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The connections between personality, ideology and (counter-)empathic emotions depend on the target

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Abstract

Empathy and schadenfreude are emotions that often lead to moral prosocial or spiteful harmful behaviors respectively. An outstanding question is what motivates feelings of empathy and schadenfreude towards people from different groups. Here we examine two prominent motivators of emotions: personality traits and ideology. Previous work has found that people's ideological orientations towards respecting traditionalism (RWA) and preferences about group-based hierarchy (SDO) can impact intergroup emotions. Furthermore, personality traits of low agreeableness, low openness, and high conscientiousness uniquely engender SDO and RWA. In the research presented here (Study 1 $n = 492$; Study 2 $n = 786$), we examine the relationships between personality traits, ideology, and emotions, arguing that SDO and RWA will relate to reduced empathy and increased schadenfreude but towards unique groups. SDO will relate to reduced empathy and increased schadenfreude towards competitive, low-status groups while RWA will relate to reduced empathy and increased schadenfreude towards threatening groups. We further extend past work by investigating a third ideology (i.e., left-wing authoritarianism), exploring its relationships with personality traits and emotions. We find broad support for our expectation that the relationships between personality and emotions, as well as ideology and emotions, depend on the specific group in question.

KEYWORDS
dual process model, empathy, left wing authoritarianism, personality, right wing authoritarianism, schadenfreude, social dominance orientation

1 | INTRODUCTION

Empathy—the cognitive capacity to understand, as well as the affective resonance with, the emotional experiences of others (Weisz & Cikara, 2021)—has been targeted as a key player in ameliorating intergroup conflict. Feeling empathy towards outgroups and low-status groups has relevant prosocial consequences, like increased support for policies that help marginalized groups (Sparkman et al., 2019), greater donations to those less fortunate (Freeman et al., 2009), and even greater willingness to incur harm to the self to avoid harming others

(FeldmanHall et al., 2015). Given that empathy often inhibits behaviors that are harmful to others and promotes moral inclinations (Tangney et al., 2007), a lack of empathy towards members of outgroups is often a precursor to intergroup conflict. Indeed, empathy is often reduced in competitive intergroup settings (Cikara et al., 2014), highlighting why empathy is often induced in intergroup interventions (Batson & Ahmad, 2009).

Empathy's impact on intergroup processes might be limited, however, to situations where the relevant outcome is helpful, communal, or prosocial. Research suggests that the *lack* of empathy towards outgroups is often insufficient to motivate violence and harm. For example, there is a relatively small correlation between empathy and aggressive behaviors in general (Vachon et al., 2014), suggesting that the lack of empathy is not sufficient for hostile intergroup violence. The absence of empathy is apathy or indifference, but not antipathy (Hortensius & de Gelder, 2018). In other words, not feeling empathy for others might make individuals less likely to engage in prosocial moral behaviors, but not necessarily more likely to engage in harmful, immoral behaviors.

Instead, feeling counter-empathy—an emotional response that is the opposite of the assumed emotional state of another—is likely uniquely related to increased engagement in intergroup harm, relative to empathy. Counter-empathy is theorized to lower people's aversion to harming others (Cikara, 2015) as well as increase the reward associated with the harm (Chiao et al., 2009; Cikara et al., 2011). Counter-empathy is an umbrella term that consists of two distinct emotions: *schadenfreude*, or feeling positively at another group's misfortune, and *gluckschmerz*, feeling negatively about another group's fortune (Leach et al., 2003; Smith & van Dijk, 2018). Given the importance of emotional responses in cases of harm, much of the work to date on counter-empathic emotions has focused on schadenfreude, which is a spiteful emotion that can be difficult to admit feeling. However, people tend to feel schadenfreude when they believe a person or a group deserves their misfortune, or even when that misfortune can lead to a boon for themselves and their ingroup (Smith & van Dijk, 2018). This is why schadenfreude is heightened during conflict and in competitive settings (Cikara et al., 2014).

In sum, both empathy and schadenfreude are morality-relevant emotions that have been shown, or hypothesized, to relate to behaviors that influence intergroup conflict (Cikara, 2015; Dovidio et al., 2010; Hudson et al., 2019; Lucas & Kteily, 2018). What is still being elucidated are the possible antecedents of feeling empathy and schadenfreude, both overall as well as within intergroup contexts. Here we focus on interpersonal antecedents of group-based empathy and schadenfreude, namely ideology and

personality, which have been shown to predict consequential intergroup outcomes in past research.

