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# The Role of Cognitive Fusion in Pathways to Violent Radicalization and Deradicalization

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***Abstract***

A better understanding of modifiable psychological processes that could reduce pathways to violent radicalization (VR) would greatly aid researchers, providers, policy makers, and individuals at risk for VR. Cognitive fusion, the tendency for behavior to be overly regulated and influenced by one's thoughts and feelings, and a common intervention target within Acceptance and Commitment Therapy (ACT), may be one such fulcrum. Participants, recruited via gateway snowball sampling, were 233 young adults drawn from five communities in North America as part of Wave 4 of the Somali Youth Longitudinal Study. Utilizing moderation and mediation path analysis in MPlus, the study examined the relations between cognitive fusion, VR, and three important variables associated with VR risk: post traumatic stress symptoms, experiences of daily discrimination, and perceptions of a just government. Findings supported that higher levels of cognitive fusion were directly related to greater openness to VR. Additionally, higher levels of cognitive fusion statistically mediated the link between both daily discrimination and openness to VR as well as between post traumatic stress symptoms and openness to VR. Findings also highlighted that cognitive fusion and perceptions of a just government interacted such that openness to VR was highest in individuals who had low perceptions of a just government and had high levels of cognitive fusion. Results of this study provide preliminary evidence of the potential role of high cognitive fusion in the pathways to VR and further evidence for its potential integration as a target domain within deradicalization efforts.

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## Introduction

Across the globe, there have been an increasing number of violent attacks stemming from diverse extremist ideologies (Adam-Troian et al., 2021; Duran, 2021; Jasko et al., 2022).

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Violent radicalization (VR) has been defined as viewing the use of violent force as an appropriate approach to promote ideologies and achieve goals often related to social, political, and/or religious beliefs (Schmid, 2013). Mental health professionals and psychosocial-focused programs are increasingly called upon to make recommendations and to provide services to individuals viewed as "at risk" for VR. While trauma-informed, culturally-responsive, and collaborative interventions are likely an essential element for diverting at-risk individuals from more dangerous trajectories (Oberg, et al., 2023), the majority of behavioral health providers and programs in the United States, and around the world, consistently report that they feel underprepared to respond to such needs (Schulten, 2022). For those who do feel more prepared, many still struggle to identify effective intervention techniques or program development frameworks that may provide a basis for psychosocial intervention (Jugl et al., 2020).

Past research has identified that psychological factors often play an important role in openness to VR, including lower future orientation and meaning in life (Miconi et al., 2022), symptoms of depression (Rousseau et al., 2019; Rousseau et al., 2020) and general psychological distress (Levinsson et al., 2022). One domain that may provide a necessary and innovative point of entry for psychosocial prevention/intervention development and refinement is cognitive fusion, a primary intervention target within Acceptance and Commitment Therapy (ACT)[2]. ACT is a well-established evidence-based cognitive behavioral therapy that has been tested across diverse populations around the world with a range of behavioral health problems including depression, anxiety, trauma, chronic pain, intimate partner violence, substance misuse, and many other psychological problems (e.g., Barnes-Holmes et al., 2001; Hann & McCracken, 2014). Interventions using ACT often place a heavy focus on decreasing an individual's experiences of "fusion" with one's internal experiences (e.g., thoughts, feelings, urges) and helping them foster its counter process - "defusion" (e.g., Hayes et al., 2012). Simply stated, cognitive fusion is the tendency for behavior to be *overly regulated and influenced* by one's thoughts and feelings. Individuals in

[2] There are numerous free and low-cost resources to learn more about the theory and practice of Acceptance and Commitment Therapy (ACT); one excellent resource that is an international hub for ACT content and training is the Association for Contextual Behavioral Science. https://contextualscience.org/act

a state of high cognitive fusion may act on thoughts as though the thoughts are literally true. As a result, in the context of high cognitive fusion, thoughts dominate awareness, are highly believable, and may have a strong and direct influence on behavior (e.g., Carnes & Winer, 2017; Gillanders et al., 2014; Hayes et al., 2012). In short, high fusion means cognitions dominate one's awareness and actions (Harris, 2021).

When fused to a painful thought like "I will never belong" or "I have failed my family" or "the government can't be trusted" the thought itself acquires the stimulus function of a potentially traumatizing event and can evoke the same reaction as if the situation was occurring in that moment (Hayes et al., 2012). Cognitive fusion is thereby the relationship individuals have with their own thoughts, on a continuum from fused (e.g., taken literally, entangled with, must be acted upon) to defused (e.g., "a thought is just a thought", "I notice a painful thought drifting by", "people have thousands of thoughts a day and this is just one of them") (e.g., Gillanders et al., 2014). Whereas "fusion" may occur in more adaptive functional contexts (e.g., becoming fully absorbed while reading a book or watching a film), the capacity to become overly fused to fleeting cognitive events is a process that may exacerbate suffering and could plausibly increase vulnerability to VR.

While the concept of cognitive fusion is newer to the field of violent radicalization prevention, psychological phenomena that are conceptually similar to cognitive fusion have been previously described as risk factors within the VR literature and play important clinical roles within deradicalization efforts. Although similar variables have been explored, none of these variables exist within an integrated and evidence-based model of both psychosocial functioning and associated mental health interventions, like ACT. ACT has been built on decades long programs of research in basic language and cognition (see Relational Frame Theory; Dymond et al., 2010); and clinical interventions using the 6-component 'Hexaflex model'; of which fusion is one of six intervention processes/targets that have been studied and implemented globally (Ghorbani et al., 2021; Luoma et al., 2012; Twohig et al., 2010). The above noted, two important and conceptually similar psychological phenomena that are known to the VR space and warrant further discussion here are the concepts of 'obsessive passion'/'pathological fixation' and 'cognitive inflexibility.'

## Pathological Fixation/Obsessive Passion

The pathway to VR often begins with a grievance or grudge – an individual perceives they have been wronged and fixates upon that perceived wrongdoing (Calhoun & Weston, 2003; Corner et al., 2018). The etiology to VR anchored around grievance is a cornerstone of the well-established conceptual model proposed by Calhoun & Weston (2003), which has since been widely adopted by threat assessment teams. In an empirical examination of this conceptual pathway, 100% of 59 active shooters held an identified grievance prior to their violent attack (Jones et al., 2024). As fixation on a grievance intensifies, often based on an individual's lived experiences across their social ecologies, it may reinforce an individual's sense of injustice (Rahman et al., 2020). Individuals and communities who have experienced chronic othering and marginalization as a result of their race, religion, or migration background may be understandably vulnerable to the development of grievance(s) (e.g., Somali immigrants to North America). When such grievances go unsupported, for example there are no prevention or intervention programs to validate their pain and redirect maladaptive actions in sustainable ways, they may develop 'pathological fixation'—or the preoccupation with a person or cause to the extent that an individual's social and/or occupational functioning is impaired. Indeed, pathological fixation has been found to precede most cases of targeted violence (see Meloy & Rahman, 2021). For example, threat assessment research has demonstrated that fixation is a key warning behavior that differentiates between school shooters and students of concern (Meloy et al., 2014). One form of such fixation, often referred to as "obsessive passion" occurs when there is a convergence of a valued "cause" with a person's identity (e.g., having the thought "I am what I believe," "I am the XYZ movement"). It is proposed that the over-identification with the cause can lead to conflict between the valued cause/activity and other aspects of the person's life, increasing vulnerability to negative mental health or behavioral outcomes (Vallerand et al., 2003, 2010). Past research has demonstrated that higher obsessive passion was directly associated with openness to VR in a sample of members of a Nationalist party in Canada (Rip et al., 2012). In addition, in a sample of Muslim men residing in Canada, obsessive passion was associated

