, p < .05). Thirdly, the analyses revealed that dogmatism and belief personification were positively related to violent extremist attitudes (r = .13 to .29, p < .001).

3.2. Structural equation models
I computed analyses of structural equation modeling using IBM SPSS AMOS 26 software (covariance-based structural equation model, CB-SEM) to evaluate path and mediation analyses (bootstrap samples = 5,000; bias-corrected confidence intervals = 95). Although CB-SEM is best suited for confirmatory study (theory confirmation; e.g., Barroso et al., 2010), I employed it to explore relationships between several variables (theory building). To assess the structural equation models, I used the following fit indices: The chi-square (χ²), root mean square error of approximation (RMSEA), goodness of fit index (GFI), comparative fit index (CFI), and normed fit index (NFI). While CFI and NFI represent relative fit indices, χ², RMSEA, and GFI are absolute fit indices that assess the degree of overall fit of a model. The GFI, CFI and NFI should be 0.95 or higher, while the RMSEA should be 0.06 or lower for acceptable model fit (e.g., Hu & Bentler, 1999; Tabachnick & Fidell, 2007). The path values presented in the results are standardized coefficients (see, Tables 2–5, and Figures 1 and 2).
Table 1. Descriptive statistics and Pearson’s *r* correlations for all variables

| Variable | 1. Autonomy satisfaction | 2. Competence satisfaction | 3. Relatedness satisfaction | 4. Autonomy frustration | 5. Competence frustration | 6. Relatedness frustration | 7. Dogmatism | 8. Fact resistance | 9. Liberalism | 10. Belief personification | 11. Violent extremist attitudes |
|----------|--------------------------|---------------------------|-----------------------------|--------------------------|---------------------------|-----------------------------|---------------|-------------------|------------------|-----------------------------|-----------------------------|
| M (SD)   | 3.81 (0.74)              | 4.03 (0.83)               | 4.13 (0.83)                 | 2.99 (0.92)              | 2.44 (1.05)              | 2.02 (0.97)                 | 2.93 (1.31)   | 2.74 (1.31)      | 4.75 (0.96)     | 3.02 (0.231)                | 1.89 (0.79)                 |
|          | -                        | -                         | -                           | -                        | 0.44***                   | -                           | 0.16***       | 0.08              | 0.16***          | -                           | -                           |
|          |                          |                           | 0.55***                     | -                        | 0.44***                   | 0.44***                     | -             | 0.05              | 0.12**           | 0.16***                    | -                           |
|          |                          |                           | 0.44***                     | -                        | -                        | -                           | -             | 0.07              | 0.02             | 0.04                        | -                           |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.02              | 0.07             | -                           | 0.04                        |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.01              | -0.06            | -0.01                      | -0.07                      |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.17***           | -0.17***         | -0.30***                    | -0.45***                   |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.19***           | 0.19***          | 0.06                        | -0.09                      |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.28***           | 0.28***          | 0.42***                    | 0.26***                   |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.31***           | 0.31***          | 0.54***                    | 0.36***                   |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.13***           | 0.13***          | 0.45***                    | 0.36***                   |
|          |                          |                           | -                           | -                        | -                        | -                           | -             | 0.29***           | 0.29***          | 0.54***                    | 0.36***                   |

Note. The significance thresholds for two tailed tests are: *** means *p < .001*, ** means *p < .01*, * means *p < .05.*
3.2.1. Model 1
The investigated model yielded the following fit indices: $\chi^2 (6, N = 509) = 353.02, p < .001$; RMSEA = .34 [.31, .37], $p < .001$; GFI = .86; CFI = .56; NFI = .56. Autonomy satisfaction positively predicted dogmatism ($\theta = .29, p < .001$) and fact resistance ($\theta = .28, p = .003$), but negatively predicted violent extremist attitudes ($\theta = -.11, p = .047$; see, Tables 2 and 3, and Figure 1). Competence satisfaction positively predicted liberalism ($\theta = .17, p = .006$), while relatedness satisfaction negatively predicted belief personification ($\theta = -.27, p < .001$; see, Tables 2 and 3, and Figure 1). Belief personification positively predicted violent extremist attitudes ($\theta = .17, p < .001$; see, Tables 2 and 3, and Figure 1). Additional analyses revealed a full mediating effect of belief personification in the relationship between relatedness satisfaction and violent extremist attitudes (direct effect, $p > .05$; indirect effect, $p < .001$; see, Table 3).