1.1 | Ideology's impact on empathy and schadenfreude

Past work has identified two main ideological culprits— **5** social dominance orientation (SDO; Ho et al., 2015; Sidanius & Pratto, 1999) and right-wing authoritarianism (RWA; Altemeyer, 1988)—that can explain a substantial amount of variance in people's discriminatory attitudes and behaviors (Duckitt, 2006; Duckitt et al., 2002). SDO measures the extent to which individuals engage in group hierarchical thinking, such that some groups of people deserve to be at the top of society while others deserve to be at the bottom. People with higher levels of SDO see the world in a competitive manner, believing that groups should engage in dominance struggle for supremacy, with some groups naturally being more superior than others.

RWA is a similar but separate ideology. It measures the extent to which individuals engage in authoritative thinking, such that people should obey radical movement leaders (i.e., submission), identify enemies that must be destroyed (i.e., aggression), and strongly commit to a dogmatic party line (i.e., conventionalism). RWA measures radicalized support of existing authority. However, authoritarianism can manifest in radicalized *opposition* to existing authority, which has been captured in a newer construct called left-wing authoritarianism (LWA; Costello et al., 2022). LWA also reflects authoritative thinking, but in line with dismantling the status quo rather than supporting it. Finally, SDO, RWA and LWA can sometimes be conflated with political conservativism, such that higher levels of SDO and RWA and lower levels of LWA are seen to be synonymous with more conservative views. Political conservatism is correlated with all three ideologies but has been shown to also be a separate construct (Costello et al., 2022; Everett, 2013). For example, past work has found SDO and RWA to be predictors of levels of political conservatism (Wilson & Sibley, 2013), with SDO being more related to economic conservatism while RWA being more related to social conservatism (Everett, 2013).

There is some work connecting SDO and RWA to emotion expression overall (Álvarez-Castillo et al., 2018; Levin et al., 2013; Matthews & Levin, 2012; Shaffer & Duckitt, 2013) but there is comparatively little work on empathy and schadenfreude. As mentioned above, empathy and schadenfreude are important emotions to study within the context of intergroup relations, highlighting the contribution of the current work. The research that does exist has primarily focused on the negative relationship between SDO and empathy, such

that those who believe in the presence of group inequality generally feel less empathy. The negative connection between SDO and empathy has been shown with trait levels of empathy (Bäckström & Björklund, 2007; Nicol & Rounding, 2013) as well as longitudinally (Sidanius et al., 2013) and is exacerbated when empathy is assessed towards outgroups and low-status groups (Hudson et al., 2019, 2020). However, SDO is *positively* related to empathy when felt towards groups that have higher status (such as corporate executives in the United States; Lucas & Kteily, 2018), suggesting a caveat to this generalization that considers the synergy between the target and the desire to support existing hierarchy. There is also evidence for an overall negative relationship between RWA and empathy (Álvarez-Castillo et al., 2018; Choma et al., 2019; Onraet et al., 2017). SEM models find the correlation between RWA and trait empathy to be modest (ranging between $r = -0.14$ and $r = -0.28$) and smaller than the associations of trait empathy with SDO (rs ranging from -0.39 to -0.49) (Álvarez-Castillo et al., 2018; Bäckström & Björklund, 2007; Nicol & Rounding, 2013).

To our knowledge, only a single published manuscript has directly examined the connections between ideology and trait schadenfreude, and only with SDO. Researchers found a positive relationship between SDO and group-based schadenfreude in general but especially towards racial and novel outgroups (Hudson et al., 2019). Unpublished studies have corroborated this finding as well for low-status groups (Hudson et al., 2020, 2022). Theoretically, schadenfreude should be associated with higher levels of SDO, but not necessarily RWA. Schadenfreude is felt most keenly in competitive threatening contexts (Smith & van Dijk, 2018) rather than dangerous ones. Furthermore, SDO is predicted by a competitive worldview rather than a dangerous worldview (Duckitt et al., 2002; Sibley & Duckitt, 2009), suggesting a baseline positive relationship between SDO and schadenfreude. This baseline relationship likely gets exacerbated by competitive contexts and outgroup designation. For example, when novel groups were competing for a prize, SDO was positively associated with outgroup schadenfreude (and unrelated to ingroup schadenfreude). However, when those groups were cooperating for a prize, the relationship between SDO and outgroup schadenfreude became attenuated to similar levels as those towards the ingroup (Hudson et al., 2019). As another piece of evidence, in a series of studies examining construct validity of LWA (Costello et al., 2022), RWA was negatively, rather than positively, correlated with a measure of partisan schadenfreude. As participants' levels of RWA increased, they were less likely to feel schadenfreude towards political outgroups. These findings together suggest a nonexistent,

or perhaps weakly negative relationship between RWA and trait schadenfreude.