with higher feelings of hatred, which was subsequently related to higher levels of support for religious extremism; however, this was only significant when individuals were primed with an anti-Islam quote spoken by Pope Benedict (Rip et al., 2012). In a different study, obsessive passion for both religion and other self-identified causes was found to enhance risk to VR when a sample of undergraduate students at a Spanish university reported higher social alienation (Lobato et al., 2023). In fact, a meta-analysis of risk and protective factors for VR found large effect sizes for the association between identity fusion and obsession passion and radical intensions (.52 and .50 respectively; Wolfowicz et al., 2021).

While pathological fixation/obsessive passion is similar to cognitive fusion in that a primary element of a given cognition is its 'thought-action-fusion or 'thought-identity-fusion', it differs from cognitive fusion in that it is a more specific, top-down application of the concept to topics that an individual derives meaning and passion from (e.g., a political cause, a sociocultural identity, a person they feel wronged by) as opposed to a broader application of how one relates to their internal experiences more globally (e.g., "my thoughts cause me distress or emotional pain"; "I tend to get very entangled in my thoughts"). This is a key distinction because many of the well evidenced intervention targets related to fusion focus on one's relationship(s) to their thoughts and internal experiences (Masuda et al., 2004; Masuda et al., 2009; Masuda et al., 2010), rather than on the specific content of cognitions as is the case in early models of cognitive therapy (See Beck, 2021). Thus, while obsessive passion and pathological fixation are indeed important and helpful domains they appear to hold less clinical utility, if the ultimate goal is to build scalable interventions using these concepts, because their primarily focus is on a *topic* as opposed to potentially malleable *process* with a large and existing intervention evidence-base, like ACT.

## Cognitive Inflexibility

Another related concept known well within the VR space is cognitive inflexibility. Cognitive inflexibility is broadly defined as the inability to switch between modes of thinking which leads to difficulty in adapting to changing rules or categories (Cools & Robbins, 2004). High levels of cognitive inflexibility may be viewed as an underlying trait, similar to neuroticism,

that engenders a vulnerability to stress-related mental health challenges (e.g., anxiety, posttraumatic stress disorder (PTSD), perfectionism). As related to VR, Zmigrod and colleagues demonstrated across two samples from the United Kingdom and the United States (N = 1,047) that cognitive inflexibility predicted endorsement of violence to protect one's national in-group, which in turn predicted a willingness to die for that group (Zmigrod et al., 2019). Results of that study were broadly replicated and extended by Schumann and colleagues in a sample of 1,378 individuals (see Schumann et al., 2022). These researchers demonstrated that lower cognitive flexibility predicted stronger willingness to fight and die for an in-group, and that, on the whole, high flexibility demonstrated a negative association with violent extremism. Across numerous studies, cognitive inflexibility has been described as an essential process for ideological extremism to take hold, insofar as it engenders the justification of intergroup violence (see McCauley & Moskalenko, 2008). Cognitive inflexibility is similar to cognitive fusion in its focus on rigid patterns of thinking; however, in many ways, cognitive inflexibility is more similar to a broader topic within ACT known as psychological flexibility (Bond et al., 2011; Doorley et al., 2020; Hayes, 2004; Kashdan, 2010) than the more specific process of cognitive fusion. This is important because techniques and strategies to reduce VR will likely require engaging more targeted sub-processes, like fusion, as opposed to only focusing on psychological flexibility at a broader, more macro level.

While it is clear that pathological fixation/obsessive passion and cognitive inflexibility are likely important and theoretically related variables with cognitive fusion, alone these cognitive variables do not lead to VR. It is likely, therefore, that rigid and overly regulated thinking styles may function as a catalyst through which risk factors can lead to violent radicalization. While there are numerous candidate variables that may increase risk for violent radicalization (see meta-analytic findings; Emmelkamp et al., 2020) the current project focused on candidate variables thought to be especially relevant within a community that has been historically and structurally marginalized across multiple aspects of identity and has experienced complex generational trauma e.g., Ellis et al., 2008). Specifically, it is hypothesized that (1) posttraumatic stress symptoms, (2) experiences of discrimination, and (3) perceptions of an unjust government may be especially potent in potential pathways to VR

when intermixed with high levels of entangled and rigid thinking. Below these three candidate variables are highlighted further.

## Important Risk Factors for VR: Traumatic Stress, Discrimination, Perceptions of an Unjust Government

*Trauma Exposure*

Trauma exposure, and in particular, symptoms of posttraumatic stress have been consistently highlighted as a key vulnerability factor linked to VR (e.g., Canetti et al., 2013; Ellis et al., 2021a; Miconi et al., 2022). The onset and development of posttraumatic stress symptoms often presents as changes in physiological responses to perceived threats (e.g., hyperarousal, hypervigilance) and changes in cognition/mood (e.g., more negative thoughts about self and the world). For some, these changes in mood, cognition, and a heightened perception of threat may increase vulnerability for radicalization or engagement in violence. For example, within the context of political violence, Canetti-Nisim and colleagues (2009; 2013) proposed a stress-based model of extremism, defined by the authors as beliefs and behaviors in support of policies and/or groups that are not represented within their government. This model highlights that exposure to high levels of political unrest and violence may increase an individual's psychological distress (defined as posttraumatic stress symptoms and depressive symptoms), which subsequently enhances their perception of threat. Importantly, a similar process has been described in understanding the role of posttraumatic stress and violence among youth within the justice system (Kerig et al., 2010). In another model, McCauley and Moskalenko suggest that harm to oneself or a loved one can contribute to a sense of grievance, and in this way potentially contribute to more openness to VR (Moskalenko & McCauley, 2012). Conceptually, as a strategy to *decrease* psychological distress individuals may *increase* their support of violence toward out-groups, particularly out-groups that they interpret as being a threat to their group and/or belief system. This would be directly in line with many etiological and treatment models of psychological trauma that focus on individuals' understandable desire to reduce stress and increase personal control and

agency. The challenge is supporting the attainment of personal control through legal, collaborative, and generative means.