3.2.2. Model 2
This model had the following fit indices: $\chi^2 (6, N = 509) = 318.57, p < .001$; RMSEA = .32 [.29, .35], $p < .001$; GFI = .87; CFI = .64; NFI = .64. Autonomy frustration ($\theta = .12, p = .045$) and relatedness frustration ($\theta = .45, p < .001$) positively predicted belief personification (see, Tables 4 and 5, and Figure 2). In addition, relatedness frustration positively predicted dogmatism ($\theta = .27, p < .001$), fact resistance ($\theta = .15, p = .044$), and violent extremist attitudes ($\theta = .14, p = .002$; see, Tables 4 and 5, and Figure 2). Belief personification positively predicted violent extremist attitudes ($\theta = .11, p < .001$; see, Tables 4 and 5, and Figure 2). The analyses also revealed a partial mediating effect of belief personification in the relationship between relatedness frustration and violent extremist attitudes (direct effect, $p < .01$; indirect effect, $p < .001$; see, Table 5).

4. Discussion
The aim of the present study was to explore the relationships between three psychological needs, four dimensions of actively open-minded thinking, and violent extremist attitudes, and to examine whether the dimensions of actively open-minded thinking could account for the relationships between the basic psychological needs and violent extremist attitudes.

4.1. Relatedness frustration and hostile thinking
Regarding the first purpose of the study, and as predicted, the correlation analyses revealed that autonomy satisfaction, competence satisfaction, and relatedness satisfaction were positively related to liberalism, and negatively related to violent extremist attitudes (see, Table 1). The paths analysis revealed more conservative findings: Liberalism was positively predicted by competence satisfaction only (see, Table 2 and Figure 1). Moreover, the correlation and paths analyses consistently revealed a negative link of relatedness satisfaction with belief personification (see, Tables 1 and 2, and Figure 1). Taken together, these results display consistent interrelationships between relatedness satisfaction, belief personification, and violent extremist attitudes, thus supporting the view that people are likely to develop negative attitudes toward others and to react aggressively when they repeatedly fail to satisfy their need to belong (Twenge et al., 2007, 2001; Williams, 2009).

Furthermore, and surprisingly, the correlation and paths analyses revealed that autonomy satisfaction was positively related to the two variables of knowledge-oriented critical thinking (dogmatism and fact resistance; see, Tables 1 and 2, and Figure 1). This suggests that the experience of autonomy, characterized by the feeling of freedom (e.g., Ryan & Deci, 2019), may induce a sense of cognitive comfort that would lead to inhibit the costly mental activity of knowledge-related critical thinking, thus inciting to give priority to one’s own beliefs over the rigorous analysis of facts. This echoes Ford and Feinberg’s (2020) view that “feeling better about politics—whether by reducing negative emotion or by increasing positive emotion—would reduce people’s motivation to take action to challenge the status quo” (p. 126). Using a self-regulatory approach, Carver (2003) called “coasting” this sort of relaxing effect caused by the experience of positive
| Type of path | Path                                      | θ   | SE  | C.R. | p     |
|-------------|-------------------------------------------|-----|-----|------|-------|
| Independent variable → Mediator           | Autonomy satisfaction → Dogmatism         | 0.29| 0.08| 3.65 | 0.000 |
|            | Autonomy satisfaction → Fact resistance   | 0.28| 0.10| 2.98 | 0.003 |
|            | Autonomy satisfaction → Liberalism        | 0.06| 0.07| 0.93 | 0.353 |
|            | Autonomy satisfaction → Belief personification | 0.07| 0.09| 0.82 | 0.410 |
|            | Competence satisfaction → Dogmatism       | −0.05| 0.07| −0.67| 0.501 |
|            | Competence satisfaction → Fact resistance | −0.03| 0.09| −0.30| 0.764 |
|            | Competence satisfaction → Liberalism      | 0.17| 0.06| 2.73 | 0.006 |
|            | Competence satisfaction → Belief personification | −0.04| 0.08| −0.44| 0.662 |
|            | Relatedness satisfaction → Dogmatism      | −0.06| 0.07| −0.93| 0.351 |
|            | Relatedness satisfaction → Fact resistance | 0.01| 0.08| 0.18 | 0.857 |
|            | Relatedness satisfaction → Liberalism     | 0.09| 0.06| 1.51 | 0.130 |
|            | Relatedness satisfaction → Belief personification | −0.27| 0.08| −3.68| 0.000 |
| Independent variable → Dependent variable | Autonomy satisfaction → Violent extremist attitudes | −0.11| 0.06| −1.99| 0.047 |
|            | Competence satisfaction → Violent extremist attitudes | −0.04| 0.05| −0.69| 0.493 |
|            | Relatedness satisfaction → Violent extremist attitudes | 0.00| 0.05| 0.00 | 0.999 |