The existing work on LWA, empathy, and schadenfreude is almost purely hypothetical as the existence of a left-wing form of authoritarianism was seen as a myth (Stone, 1980) until recently. The supporters of the existence of LWA focused on the surprising similarities between communism (far left) and fascism (far right) regarding important aspects of authoritarianism (Eysenck, 1956, 1981). Similarly, in Eastern European countries, there is some evidence that authoritarianism is positively related to support for socialism and communism, both leftist theories (de Regt et al., 2011; Krauss, 2002; Todosijević & Enyedi, 2008). While there have been some attempts at quantifying LWA mostly by re-writing RWA items (see Altemeyer, 1996 for an example), it wasn't until 2022 that a validated LWA scale became available (Costello et al., 2022).

Based on the (small amount of) theory on LWA, LWA should have a similar relationship as SDO to schadenfreude, but the opposite relationship as SDO to empathy; LWA is likely positively related to both empathy and schadenfreude. Both LWA and SDO has been found to be positively related to partisan schadenfreude, with LWA having a stronger positive correlation than did SDO (Costello et al., 2022). Given the items within the LWA scale, this positive relationship is not surprising, as many items seem to revel in the misfortunes of groups that uphold social conventialism. Sample items such as "certain elements in our society must be made to pay for the violence of their ancestors" and "I hate being around non-progressive people," are in line with a virulent antipathy towards large parts of society. In terms of empathy, those who have higher levels of LWA want to eliminate inequality, which is in line with a more prosocial view of the world. In fact, some of the items in the scale are worded to be the direct opposite that of SDO (e.g., "If I could remake society, I would put members of historically and presently marginalized groups at the top") suggesting that LWA might be positively associated with trait empathy.

1.2 | Personality's impact on ideology and emotions

Personality traits have been shown to be another antecedent to empathy and schadenfreude in addition to ideology (De Raad & Kokkonen, 2000; Duckitt & Sibley, 2010; Mooradian et al., 2011; Sibley & Duckitt, 2009; Wang et al., 2019). There are several models of assessing personality, with one primary model being the Big Five model of personality (John & Srivastava, 1999; McCrae & John, 1992). The Big Five model contains five personality factors: openness (i.e., measuring people's spontaneity

and creativity), conscientiousness (i.e., measuring people's thoughtfulness, detail-orientation, and impulse control), extraversion (i.e., measuring people's optimistic and social nature), agreeableness (i.e., measuring people's trusting and compliant nature), and neuroticism (i.e., measuring people's proclivity towards anxiety and negative emotionality).

Of all the personality factors, agreeableness is most strongly positively associated with empathy (Graziano et al., 2007; Habashi et al., 2016; Melchers et al., 2016). Indeed, empathy-related constructs (especially compassion and empathic concern) are part of the lower-level structure of agreeableness (Mooradian et al., 2011). Empathy is also positively associated with openness, but to a lesser degree compared to agreeableness (Mooradian et al., 2011). There is less work on the personality correlates of schadenfreude, but what does exist suggest that schadenfreude should be positively related to neuroticism, as schadenfreude has been most connected with the Dark Triad personality traits (e.g., narcissism, psychopathy, and Machiavellianism; Wang et al., 2019). In addition, schadenfreude should be negatively related to agreeableness (Greenier, 2018), conscientiousness (Crysel & Webster, 2018), and perhaps openness (Crysel & Webster, 2018). Across the studies that have examined personality correlates of empathy and schadenfreude, extraversion is almost never associated with those emotions.

There is also extensive work on the personality antecedents of ideology. Past work has found that SDO is negatively related to agreeableness (and perhaps also negatively related to openness; Akrami & Ekehammar, 2006; Ho et al., 2015; Nicol & De France, 2016). Openness is also negatively related to RWA while conscientiousness is positively related to RWA (Duckitt & Sibley, 2010; Sibley & Duckitt, 2009). LWA is hypothesized to be negatively related to agreeableness and conscientiousness, while positively related to negative emotionality (Costello et al., 2022).