*Daily Discrimination*

A second variable that is important to explore in consort with cognitive fusion are experiences of discrimination. As discussed above, 'grievances', broadly defined, are held up as a primary risk factor for VR. Importantly grievances are often conceptualized as occurring as the result of a real or perceived threat to an individual or their community. It is not surprising then, that *real* experiences of identity-based othering including marginalization, bias, and oppression may lead to a pain that manifests itself as greater openness to VR. Indeed, daily discrimination is in itself a form of trauma, and by definition is the result of behaviors that are unfounded, unjust, and unfair (e.g., Nadal, 2018). It is essential to note that experiences of discrimination do not alone lead to radical intentions associated with violence. On the contrary, experiences of daily oppressive encounters can lead to activism in the forms of adaptive community action, including civic engagement (Christophe et al., 2022) and legal forms of activism, (Ellis et al., 2014). Adaptive forms of resistance are crucial to promote social change. The problem often does not lie within the individual victim, but within the structures that they occupy and not having opportunities to channel experienced injustices towards proactive ends. Experiences of cognitive fusion may make these thoughts all-consuming and lead to increased distress. Support for extreme measures to manage this distress, such as supporting the use of violence to rectify grievances, may unfold as a coping strategy.

*Perceptions of an Unjust Government*

A third variable that has consistently been linked to openness to VR and helps connect how thinking patterns can become hooked on broader socio-political phenomena is perceived government injustices (e.g., Doosje et al., 2013; Ellis et al., 2021a, 2021b). Doosje and colleagues (2013) found that, in a sample of Dutch Muslim youth, both discrimination and symbolic threats (e.g., threats to cultural values) were associated with perceiving authorities as less legitimate, which in turn was associated with higher openness to VR. Similarly,

research with adolescents in Italy has demonstrated that societal disconnectedness and perceived illegitimacy of authorities fully mediated the relationship between psychological well-being and radicalism (negatively) and activism (positively) (Costabile et al., 2021).

To date, while there has been research exploring psychological factors as either mechanisms (e.g., facilitating the development of VR following experiences of contextual risk) and/or moderating factors (e.g., impacting the strength of the relationships between contextual risk and VR); more work is needed to clarify how these relations fit together and what modifiable variables programs and providers may directly target to reduce pathways to VR. Clinically, intervention strategies to help individuals in the context of traumatic stress, discrimination, and perceptions of an unjust government often require some element of cognitive defusion. As a result, building an evidence-base for the potential value for components of ACT in these etiological pathways may help strengthen confidence in using an ACT framework (with a focus on defusion) in VR programming and interventions. Furthermore, ACT is situated within a robust evidence-base (Ruiz, 2010), strong implementation effectiveness and scalability across diverse providers (Muñoz-Martínez et al., 2022), and generally high levels of acceptability among individuals with complex psychopathology (Ruiz, 2010).

## The Present Study

The present study explores how cognitive fusion may play a role in explaining how, and under what conditions, certain experiences and beliefs relate to openness to VR and, correspondingly, may offer a treatment focus for deradicalization. Specifically, we explore both moderation and mediation frameworks for the role of cognitive fusion in its association with VR. Examining both mediation and moderation is theoretically warranted given cognitive fusions' role as both a process and a cognitive context for previous risk factors to mobilize towards VR. In the first model, we examine how the relation between posttraumatic stress symptoms, perceptions of a just government, and perceived discrimination are related to openness to VR when higher levels of cognitive fusion are present (Model 1; Moderation). The second model examines whether cognitive fusion provides a candidate pathway for how

these risk factor variables connect to VR (Model 2; Mediation). As such, the following hypotheses guide our study:

Hypothesis 1 [Model 1; moderation]: Cognitive fusion will moderate the relation between risk factors for openness to VR and radicalism intentions. First, higher levels of cognitive fusion in the presence of higher levels of posttraumatic stress symptoms will be associated with higher radicalism intentions (H1a). Second, higher levels of cognitive fusion in the presence of lower levels of perceptions of a just government will be associated with higher radicalism intentions (H1b). Third, higher levels of cognitive fusion in the presence of higher levels of perceived discrimination will be associated with higher radicalism intentions (H1c). Thus, cognitive fusion is hypothesized to potentially amplify the role of all three risk factors in statistically predicting outcomes.

Hypothesis 2 [Model 2; mediation]: Cognitive fusion will help explain the statistical effects of risk factors for openness to VR on radicalism intentions. First, cognitive fusion will statistically mediate the relationship between posttraumatic stress symptoms and radicalism intentions (H2a). Second, cognitive fusion will statistically mediate the relationship between perceptions of a just government and radicalism intentions (H2b). Third, cognitive fusion will statistically mediate the relationship between perceived discrimination and radicalism intentions (H2c).

## Method

*Community-Based Participatory Research*

The current study builds upon a more than two decades-long community-based participatory research (CPBR) program focused on understanding and supporting the mental health of young Somali immigrants and refugees living in North America.. CBPR is an approach to social change and discovery that involves building genuine partnership(s) between community and academic stakeholders in which the needs, capacity, and knowledge of community members are central to the research (see Israel et al., 2001). CBPR is a model for scientific power sharing that aspires to pursue the questions and solutions that matter most to historically marginalized and underrepresented communities and uplift the wisdom that

already resides within these communities. In line with this framework, in each North American city where data collection took place (as described below), our team formed collaborative community partnerships with local Somali community members, leaders, and stakeholders. Our community partners include social services agencies, religious organizations, and refugee resettlement agencies. The decision to include a measure of cognitive fusion in this study was made through iterative dialogue with multiple Somali community stakeholders and Somali mental health providers/researchers. The study was approved by the Boston Children's Hospital Institutional Review Board.

At the time of data collection of this project 2012-2019, the field of Countering Violent Extremism (CVE) was highly, although wrongly, focused on Islamic extremism without consideration of other types of extremism that were on the rise (e.g., Duran, 2021). Increased surveillance of Muslim communities alienated and, understandably, decreased communities' trust in government (e.g., Mishra & Lokaneeta, 2021; Yazdiha, 2023). This included the Somali community, where due to several high profile cases within the Somali-American community, specific attention was placed on the potential vulnerability of individuals in this community to engage with VE. The current project emerged from a community-academic partnership that sought to elevate Somali voices and use data to ensure that Somali needs and interests were integrated into the questions asked and the solutions proposed in relation to VE.