(Continued)
emotion, signing that everything is going smooth for the individual and resulting in saving physical energy while conserving a satisfactory position or standing.

By contrast, the correlation analysis showed that autonomy frustration, competence frustration, and relatedness frustration were positively associated with dogmatism, belief personification, and violent extremist attitudes (see, Table 1). However, the paths analysis revealed that belief personification was positively predicted by autonomy frustration, competence frustration, and relatedness frustration, whereas dogmatism and violent extremist attitudes were positively predicted by relatedness frustration only (see, Table 4 and Figure 2). In all, these findings reveal links between relatedness frustration, dogmatism, belief personification, and violent extremist attitudes, thus supporting research showing that the repeated dissatisfaction of the need for relatedness could entail hostile attitudes and behaviors toward others (e.g., Twenge et al., 2007, 2001).

Furthermore, the correlation analyses revealed that the strength of the relationships of the need frustration constructs with actively open-minded thinking and violent extremist attitudes was globally stronger than that of the relationships of the need satisfaction constructs with actively open-minded thinking and violent extremist attitudes (small to moderate effects vs. small effects; see, Table 1). This indicates the existence of asymmetrical socio-cognitive effects in the sense that the dissatisfaction of needs appeared to be more impactful in terms of content and intensity of negative cognitions than did the satisfaction of needs in terms of content and intensity of positive cognitions. More generally, this asymmetry is consistent with the general principle that negative events have more pervasive effects than equivalent positive events (e.g., Baumeister et al., 2001). In addition, while the constructs of need satisfaction were related to mixed cognitive contents (flexible and rigid thinking), the constructs of need frustration were associated with hostile and rigid reasoning only, suggesting that the presence of need frustration would be perceived by the self as more threatening than the absence of need satisfaction. Therefore, beyond supporting the view that the fulfillment of psychological needs induces adaptive consequences in terms of mental flexibility (e.g., Legault & Inzlicht, 2013), the findings support the differentiation between need satisfaction and need frustration (Chen et al., 2015).

| Type of path | Path | $\beta$ | SE  | C.R. | $p$   |
|--------------|------|--------|-----|------|------|
| Mediator → Dependent variable | Dogmatism → Violent extremist attitudes | 0.06  | 0.03 | 1.82 | 0.069 |
| Fact resistance → Violent extremist attitudes | 0.02  | 0.03 | 0.63 | 0.526 |
| Liberalism → Violent extremist attitudes | −0.02 | 0.04 | −0.52 | 0.600 |
| Belief personification → Violent extremist attitudes | 0.17  | 0.03 | 6.20 | 0.000 |
Table 3. Standardized direct and indirect effects of the mediation analyses for Model 1