1.3 | The group-specific nature of empathy and schadenfreude

Thus far, we have reviewed theoretical and empirical evidence in support for the relationship between ideology and personality with trait levels of empathy and schadenfreude. However, these relationships are likely group specific. In terms of the relationship between ideology and emotions, not all social groups uphold the beliefs rooted in the ideologies in the same way. Groups that threaten the existing hierarchy are similar but distinct from groups that threaten conformity to the status quo, suggesting SDO and RWA will have overlapping but distinct impacts on

intergroup outcomes. This argument is formalized within the dual process motivational model of prejudice (DPM: Duckitt et al., 2002; Duckitt & Sibley, 2016), which argues that SDO primarily relates to prejudice and discrimination towards groups seen as competitive and low-status, while RWA primarily relates to these outcomes towards groups seen as dangerous and threatening.

Thus, while SDO might be negatively related to empathy overall, we would expect that SDO would be positively related to empathy for groups in line with the ideology, or groups at the top of the hierarchy (Lucas & Kteily, 2018). Similarly, while RWA is likely not related to schadenfreude overall, we would expect RWA to be positively related to schadenfreude for groups that are dangerous to the existing status quo. In the same way that RWA and SDO's relationships with empathy and schadenfreude should be group specific, we expect LWA to be positively related to empathy, and negatively related to schadenfreude, for marginalized groups. The groups that dismantle the existing status quo (relevant to RWA) are often marginalized in similar ways as groups that threaten hierarchy (relevant to SDO) are, suggesting that LWA would be positively related to empathy for competitive as well as dangerous groups.

Additionally, we should expect the personality correlates of empathy and schadenfreude to depend on the target, although to our knowledge there has not been a systematic inquiry into this question. Some work on the relationships between agreeableness and helping behaviors have found that agreeableness wasn't as related to helping behaviors (in an extraordinary situation) when the target was a sibling or a friend compared to when the target was a stranger (Graziano et al., 2007). This finding suggests that the relationship between agreeableness and empathy might depend on target characteristics. We do not have strong hypotheses as to how target characteristics might play a role but explore those relationships in the present work.

1.4 | Current research

In past research, the DPM has been used to examine intergroup emotions like anger, fear, and disgust (Álvarez-Castillo et al., 2018; Levin et al., 2013; Matthews & Levin, 2012; Shaffer & Duckitt, 2013). There is limited research though examining morality-related emotions such as empathy and schadenfreude. Furthermore, the DPM has not yet integrated LWA, although it is a form of authoritarianism that share similar roots to SDO and RWA. Thus, across two studies we extend the DPM in two important ways (Figure 1), examining the connections between personality, ideology, and morality-related emotions in Study 1 and pre-registering a direct replication in
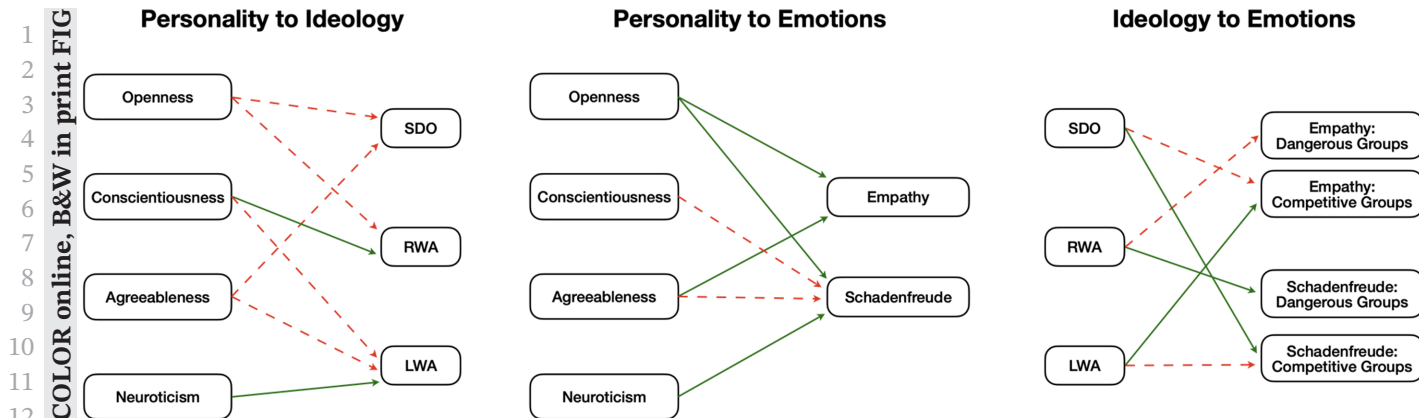
FIGURE 1 Schematic of anticipated relationships between personality, ideology, and emotions. Red/dashed lines represent a hypothesized negative relationship, while the green/solid lines represent a hypothesized positive relationship. While we measure extraversion, we do not expect extraversion to relate to ideology or emotions.