*Participants*

Data from the current study was drawn from Wave 4 of the Somali Youth Longitudinal Study (SYLS), the first wave in which the Cognitive Fusion Questionnaire (CFQ) was included in this project. Participants in SYLS were first recruited and interviewed at Wave 1 (May 2013-Jan 2014; $n$ = 439) and/or Wave 2 (June 2014-Aug 2015; $n$ = 375). Wave 3 was collected Dec 2016-Feb 2018 ($n$ = 266). Data at Wave 4 were collected between April 2018 and Feb 2019. All participants in the current project participated in either Wave 1 or Wave 2; the vast majority also participated in Wave 3. To be eligible to participate at initial recruitment (Waves 1 and 2), participants must have lived in the United States or Canada for at least one year, were either born in Somalia or were of Somali descent, and were between

the age of 18 and 30. The dataset used in the current project, Wave 4, includes a total of 233 Somali immigrant young adults. At the time of this study, participants were 25.35 years old on average (*SD* = 2.95, min = 20, max = 38), approximately half were female (female *n* = 105, 45.10%, male *n* = 126, 54.1%), and had spent 17.94 years in North America (*SD* = 6.07, min = 6, max = 28). Further descriptive information about the sample appears in Table 1.

*Procedure*

A strategy known as gateway snowball sampling, initiated by Somali study staff, was utilized for recruitment in order to navigate well known barriers to research participation for this population (e.g., institutional mistrust and stigma of mental health programming; see Spring et al., 2003). This recruitment strategy included Somali staff members attending a variety of local Somali-specific events, and within these gatherings, describing the study to groups of people. These people plus established Somali community leaders associated with the program acted as recruitment ‘‘gateways.’’ Initial participants then referred family, friends, and acquaintances to the study, serving as additional gateways. Although gateway snowball sampling is unable to guarantee a representative sample, we were able to recruit Somali individuals who reflect a range of diverse experiences including religious practice, socioeconomic status, place of birth, etc. All recruitment and informed consent were led by highly skilled Somali-American or Somali-Canadian social workers and researchers trained in the responsible conduct of research. Participants completed interviews in person with non-Somali research assistants or postdoctoral fellows via survey software on dedicated research iPads. A Somali staff member was always available on site for interpretation and cultural brokering as needed.

*Measures*

Cognitive Fusion. The Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) is a 7-item measure of cognitive fusion (i.e., the tendency for someone to believe, to be entangled with, and/or to be overly regulated by their thoughts) rated on a 7-point Likert scale from 1 = “never true” to 7 = “always true”. The CFQ has been validated with diverse populations around the world (Costa et al., 2017; Dionne et al., 2016; Romero-Moreno et al.,

2014) including with this sample of Somali young adults (Winer et al., 2020). Since its initial publication in 2014, the psychometric properties of the CFQ have been examined in a range of populations and cultural contexts. All studies replicated the one-factor structure, and demonstrated adequate convergent, discriminant, or concurrent validity with a range of theoretically adjacent constructs (e.g., psychological inflexibility, rumination, mindfulness) and clinical symptoms (e.g., depression, anxiety). Internal consistency in the current sample was high (α = .94).

Posttraumatic Stress. The Harvard Trauma Questionnaire (HTQ; Mollica et al., 1992) is a 16-item measure, scored on a 4-point Likert scale from 1 = "not at all to" 4 = "extremely", that assesses symptoms of posttraumatic stress. The HTQ has been validated across multiple countries and cultures (Kleijn et al.,, 2001) and displayed high internal consistency in this sample (α = .95).

Perceptions of a Just Government. Perceived government justice was measured by a 4-item scale adapted from items developed through research on adolescent civic engagement (Flanagan, 2007). The scale is a continuous measure of perceptions of a just and fair government; specific items include, "The U.S. government really cares what people like my family think," "Basically, people get fair treatment in the U.S., no matter who they are," "In the U.S. you have an equal chance no matter where you come from," "The U.S. government is pretty much run for the rich, not the average person" (reverse scored). Participants respond on a 5-point Likert scale from 1 = "strongly disagree" to 5 = strongly agree. Higher scores indicate perceptions that the government is more just. For interviews administered in Canada, items referenced "Canada" and "the Canadian government" instead of "America" and "the U.S. government." The scale's internal consistency in this sample was adequate (α = .80).

Experiences of Discrimination. The Everyday Discrimination Scale is a 9-item measure assessing ongoing, routine, and subtle cases of perceived injustice/discrimination (Williams et al., 1997). Responses are rated on a 6-pt Likert scale from 1="never" to 6="almost every day". The EDD has demonstrated high reliability with Somali refugees and immigrants (Cardeli et al., 2019; Ellis et al., 2008); similarly, the measure had high internal consistency in this sample (α = .91).

Openness to Violent Extremism. Openness to Violent Extremism was measured by the 5-item Radicalism Intentions Subscale of the Activism and Radicalism Intention Scales (Moskalenko & McCauley, 2009). The Radicalism Intentions Subscale (RIS) was developed to identify willingness to engage in radical actions (Moskalenko & McCauley, 2009). The scale asks participants whether they would endorse a range of behaviors from supporting groups who use illegal means to further their goals (i.e., "I would continue to support an organization that fights for my group's political and legal rights even if the organization sometimes breaks the law") to using violence themselves for a political motive (i.e., "I would attack police or security forces if I saw them beating members of my group"). Participants responded on a 7-point Likert scale from 1 = "disagree completely" to 7 = "agree completely". Importantly, the RIS does not assess behavior, but rather intentions and attitudes in relation to the use of violence for political change. While attitudes in support of violence may accompany violent behavior, they do not inherently predict behavior. Cronbach's alpha in the current sample was measured at .86.

*Data Analytic Plan*

We compared moderation and mediation models to examine relationships between posttraumatic stress symptoms, experiences of discrimination, perceptions of a just government, cognitive fusion, and radicalism intentions. All analyses were conducted in Mplus 8.0 (Muthén & Muthén, 1998-2017). Results adjusted for missing data using full-estimation maximum likelihood, which is the default option for handling missing data in MPlus and has been widely accepted as an effective approach producing stable results when compared to other possible strategies like multiple imputation (Allison, 2012). Table 2 lists all descriptives for all variables included in models, including information about missing data which ranged from 1.72% to 4.72% on all variables considered.

*Moderation*

We built a multiple moderator regression model in Mplus 8.0 using a path analytic framework. This model was used to test H1a, H1b, and H1c simultaneously. In this model, posttraumatic stress symptoms (H1a), perceptions of a just government (H1b), everyday

discrimination (H1c), and cognitive fusion predicted radicalism intentions. Using this model, we tested whether cognitive fusion moderated relationships between other predictors and radicalism intentions. All predictors included in interaction terms were mean-centered; these therefore consisted of the products of centered predictor variables. Finally, we also included age, gender (female vs. other), location (US vs. Canada), and time in US/Canada as predictors to control for important demographic factors. Thus, the model tested eight direct effects and three interaction effects.