|                  | Autonomy satisfaction | Competence satisfaction | Relatedness satisfaction | Dogmatism | Liberalism | Fact resistance | Belief personification |
|------------------|-----------------------|-------------------------|--------------------------|-----------|------------|-----------------|------------------------|
| Dogmatism        | Direct                | 0.29***                 | -0.05                    | -0.06     | -          | -               | -                      |
|                  | Indirect              | -                       | -                        | -         | -          | -               | -                      |
| Fact resistance  | Direct                | 0.28**                  | -0.03                    | 0.01      | -          | -               | -                      |
|                  | Indirect              | -                       | -                        | -         | -          | -               | -                      |
| Liberalism       | Direct                | 0.06                    | 0.17**                   | 0.09      | -          | -               | -                      |
|                  | Indirect              | -                       | -                        | -         | -          | -               | -                      |
| Belief personification | Direct    | 0.07                    | -0.04                    | -0.27***  | -          | -               | -                      |
|                  | Indirect              | -                       | -                        | -         | -          | -               | -                      |
| VEA              | Direct                | -0.11*                  | -0.04                    | 0.00      | 0.06       | -0.02           | 0.02                   |
|                  | Indirect              | 0.03                    | -0.01                    | -0.06***  | -          | -               | -                      |

Note. VEA = violent extremist attitudes. * p < 0.05, ** p < 0.01, and *** p < 0.001 for a two-tailed test.
| Type of path | Path | $\beta$ | SE  | C.R. | p    |
|--------------|------|---------|------|------|------|
| Independent variable → Mediator | Autonomy frustration → Dogmatism | 0.03 | 0.06 | 0.54 | 0.590 |
| | Autonomy frustration → Fact resistance | -0.00 | 0.07 | -0.05 | 0.961 |
| | Autonomy frustration → Liberalism | 0.04 | 0.05 | 0.72 | 0.472 |
| | Autonomy frustration → Belief personification | 0.14 | 0.06 | 2.23 | 0.026 |
| | Competence frustration → Dogmatism | -0.02 | 0.06 | -0.41 | 0.679 |
| | Competence frustration → Fact resistance | -0.00 | 0.07 | -0.04 | 0.967 |
| | Competence frustration → Liberalism | -0.04 | 0.05 | -0.74 | 0.461 |
| | Competence frustration → Belief personification | 0.12 | 0.06 | 2.00 | 0.045 |
| | Relatedness frustration → Dogmatism | 0.27 | 0.06 | 4.48 | 0.000 |
| | Relatedness frustration → Fact resistance | 0.15 | 0.07 | 2.01 | 0.044 |
| | Relatedness frustration → Liberalism | -0.07 | 0.05 | -1.22 | 0.222 |
| | Relatedness frustration → Belief personification | 0.45 | 0.06 | 7.36 | 0.000 |
| Independent variable → Dependent variable | Autonomy frustration → Violent extremist attitudes | 0.04 | 0.04 | 0.88 | 0.379 |
| | Competence frustration → Violent extremist attitudes | 0.05 | 0.04 | 1.18 | 0.238 |
| | Relatedness frustration → Violent extremist attitudes | 0.14 | 0.04 | 3.08 | 0.002 |

(Continued)
4.2. The critical mechanism of belief personification

Regarding the second purpose of the study, which consisted in examining the mediating effect of actively open-minded thinking, I built two structural equation models that focused on either need satisfaction (Model 1) or need frustration (Model 2). Interestingly, both models revealed a consistent finding: Belief personification accounted for the relationship between need for relatedness and violent extremist attitudes. Specifically, Model 1 revealed that relatedness satisfaction decreased violent extremist attitudes through experiencing less belief personification, while Model 2 revealed that relatedness frustration increased violent extremist attitudes through experiencing more belief personification. These findings suggest the view that the satisfaction (or frustration) of people’s need for relatedness would prevent (or encourage) the development of extremist attitudes through the adoption of more inclusive (or exclusive) conceptions of the social world.