Study 2. First, we investigated whether the relationships between SDO/RWA and emotions change depending on the social group. Second, we explored LWA in terms of personality and intergroup outcomes, seeing if LWA's relationships with empathy and schadenfreude are also sensitive to the specific group in question. We replicated past work assessing the personality correlates of ideology and emotions and nuanced it by considering whether these relationships are group-specific. Across all three ideologies, we assessed relationships with both trait and group-specific forms of empathy and schadenfreude.

We had four hypotheses that we explore in Study 1 and confirm in the pre-registered Study 2. We hypothesized that SDO, RWA, and LWA will have distinct relationships with trait empathy and schadenfreude (H1). SDO will be negatively related to empathy and positively related to schadenfreude, RWA will be negatively related to empathy and weakly negative or unrelated to schadenfreude, while LWA will be positively related to both empathy and schadenfreude. Given past research, we expect SDO to have a particularly strong relationship with both trait empathy and schadenfreude, at least compared to RWA and perhaps compared to LWA.

More germane to the current research, we further predict that each ideology will be more strongly related to empathy and schadenfreude for groups that align with the ideology, such that there will be less empathy and more schadenfreude towards groups that are antithetical to the ideological belief system (H2). SDO will predict reduced empathy and increased schadenfreude towards competitive and/or low-status groups (compared to RWA) while RWA will predict reduced empathy and increased schadenfreude towards threatening groups (compared to SDO). We further test the relationship between LWA and group-specific empathy and schadenfreude, expecting LWA to be positively related to empathy, and negatively

related to schadenfreude, for both dangerous and competitive groups. We do not have strong hypotheses as to whether these relationships will be stronger or weaker compared to SDO and RWA. If we find support for these two hypotheses, that suggests that understanding people's ideology is not enough to predict how they will likely react to specific groups. Instead, group-specific empathy and schadenfreude depends on how the group reinforces, or contradicts, the beliefs embedded within the ideology.

Next, we predict that each ideology will have different personality correlates (H3). SDO will be negatively related to agreeableness, and to a lesser degree, negatively related to openness. Lower openness and higher conscientiousness will relate to greater levels of RWA. Finally, LWA will be negatively related to conscientiousness and agreeableness, and positively related to negative emotionality. Last, we predict that personality factors will relate to trait, as well as group-specific forms of empathy and schadenfreude (H4). More specifically, various forms of empathy will be associated with increased levels of agreeableness and openness, while the schadenfreude measures will be associated with increased neuroticism, and reduced conscientiousness, agreeableness, and openness. If we find that some groups' empathy and schadenfreude personality correlates differ from the broader group, that again suggests that broad measures of empathy and schadenfreude might fall short in predicting how individuals will react in specific situations.

Our hypotheses hinge upon social groups that differ in their perceived threat and competitiveness. To find said groups, we ran a pilot study similar to Duckitt and colleagues, (2006) in which we assessed the extent to which 30 social groups in America were seen as threatening or competitive (see supplementary materials for full list of social groups and analyses). Our goal was to select four social groups with differing perceptions of threat and

competition: a group that was perceived as more threatening than competitive, a group that was more competitive than threatening, a group that was both threatening and competitive, and a group that was neither threatening nor competitive. Based on participants' answers, we chose the following social groups: homeless people to represent high competition and low threat, drug dealers to represent low competition and high threat, undocumented immigrants to represent high competition and high threat, and medical specialists to represent low competition and low threat. All materials, data, analysis code, and supplementary materials are publicly available and can be found on OSF here.

2 | STUDY 1: TESTING DUAL PROCESS MOTIVATIONAL MODEL IN FOUR GROUPS

2.1 | Methods

2.1.1 | Participants

We aimed to recruit 500 participants into Study 1 from Amazon Mechanical Turk through CloudResearch.com (Berinsky et al., 2012; Litman et al., 2017) for a 15-min study, paying them $2.00. Simulations regarding correlation stability suggest that a sample of around 250 participants is enough to stabilize correlations of $r = 0.1$ or higher with 80% confidence and a "corridor of stability" at 0.1 (Schönbrodt & Perugini, 2013). Simulations on SEMs have found that the sample size to have 80% power at an alpha level of 0.05 can range between 30 and 460 subjects (Wolf et al., 2013), placing our goal of 500 subjects at the top of that threshold. We restricted our sample in Study 1 to adult participants living in the United States, who completed 500 or fewer hits on Mechanical Turk, and had an acceptance rate greater than 95%. We also had a "bot check" before the consent document to ensure participants could read instructions carefully. If they failed the bot check, they never saw the consent document nor completed any study tasks.