*Mediation*

We built a mediation model to examine relationships between variables to tesH2a, H2b, and H2c. The first model tested whether cognitive fusion (single mediator) explained the effects of posttraumatic stress symptoms (H2a), perceptions of a just government (H2b), and everyday discrimination (H2c), on radicalism intentions. We examined multiple fit indices to determine whether these models were a good fit for the data given the effect of sample size on chi-square tests of model fit, looking at Root Mean Square Error of Approximation (RMSEA = or < .08 indicates adequate fit), Comparative Fit Index (CFI = or > .90 indicates adequate fit) and Standardized Root Mean Squared Residual (SRMR = < .08 indicates adequate fit) (Hu & Bentler, 1999; Kline, 2005). We further assessed indirect effects (i.e., mediation effects) using bootstrapping with 95% bias-corrected 5,000-bootstrapped sample confidence intervals.

## Results

*Moderation Models*

The moderation model testing H1a, H1b, and H1c yielded two statistically significant direct effects and one statistically significant interaction effect. For direct effects, cognitive fusion (β = 0.24, $p$ = .01) and perceptions of a just government (β = -0.14, $p$ = .046) were statistically significantly associated with radicalism intentions. For interactions, cognitive fusion only moderated the relationship between perceptions of a just government (H1b) and radicalism intentions (β = -0.14, $p$ = .04). Simple slopes analyses showed that perceptions of a

just government negatively related to radicalism intentions in the context of high cognitive fusion (β = -0.48, *p* = .001), but not in the context of low cognitive fusion (β = 0.01, *p* = .91). None of the other direct or interaction effects were statistically significant (all *p*s > .05). Specifically,cognitive fusion did not moderate the relationships between posttraumatic stress symptoms (H1a), everyday discrimination (H1c) and radicalism intentions (both *p*s > .05). Thus, H1b was supported by results but H1a and H1c were not. Table 3 provides bivariate correlations of main variables. Table 4 lists all unstandardized and standardized coefficients as well as p-values for this model. Figure 1 depicts the statistically significant moderation effect.

*Mediation*

The mediation model testing H2a, H2b, and H2c provided an acceptable fit for the data, $\chi^2(3) = 8.34$, *p* = .04, RMSEA = .09 [90% CI: .02, .16], CFI = .98, SRMR = .02. Examination of standardized direct effects showed that posttraumatic stress symptoms (β = 0.56, *p* < .001) and everyday discrimination (β = 0.21, *p* < .001) demonstrated statistically significant relationships with cognitive fusion. In turn, cognitive fusion demonstrated a statistically significant relationship with radicalism intentions (β = 0.35, *p* < .001). Cognitive fusion mediated the indirect relationship between posttraumatic stress symptoms (H2a) and radicalism intentions (β = 0.20, *p* < .001, 95% CI = .11, .29). Cognitive fusion also mediated the indirect relationship between everyday discrimination (H2c) and radicalism intentions (β = 0.07, *p* = .002, 95% CI = .03, .13). In contrast, cognitive fusion did not statistically mediate the relationship between perceptions of a just government and radicalism intentions. Thus, H2a and H2c were supported by results, but not H2b. Figures 2 and Figure 3 (Johnson-Neyman plot) present results of this model. Table 5 lists all unstandardized and standardized coefficients as well as p-values for the direct and indirect effects included in this model.

## Discussion

The present study explored the role of cognitive fusion as a potential factor in radicalization and, by extrapolation, deradicalization. Findings highlight cognitive fusion as a risk factor for openness to VR, such that, consistent with hypotheses, higher cognitive fusion was related to greater openness to VR. This aligns with past research that has found that cognitive processes similar to cognitive fusion (i.e., cognitive inflexibility and obsessive passion/pathological fixation; Schumann, et al., 2022) are statistically associated with greater openness to VR. In addition, results indicate that cognitive fusion may contribute to our understanding of *how* and/or *under what conditions* risk factors influence an individual's openness to VR. Specifically, higher cognitive fusion mediated the link between both daily discrimination and openness to VR as well as posttraumatic stress and openness to VR. Findings also highlighted that cognitive fusion and perceptions of a just government interacted such that openness to VR was highest in individuals who had low perceptions of a just government *and* had high levels of cognitive fusion.

Our finding that higher cognitive fusion mediated the link between higher discrimination and posttraumatic stress symptoms and openness to VR may suggest that those who reported higher levels of discrimination and posttraumatic stress symptoms may be more fused to their thoughts, and subsequently, more open to VR. Findings point to cognitive fusion as a potential explanatory factor in understanding how certain types of risk factors may increase risk for VR. Specifically, consistent with past research on grievances, for some, discrimination and/or posttraumatic stress symptoms from trauma exposure may provide an opening for VR by promoting feelings of alienation and frustration, subsequently justifying using violence as a means to promote an ideology and/or rectify perceived injustices. As such, these experiences may lead to high levels of distress tied to their discrimination and/or trauma experiences and greater fusion to their thoughts related to those experiences (e.g., "violence is the only way to fight for my community"; "you broke me, now I'll break you"), which may increase vulnerability to VR. This vulnerability may present as being more amenable to terrorist recruitment or more strongly attached to hate-fueled ideologies.

We also identified that cognitive fusion interacts with perceptions of a just government to increase risk of VR, such that openness to VR was highest for those who reported higher cognitive fusion and lower perceptions of a just government. This finding emphasizes the idea that experiences and/or belief systems alone are insufficient in understanding the process of radicalization. Rather, it is important to understand how the underlying cognitions/belief systems a person holds interact with vulnerability factors, and how that combination can foster experiences of cognitive fusion. Most importantly, identifying cognitive fusion as one process that bolsters our understanding of *how* and *under what conditions* risk factors increase openness to VR is a particularly meaningful finding given cognitive fusion is a malleable cognitive process that can be directly targeted with existing evidence-based clinical interventions and strategies (e.g., cognitive defusion techniques). However, more research is still needed to validate and provide tighter links between the connections between risk factors, cognitive fusion, and openness to VR.

Practically, these findings provide support for integrating well-established interventions that aim to help an individual defuse from thoughts and internal experiences as a means of reducing VR risk. At present, there is limited guidance on easy-to-integrate clinical assessment and intervention strategies to effectively reduce violence risk for those at-risk for radicalization to violence, largely due to lack of empirically identified malleable risk factors that can be addressed through primary, secondary, and tertiary prevention programming (as reviewed in Feddes et al., 2019). Few mental health professionals feel confident or competent in working with individuals at risk for VR due to the lack of training in violence risk assessment and a dearth of training in VR (Schulten, 2022). It is therefore imperative to equip mental health providers with tools and guidance to enhance their confidence and competence to work with individuals at risk for VR. It is clear that mental health problems alone do not lead to engagement in violence (Elbogen & Johnson, 2009), however, targeting underlying psychological factors may promote use of adaptive coping and divert VR or facilitate deradicalization.