Belief personification refers to a dichotomized way of thinking that consists in categorizing others into two opposite sides: “With me/us” or “against me/us”. This resembles the view proposed by Schwartz et al. (2009) positing that two sorts of personality outcomes would have relevance for the development of extremist identity: “Authoritarian foreclosure” and “aimless diffusion”. Authoritarian foreclosed people are thought to develop rigid personal identities based on the identification with exclusionary models, while aimless-diffused people are viewed to possess little purpose in life, to show little engagement in the development of their personal identities, and to be inclined to adhere to purposeful radicalized groups. According to Schwartz et al. (2009), both personality outcomes are likely to develop psychological rigidity, which is thought to produce a dichotomized mode of thinking. Following that perspective, the results suggest that anybody who is (unfairly) prevented from satisfying his or her need for relatedness is put at risk of developing personal identity deficits, thereby fostering dichotomized ways of thinking and binary attitudes toward others.

Interestingly, the profiles of authoritarian foreclosure and aimless diffusion resemble the controlled and impersonal motivation, respectively, as conceived by self-determination theory (e.g., Deci & Ryan, 2008; Weinstein et al., 2011). According to the theory, both motivations are associated with maladaptive responses, such as defensiveness, mental rigidity, passivity, and helplessness, which are thought to appear when the social environment dissatisfies people’s basic psychological needs. The construct of belief personification can also be thought from the scope of social identity theory (Tajfel & Turner, 2004), which argues that people tend to develop favorable or unfavorable judgments toward the “in-

| Type of path                                                                 | Path                                                                 | β   | SE  | C.R. | p      |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------|-----|-----|------|--------|
| Mediator → Dependent variable                                              | Dogmatism → Violent extremist attitudes                              | 0.01| 0.03| 0.42 | 0.672  |
|                                                                             | Fact resistance → Violent extremist attitudes                        | 0.01| 0.03| 0.48 | 0.632  |
|                                                                             | Liberalism → Violent extremist attitudes                            | −0.04| 0.03| −1.29| 0.198  |
|                                                                             | Belief personification → Violent extremist attitudes                 | 0.11| 0.03| 3.79 | 0.000  |
|                      | Autonomy frustration | Competence frustration | Relatedness frustration | Dogmatism | Liberalism | Fact resistance | Belief personification |
|----------------------|----------------------|------------------------|-------------------------|-----------|------------|------------------|-------------------------|
| Dogmatism            | Direct               | -0.03                  | -0.02                   | 0.27***   | -          | -                | -                       |
|                      | Indirect             | -                      | -                       | -         | -          | -                | -                       |
| Fact resistance      | Direct               | -0.00                  | -0.00                   | 0.15*     | -          | -                | -                       |
|                      | Indirect             | -                      | -                       | -         | -          | -                | -                       |
| Liberalism           | Direct               | 0.04                   | -0.04                   | -0.07     | -          | -                | -                       |
|                      | Indirect             | -                      | -                       | -         | -          | -                | -                       |
| Belief personification| Direct              | 0.14*                  | 0.12*                   | 0.45***   | -          | -                | -                       |
|                      | Indirect             | -                      | -                       | -         | -          | -                | -                       |
| VEA                  | Direct               | 0.04                   | 0.05                    | 0.14**    | 0.01       | -0.04            | 0.11***                 |
|                      | Indirect             | 0.02                   | 0.02                    | 0.07***   | -          | -                | -                       |

Note. VEA = violent extremist attitudes. * p < .05, ** p < .01, and *** p < .001 for a two-tailed test.
group” or “out-group” social category, respectively. Such social categorizations are reputed to entail hostile attitudes toward the out-group for the benefits of the in-group (e.g., Dorrrough et al., 2015; Giannakakis & Fritsche, 2011). In that regard, belief personification can be viewed as the mechanism through which people engage themselves with others who share similar views, and dehumanize or persecute those who hold divergent beliefs and conceptions of the world (Giannakakis & Fritsche, 2011; Schwartz et al., 2009). The strength of this phenomenon would be amplified by uncertainty feelings about oneself and one’s personal identities (Hogg, 2015a, 2015b). Therefore, belief personification might be conceived as a coping strategy that can precipitate the appearance of social and interpersonal conflicts (Agnew, 2013, 2015).