We managed to recruit 534 initial participants into Study 1. After removing the participants that did not complete all study measurements, we were left with 492 participants. Most participants in Study 1 self-identified as White ($n = 344$), while 53 identified as Black, 29 as Latino, 23 as Asian, three as Native American, one as Middle Eastern, and 33 as multiracial. Six participants declined to provide their race. Participants in Study 1 predominantly identified as a woman, with 176 identifying as men, seven as nonbinary or gender queer, and two declining to answer. The mean age of the Study 1 sample was 36.71, $SD = 11.52$, and most participants identified more on the liberal side ($n = 229$) than the conservative side ($n = 141$) of the political spectrum.

2.1.2 | Procedure

Before reaching the consent document, participants answered a botcheck question where they had to write, in all capitalized letters, what the middle number was if the numbers "Four, 1, and Six" were arranged in increasing value (the correct answer is FOUR). After reading the consent document, participants completed three sets of questionnaires in a fixed order. Participants first completed the personality questionnaire, then moved onto the ideology questions, filling out the SDO, RWA, and LWA scales in a randomized order. Finally, participants completed the trait and state empathy/schadenfreude questionnaires in a randomized order, followed by an exploratory ecological dominance orientation[1] item and demographics. We organized the questionnaires based on the implied causal pathway, although we are not testing causality here. Previous work on the DPM finds that personality traits predict ideologies, which then predict reported empathy and schadenfreude, which is why we had participants fill out personality measures, then ideologies, then emotions.

2.1.3 | Measures

Table 1 contains the means, standard deviations, Cronbach alpha values, and zero-order correlations for all variables in Studies 1 and 2.

2.1.3.1 | Personality traits

We measured participants' personality traits using a shortened version of the non-commercial Big Five scale. Participants answered the same six items for each dimension as Sibley and Duckitt (2009) (i.e., openness, conscientiousness, extraversion, agreeableness, and neuroticism/negative emotionality), indicating to what extent the statements accurately described them or not on a 1(extremely inaccurate) to 7 (extremely accurate) scale. Sample items included "am full of ideas" (i.e., openness), "am always prepared" (i.e., conscientiousness), "start conversations" (i.e., extraversion), "sympathize with others' feelings" (i.e., agreeableness), and "get stressed out easily" (i.e., neuroticism). Each factor was coded such that higher numbers corresponded to greater presence of the personality type and all scales were reliable in both studies. Furthermore, an EFA supported a five-factor solution by personality dimension, with each factor explaining between 8% and 10% of the variance.

TABLE 1 Means, standard deviations, Cronbach's alphas, and zero-order correlations between personality, ideology, and emotions.