In order to improve assessment and intervention anchored around cognitive fusion, providers/programs may consider utilizing the 7-item self-report Cognitive Fusion Questionnaire (Gillanders et al., 2014), which is currently freely available in numerous

languages and directly measures experiences of fusion. The CFQ can be utilized as a treatment-progress tool, and may be a powerful and easy-to-integrate addition to clinical practice (Gillanders et al., 2014; Gillanders, 2022). With regard to interventions, practitioner treatment consensus guidelines developed by the Canadian Practitioners Network for the Prevention of Extremist Violence (CPN-Prev) recommends refraining from directly challenging extremist views of clients (see Brouillette-Alarie et al, 2019). . Findings from this study might suggest that an alternate and likely more acceptable approach to addressing maladaptive cognitions in this context may be to focus on *cognitive defusion strategies* (e.g., attempting to shift one's relationship to their thoughts) as opposed to *cognitive restructuring strategies* (e.g., attempting to directly change the content of one's thoughts).

There are numerous defusion strategies that can be implemented within clinical practice. One such technique is the use of 'thought labeling' as opposed to 'direct restructuring.' For example, helping a client first add or state "I am noticing, I'm having the thought that_____" when discussing ideas or concepts that carry intense affective weight, including thoughts related to radical ideologies. This small labeling shift may help a client begin to adjust the context of a thought as opposed to directly challenging the content of the thought (e.g., Hayes et al., 2012; Harris, 2021). This in turn can help promote the potential for further observation and flexibility. Another defusion technique is the use of mindfulness-based visualization exercises. For example, helping a client slow down and imagine a gently flowing stream; and then placing their thoughts (e.g., pleasant, painful, radical) on the leaves as they float by – noticing what they look like and how they move or drift as they float away (e.g., Hayes et al., 2012; Harris, 2021). While subtle or even a little silly, this allows for noticing that thoughts are just "thoughts" that come and go, like leaves on a stream, as opposed to "facts" etched in stone. A third defusion technique, known as 'deliteralizing', includes identifying a single word or phrase that carries a heavy affective charge and repeating it aloud with a clinician for 30-60 seconds (see Masuda et al., 2004). During and after the repeating, the client is encouraged to notice how that word or phrase feels in the mouth and on the ears. This 'hearing it back' strategy can allow a client to shift to an observing role with their thoughts – noticing a word or phrase in a new and unexpected way. While these, and many other defusion strategies have yet to be evaluated in the context of

deradicalization efforts, they build upon a solid foundation of intervention research with other maladaptive cognitive processes utilized in numerous clinical settings (e.g., Hayes et al., 2012; Masuda et al., 2004).

## Strengths, Limitations, & Future Directions

The present study's sample includes immigrants from Somalia, many of whom experienced forced migration - fleeing situations of significant adversity and trauma as a result of the Somali civil war. Following their migration to North America, many of these individuals experienced additional adversity and trauma, including discrimination (e.g., Ellis et al., 2010; Liebkind & Jasinskaja-Lahti, 2000), especially as Black, predominately Muslim, young men and women. Specifically, in the context of the United States, Anti-Muslim sentiments increased substantially following the 9/11 terrorist attacks leading to an increase of Islamophobic discrimination that has maintained over two decades (Samari, 2016). Although discrimination is a relevant grievance to consider broadly in the context of understanding VR, it may be particularly relevant for this population, who have experienced significant levels of discrimination since resettlement in North America. This noted, we do not believe these findings are unique to this population. This resilient and vulnerable community has created a context for providers and programs to think thoughtfully and deeply about what levers and contexts can be adjusted to encourage adaptive outcomes.

While this study has multiple strengths, such as the inclusion of novel variables, like the CFQ, in the context of VR research within a unique and hard-to-reach sample, a number of important limitations should be noted. First, this is a single wave study (Wave 4 of the Somali Youth Longitudinal Study). Replication studies and longitudinal analyses looking at cognitive fusion's impact overtime are indicated to strengthen confidence in the pathways demonstrated in this study. Secondly, while the study examined an important and unique sample, Somali immigrants living in North America, future studies that examine these processes in other potentially VR-vulnerable groups (e.g. White Supremacy groups/organizations) will broaden the potential impact of this work. Third, while the Radicalism Intentions Subscale of the Activism and Radicalism Intention Scales (Moskalenko

& McCauley, 2009), is a leading measure used to assess openness/attitudes towards violent radicalization, several more recent critiques suggest that its use as an indicator of support for violent extremism has its limitations. In particular, the scale may be biased towards over-measuring radical intentions in left-leaning populations due to the use of items endorsing violence against police. For example, in an article by Filho and Modesto (2019), left-leaning individuals scored statistically significantly higher on the RIS, likely due to having legitimate grievances and concerns related to, among other things, violence in policing. Furthermore, the scale has also been critiqued for specifically focusing on violence to support a group, as opposed to other rationales that may motivate violence (Decker & Pyrooz, 2019). Further research into the role of cognitive fusion in openness to VR should consider exploring other ways of operationalizing the dependent variable; or using multiple dependent variables of VR.

Finally, future work should also examine the efficacy and effectiveness of interventions addressing cognitive fusion as an approach to reducing violence risk and radicalization. For example, future deradicalization research is needed to better understand how cognitive defusion might operate at different phases within the deradicalization process. Research may help to elucidate whether some defusion strategies may help facilitate someone's openness or willingness to examine their extremist beliefs and/or whether defusion is more appropriate and effective with individuals who have already begun to question their beliefs. At present our program is currently piloting multiple VR prevention and intervention programs in close partnership with community stakeholders and community programs. One school-based primary and secondary prevention program for adolescents, Strong and Belong , places a major focus on defusion strategies within a broader context of belongingness and social connection. The desire to belong is at the center of the human experience and onethat can be directly thwarted during experiences of trauma, discrimination, and unjust government rule. Given the continued evidence for the potential role of cognitive fusion within paths to VR, further exploration of this phenomena as a potential target of clinical intervention will be an important next step within field of violence deradicalization.