5. Conclusions and perspectives
To conclude, the present study allowed to advance knowledge of the development of violent extremist attitudes by identifying a process arranged from the need for relatedness to belief personification to violent extremist attitudes. However, this study contains limitations. Chief among them is its correlational nature, thus inciting to use longitudinal designs to examine the relationships between psychological needs, actively open-minded thinking, and violent extremist attitudes across a period of time. Other studies may also attempt to qualitatively examine how dichotomized views of others develop over time. Indeed, resituating the analysis of the relationships between the need for relatedness, belief personification, and violent extremist attitudes in a temporal dimension may help understand why the non-satisfaction or frustration of the need for relatedness can spark a negative dynamic of thinking characterized by hostile attitudes toward others. Temporal need-threat model (Williams, 2009) posits that the dissatisfaction of the need for relatedness (e.g., social rejection) does not systematically entail hostile responses toward others, but rather can generate aggressive responses when multiple attempts of relatedness restoration (via the application of social adjustment strategies) meet no success. Another limitation concerns the relatively poor model fit indices that characterized Model 1 and Model 2. However, instead of attempting to confirm an established theory, this study aimed at identifying a psychosocial process among a diversity of variables and relationships, thus leading to determine a preliminary model. This research process, characterized by the

![Figure 1. Structural equation model of the relationships among need satisfaction constructs, actively open-minded thinking dimensions (as mediators), and violent extremist attitudes (Model 1). All coefficients are standardized, and the solid lines indicate statistical significance. The significance thresholds for a two-tailed test are: * p < .05, ** p < .01, and *** p < .001.](image-url)
identification of relevant (and less relevant) paths and relationships, accounts for the appearance of poor model fit indices (Montoya & Edwards, 2021).

This study also identified a positive relationship of autonomy satisfaction with dogmatism and fact resistance, running counter the evidenced view that the experience of personal control promotes mental flexibility and open-mindedness (e.g., Legault & Inzlicht, 2013). This also contrasts with the finding showing a positive relationship between autonomy frustration and dogmatism. Thus, the need for autonomy appeared to be positively linked to dogmatism, regardless of its satisfied or dissatisfied status. I suggest, however, that the meaning of this relationship may differ according to whether the need is satisfied or not: Once satisfied, the experience of freedom may limit the desire to critically think due to the feeling of well-being that characterizes that experience (coasting effect), while once dissatisfied it may limit critical thinking by activating a reactive restoration attempt in response to the perception of discomfort (reactive effect). Research revealed the specificity of the need for autonomy: Either it leads to its disaffection in favor of other psychological needs after being continuously dissatisfied (need abandonment effect; Sheldon & Krieger, 2007), or it leads to a reactive and defensive response consisting in acting against the autonomy of the individual immediately after its dissatisfaction (reactive autonomy effect; Koestner et al., 1999; Wilbur et al., 2021). Deriving from psychological reactance theory (Brehm, 1966) positing that people desire to free themselves from the control of others, reactive autonomy refers to a “non-reflective resistance to external control (‘You can’t make me!’) [that occurs] in the absence of positive feelings of choice and self-determination.” (Wilbur et al., 2021, p. 3). Radel et al. (2011) provided a relevant illustration of this paradoxical reactive phenomenon: “For example, if students intend to drink more because they were told not to, they are not exerting true, or reflective, autonomy. In one sense, they are deceiving themselves about their desires because they have been pressured and so they are defiant but not free.” (p. 922) Reactive autonomy may explain why the frustration of the need for autonomy can foster rigid knowledge-related reasoning. However, further studies are needed to better understand the relationship between the need for autonomy (reflective vs. reactive autonomy) and critical thinking, and to shed the light on the potential complex role of the need for autonomy in the process of reasoning.

From an applied perspective, this study has relevance for combatting radicalization to extremist violence. It shows the importance of supporting, and especially of not frustrating, people’s need for relatedness in order to prevent the development of belief personification and violent extremist
attitudes. In so doing, policymakers should build social plans considering the importance of inclusive measures to generate the perceptions that everybody is valuable and belongs to the community. For youth, they may also create inclusive spaces valuing culture, sciences, and arts where they would be incited to share their opinions and debate with eloquence under the supervision of experts in social and human sciences (e.g., psychologists, sociologists) trained in the field of (de)radicalization.

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