	Study 1		Study 2		Correlations																		
	M (SD)	α	M (SD)	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Trait empathy[a]	3.92 (0.62)	0.89	3.96 (0.61)	0.89	—	0.65***	−0.01	0.46***	0.39***	−0.38***	−0.50***	−0.05	−0.42***	−0.38***	0.18***	0.76***	0.15***	−0.06	0.25***	−0.40***	0.06	−0.09*
2. Homeless empathy[b]	5.29 (1.32)	0.90	5.54 (1.27)	0.92	0.58***	—	0.15***	0.62***	0.40***	−0.25***	−0.52***	−0.07	−0.40***	−0.21***	0.03	0.50***	0.02	0.07*	0.11**	−0.49***	0.27***	−0.20***
3. Drug dealer empathy[b]	2.62 (1.38)	0.90	2.44 (1.34)	0.92	−0.05	0.21***	—	0.28***	0.14***	0.12***	0.13***	−0.50***	−0.03	0.20***	0.02	−0.02	−0.21***	0.17***	0.05	−0.10*	0.28***	−0.15***
4. Undocumented immigrant empathy[b]	4.84 (1.51)	0.93	4.89 (1.55)	0.94	0.38***	0.58***	0.32***	—	0.41***	−0.16***	−0.39***	−0.15***	−0.63***	−0.19***	0.01	0.34***	−0.08*	0.09**	0.09*	−0.57***	0.44***	−0.44***
5. Medical specialist Empathy[b]	4.59 (1.28)	0.85	4.54 (1.32)	0.89	0.33***	0.41***	0.21***	0.43***	—	−0.12***	−0.16***	0.04	−0.16***	−0.30***	0.08*	0.29***	0.05	−0.01	0.09**	−0.21***	0.18***	−0.01
6. Trait schadenfreude[b]	3.16 (0.94)	0.82	2.80 (0.99)	0.86	−0.45***	−0.27***	0.12***	−0.21***	−0.17***	—	0.33***	0.01	0.24***	0.31***	−0.01	−0.30***	−0.22***	0.16***	−0.08*	0.20***	0.09*	0.03
7. Homeless schadenfreude[b]	2.04 (1.23)	0.90	1.81 (1.03)	0.85	−0.60***	−0.46***	0.18***	−0.27***	−0.13**	0.43***	—	0.13**	0.63***	0.53***	0.06	−0.33***	−0.07	−0.02	−0.12**	0.51***	−0.01	0.33***
8. Drug dealer schadenfreude[b]	4.37 (1.52)	0.88	4.45 (1.55)	0.88	−0.10*	−0.12**	−0.44***	−0.24***	−0.02	0.10*	0.16***	—	0.29***	0.06	−0.02	0.01	0.11**	−0.06	−0.09**	0.15***	−0.07*	0.18***
9. Undocumented immigrant schadenfreude[b]	2.39 (1.41)	0.90	2.29 (1.36)	0.90	−0.42***	−0.31***	0.02	−0.55***	−0.15**	0.27***	0.57***	0.37***	—	0.44***	0.08*	−0.25***	0.02	−0.05	−0.09*	0.57***	−0.20***	0.46***
10. Medical Specialist schadenfreude[b]	2.46 (1.34)	0.90	2.18 (1.13)	0.88	−0.49***	−0.22***	0.23***	−0.24***	−0.27***	0.34***	0.60***	0.21***	0.53***	—	0.02	−0.26***	−0.14***	0.11***	−0.08*	0.25***	0.12***	0.23***
11. Extraversion[b]	3.57 (1.42)	0.83	3.48 (1.51)	0.90	0.11*	0.02	0.06	−0.01	0.04	−0.01	0.03	−0.04	−0.01	0.00	—	0.28***	0.02	−0.25***	0.26***	0.07	−0.07	0.14***
12. Agreeableness[b]	5.46 (1.13)	0.79	5.43 (1.13)	0.85	0.62***	0.30***	−0.07	0.23***	0.16***	−0.30***	−0.36***	−0.04	−0.31***	−0.27***	0.21***	—	0.15***	−0.14***	0.29***	−0.29***	0.01	−0.06
13. Conscientiousness[b]	4.89 (1.23)	0.76	5.17 (1.19)	0.82	0.02	−0.13**	−0.22***	−0.13**	−0.02	−0.08	0.01	0.06	0.03	−0.07	0.06	0.15***	—	−0.25***	0.07*	0.03	−0.19***	0.13***
14. Neuroticism[b]	3.86 (1.42)	0.85	3.40 (1.45)	0.88	−0.06	0.04	0.13**	0.06	−0.02	0.19***	0.05	−0.08	0.08	0.09*	−0.14***	−0.16***	−0.25***	—	−0.17***	−0.09*	0.25***	−0.13***
15. Openness[b]	5.37 (1.11)	0.79	5.37 (1.09)	0.81	0.34***	0.20***	−0.02	0.09*	0.13**	−0.23***	−0.28***	−0.11*	−0.22***	−0.25***	0.10*	0.29***	0.10*	−0.15***	—	−0.11**	−0.08*	−0.14***
16. SDO[b]	2.51 (1.20)	0.88	2.30 (1.31)	0.91	−0.42***	−0.42***	−0.01	−0.50***	−0.16***	0.28***	0.43***	0.20***	0.54***	0.35***	0.08	−0.27***	0.13**	−0.02	−0.20***	—	−0.40***	0.52***
17. LWA[b]	3.41 (1.27)	0.95	3.33 (1.24)	0.95	0.00	0.26***	0.46***	0.46***	0.23***	0.07	0.09*	−0.16***	−0.11*	0.15***	0.00	−0.01	−0.20***	0.19***	−0.13***	−0.33***	—	−0.29***
18. RWA[b]	3.40 (1.01)	0.86	3.16 (1.16)	0.90	−0.13**	−0.13**	−0.17***	−0.44***	−0.06	0.01	0.23***	0.27***	0.44***	0.27***	0.05	−0.05	0.22***	−0.09	−0.13***	0.49***	−0.29***	—

Note: Correlations from Study 1 are below the diagonal while correlations from Study 2 are above the diagonal. M stands for means while SD stands for standard deviations.

[a]Scales anchored at 1–5.