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## Annex

**Table 1**
***Demographic Characteristics of the Sample***

| | *N*(%) |
|---|---|
| **Location** | |
| Boston, MA | 73(31.30%) |
| Minneapolis, MN | 44(18.90%) |
| Portland, ME | 7(3.00%) |
| Lewiston, ME | 31(13.30%) |
| Toronto, Canada | 65(27.90%) |
| Other locations | 13(5.60%) |
| Missing | 0(0.00%) |
| **Gender** | |
| Female | 105(45.10%) |
| Male | 126(54.10%) |
| Missing | 0(0.00%) |
| **Marital Status** | |
| Single | 174(74.70%) |
| Married | 56(24.00%) |
| Engaged to be married | 2(0.90%) |
| Separated | 1(0.40%) |
| Missing | 0(0.00%) |
| **Location of Birth** | |
| Somalia | 87(37.30%) |
| US or Canada | 75(32.19%) |
| Other countries | 70(30.04%) |
| Missing | 1(0.40%) |
| **Employment status** | |
| Employed | 183(78.50%) |
| Not employed | 50(21.50%) |
| Missing | 0(0.00%) |
| **School status** | |

| | | |
|---|---|---|
| Currently attending school | 92(39.50%) | |
| Not attending school | 141(60.50%) | |
| Missing | 0(0.00%) | |
| | ***M(SD)*** | ***Missing n(%)*** |
| Age | 25.35(2.95) | 0(0.00%) |
| Years in US/Canada | 17.95(6.07) | 11(4.70%) |

**Table 2**

***Descriptive Statistics for All Variables Included in Models, Including Mean, Standard Deviation, Minimum, Maximum, Sample Size, and Missing Data.***

| | ***M*** | ***SD*** | ***Min*** | ***Max*** | ***N*** | ***Missing n(%)*** |
|---|---|---|---|---|---|---|
| **HTQ** | 1.37 | 0.51 | 1.00 | 3.75 | 229 | 1.72 |
| **PJG** | 2.66 | 0.88 | 1.00 | 4.75 | 222 | 4.72 |
| **EDD** | 2.60 | 1.10 | 1.00 | 5.44 | 230 | 1.29 |
| **CFQ** | 2.47 | 1.47 | 1.00 | 7.00 | 225 | 3.43 |
| **RIS** | 2.47 | 1.54 | 1.00 | 7.00 | 227 | 2.58 |

*Note: EDD = Everyday Discrimination scale; PJG = Perceptions of a Just Government; CFQ = Cognitive Fusion Questionnaire; HTQ = Harvard Trauma Questionnaire (posttraumatic stress symptoms); RIS = Radicalism Intentions Scale*

**Table 3**
***Bivariate Correlations between Main Variables***

| | EDD | | | PJG | | | CFQ | | | HTQ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***r*** | ***p*** | ***n*** | ***r*** | ***p*** | ***n*** | ***r*** | ***p*** | ***n*** | ***r*** | ***p*** | ***n*** |
| **PJG** | -.344 | <.001 | 221 | -- | | | | | | | | |
| **CFQ** | .581 | <.001 | 224 | -.230 | .001 | 222 | -- | | | | | |
| **HTQ** | .599 | <.001 | 228 | -.229 | .001 | 222 | .712 | <.001 | 225 | -- | | |
| **RIS** | .229 | .001 | 226 | -.242 | <.001 | 221 | .324 | <.001 | 223 | .321 | <.001 | 227 |

*Note: EDD = Everyday Discrimination scale; PJG = Perceptions of a Just Government; CFQ = Cognitive Fusion Questionnaire; HTQ = Harvard Trauma Questionnaire (posttraumatic stress symptoms); RIS = Radicalism Intentions Scale*

**Table 4**

***Results of Moderation Model Including All Unstandardized B Coefficients, Standard Errors, Standardized β Coefficients, and P-Values, as Well $R^2$ value for the Dependent Variable.***

| | ***B*** | ***SE*** | **β** | ***p*** |
|---|---|---|---|---|
| **Paths** | | | | |
| EDD | -0.02 | 0.12 | -0.02 | .86 |
| PJG | -0.24 | 0.12 | -0.14 | .046 |
| HTQ | 0.52 | 0.40 | 0.17 | .20 |
| CFQ | 0.25 | 0.10 | 0.24 | .01 |
| EDD x CFQ | -0.11 | 0.09 | -0.13 | .19 |
| PJG x CFQ | -0.17 | 0.08 | -0.14 | .04 |
| HTQ x CFQ | 0.04 | 0.14 | 0.03 | .81 |
| Age | -0.03 | 0.04 | -0.06 | .36 |

| | | | | |
|---|---|---|---|---|
| Gender (0 = Other, 1 = Female) | -0.02 | 0.02 | -0.09 | .17 |
| Location (0 = US, 1 = Canada) | -0.35 | 0.22 | -0.11 | .12 |
| Years in US/Canada | 0.00 | 0.01 | -0.03 | .69 |
| **$R^2$** | | | | |
| RIS | 0.18 | 0.05 | | <.001 |

*Note: EDD = Everyday Discrimination scale; PJG = Perceptions of a Just Government; HTQ = Harvard Trauma Questionnaire (posttraumatic stress symptoms); CFQ = Cognitive Fusion Questionnaire; all predictors included in interaction products are mean-centered.*

**Table 5**
***Results of Mediation Model Including All Unstandardized B Coefficients, Standard Errors, Standardized β Coefficients, and P-Values for both Direct and Indirect Effects.***

| | ***B*** | ***SE*** | **β** | ***p*** |
|---|---|---|---|---|
| ***Direct Effects*** | | | | |
| EDD → CFQ | 0.28 | 0.07 | 0.21 | <.001 |
| PJG → CFQ | -0.06 | 0.08 | -0.03 | .48 |
| HTQ → CFQ | 1.61 | 0.21 | 0.56 | <.001 |
| Age → CFQ | -0.02 | 0.02 | -0.04 | .45 |
| Gender (0= Other, 1 = Female) → CFQ | 0.01 | 0.06 | 0.02 | .36 |
| Location (0 = US, 1 = Canada) → CFQ | 0.36 | 0.17 | 0.11 | .03 |
| Years in US/Canada → CFQ | 0.00 | 0.00 | -0.03 | .50 |
| CFQ → RIS | 0.37 | 0.07 | 0.35 | <.001 |

| | | | | |
|---|---|---|---|---|
| Age → RIS | -0.04 | 0.03 | -0.08 | .13 |
| Gender (0= Other, 1 = Female) → RIS | -0.02 | 0.10 | -0.08 | .35 |
| Location (0 = US, 1 = Canada) → RIS | -0.37 | 0.21 | -0.11 | .07 |
| Years in US/Canada → RIS | 0.00 | 0.01 | -0.05 | .53 |
| ***Indirect Effects*** | | | | |
| EDD → CFQ → RIS | 0.10 | 0.03 | 0.07 | .002 |
| PJG → CFQ → RIS | -0.02 | 0.03 | -0.01 | .50 |
| HTQ → CFQ → RIS | 0.60 | 0.14 | 0.20 | <.001 |

**Figure 1**

***Visualization of Moderation Model Examining Radicalism Intentions at High and Low Levels of Perceptions of a Just Government and High and Low Levels of Cognitive Fusion***

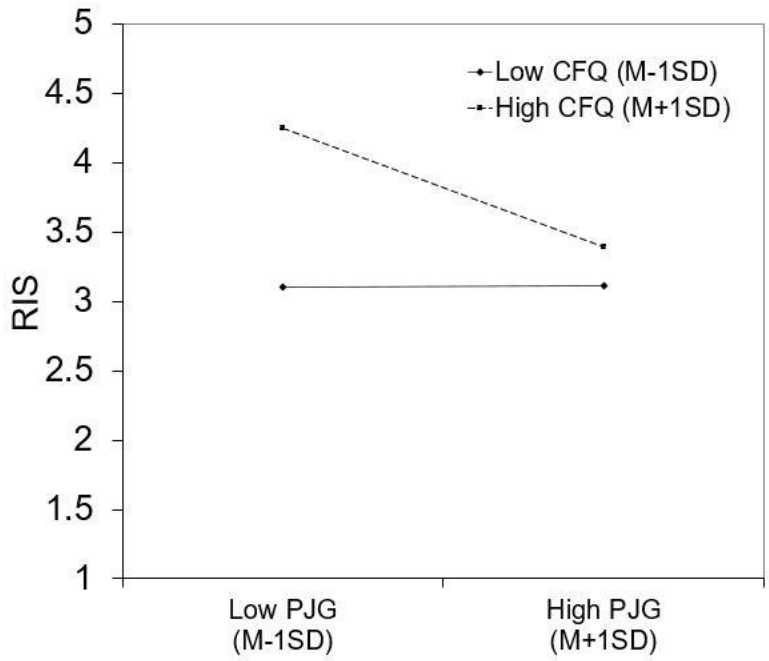
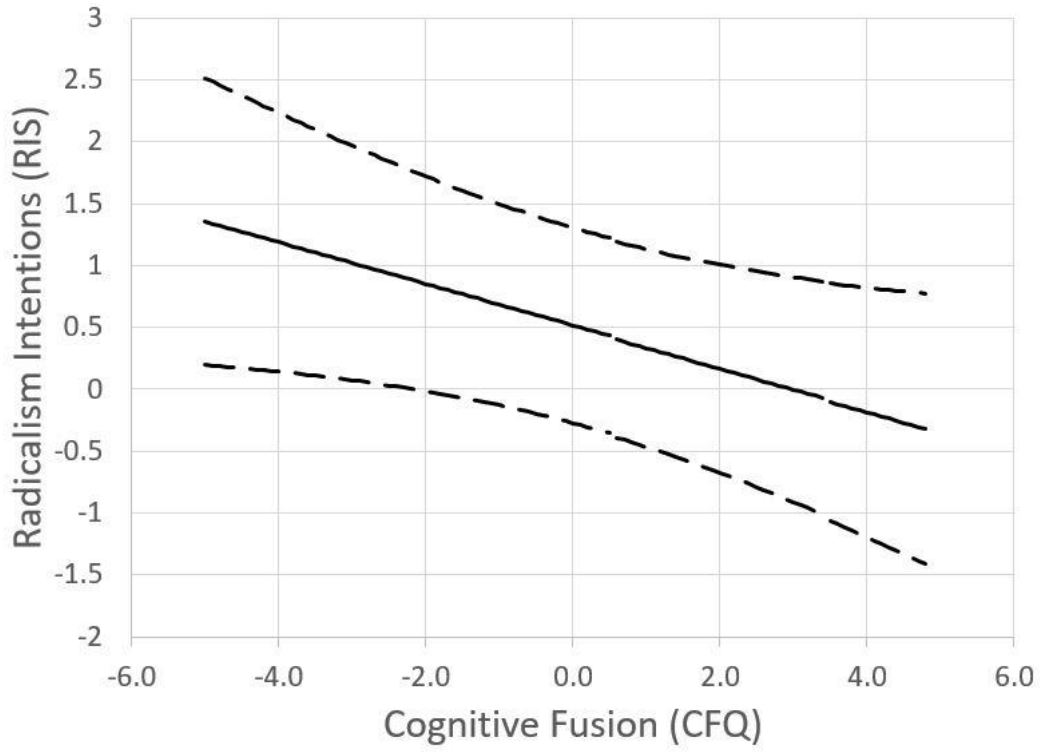


**Figure 2**

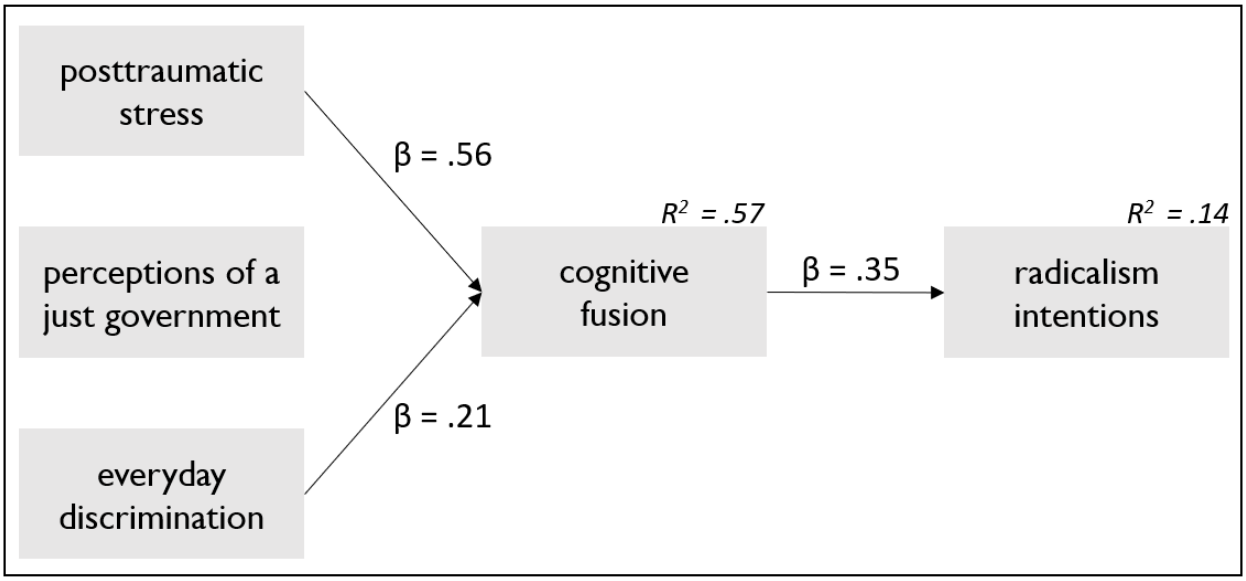
***Johnson-Neyman Plot Describing Perceptions of a Just Government x Cognitive Fusion Moderation Effect on Radicalism Intentions***




*Note: The solid line represents the relationship between Perceptions of a Just Government (PJG) and Radicalism Intentions (RIS) at various levels of the moderator, Cognitive Fusion (CFQ). The dotted lines represent the upper and lower 95% Confidence Intervals.*

**Figure 3**

***Results of Mediation Model Including All Significant Standardized Coefficients and R-Squared Values (Controlling for Age, Gender, Location, and Years In US/Canada).***



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