[b]Scales anchored at 1–7.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

2.1.3.2 | Social dominance orientation

We measured SDO using the shortened eight-item scale (Ho et al., 2015) to assess the extent to which individuals see group relationships in a hierarchical fashion. A sample item includes "An ideal society requires some groups to be on top and others to be on the bottom." The scale was anchored from 1 (Strongly Oppose) to 7 (Strongly Favor).

2.1.3.3 | Authoritarianism

We measured authoritarianism in two ways: right-wing (RWA) and left-wing (LWA) authoritarianism. We used the shortened 15-item RWA (Zakrisson, 2005) scale and the shortened 22-item LWA scale (Costello et al., 2022; Costello & Lilienfeld, 2020), both anchored from 1 (Strongly disagree) to 7 (Strongly agree). Sample items from RWA and LWA included "Our country needs a powerful leader, in order to destroy the radical and immoral currents prevailing in society today" and "Certain elements in our society must be made to pay for the violence of their ancestors", respectively. The two scales were negatively correlated, $r(489) = -0.29$, $p < 0.001$, which was in line with past findings (Costello et al., 2022).

2.1.3.4 | Trait empathy

We measured trait empathy using the 16-item Toronto Empathy Questionnaire (Spreng et al., 2009), assessed on a 1 (Never) to 5 (Always) scale. Participants were asked to read each statement and rate how frequently they felt or acted in the manner described. Sample items included "When someone else is feeling excited, I tend to get excited too" and "I remain unaffected when someone close to me is happy" (reverse-coded). Higher numbers represented greater levels of trait empathy. We chose this version of trait empathy as past work had measured it in conjunction with the trait measure of schadenfreude outlined below (Crysel & Webster, 2018).

2.1.3.5 | Trait schadenfreude

We measured trait levels of schadenfreude using a 12-item scale (Crysel & Webster, 2018) anchored from 1 (Strongly disagree) to 7 (Strongly agree). Sample items included "I enjoy reading 'most embarrassing moment' stories" and "I do not enjoy seeing someone's computer crash" (reverse-coded). Higher numbers represented greater levels of trait schadenfreude.

2.1.3.6 | Target specific empathy and schadenfreude

To measure empathy and schadenfreude towards our four social groups (i.e., homeless people, drug dealers, undocumented immigrants, and medical specialists), we combined two trait empathy and schadenfreude scales and adapted them to reflect group-specific emotions. For empathy, we adapted the empathic concern subscale (four items) of the Brief Form of the Interpersonal Reactivity Index (Davis, 1983; Ingoglia et al., 2016), altering the scale to reflect empathy towards our targets. For example, one original item read "When I see someone being taken advantage of, I feel kind of protective toward them". We changed the item to read "When I see a **[drug dealer]** being taken advantage of, I feel kind of protective toward them" in the drug dealer questionnaire. For schadenfreude, we adapted Leach and Spears (2009) four-item schadenfreude measure, changing the portion that discussed "successful people" to one of the four targets in the study. For example, the item that originally read "It feels good to see very successful people encounter a little difficulty" was changed to "It feels good to see **[undocumented immigrants]** encounter a little difficulty." For each item, the specific group being assessed was bolded in the sentence and measured on a 1 (Strongly disagree)—7 (Strongly agree) scale. The four empathy and schadenfreude items were presented in a randomized order to participants by target.

An EFA using parallel analysis showed adequate separation of empathy and schadenfreude by target. Empathy (factor loadings between 0.75 and 0.93) and schadenfreude (factor loadings between 0.65 and 0.91) each accounted for 35% of the variance for homeless people. For drug dealers, empathy (factor loadings between 0.78 and 0.89) accounted for 35% of the variance, while schadenfreude (factor loadings between 0.64 and 0.85) accounted for 32% of the variance. For undocumented immigrants, empathy (factor loadings between 0.81 and 0.91) accounted for 38% of the variance while schadenfreude (factor loadings between 0.67 and 0.89) accounted for 34% of the variance. Finally, for medical specialists, empathy (factor loadings between 0.74 and 0.89) accounted for 35% of the variance, while schadenfreude (factor loadings between 0.64 and 0.84) accounted for 30% of the variance.

2.2 | Results

Path analyses allow us to see the relations between variables in the predicted model structure accounting for covariances. Thus, we used structural equation modeling to calculate the standardized path coefficients between personality, ideology, and emotions for each target group separately (see Figure 2 for a schematic). We included trait empathy and trait schadenfreude in each model to compare *trait* and target-specific pathways. For each variable in the model, we created between 2 and 4 manifest parcels by combining scale items with the goal of reducing the difference in variance between the parcels. We used parcels to reduce the degrees of freedom given the complexities of each model. Each group-specific measure of empathy and
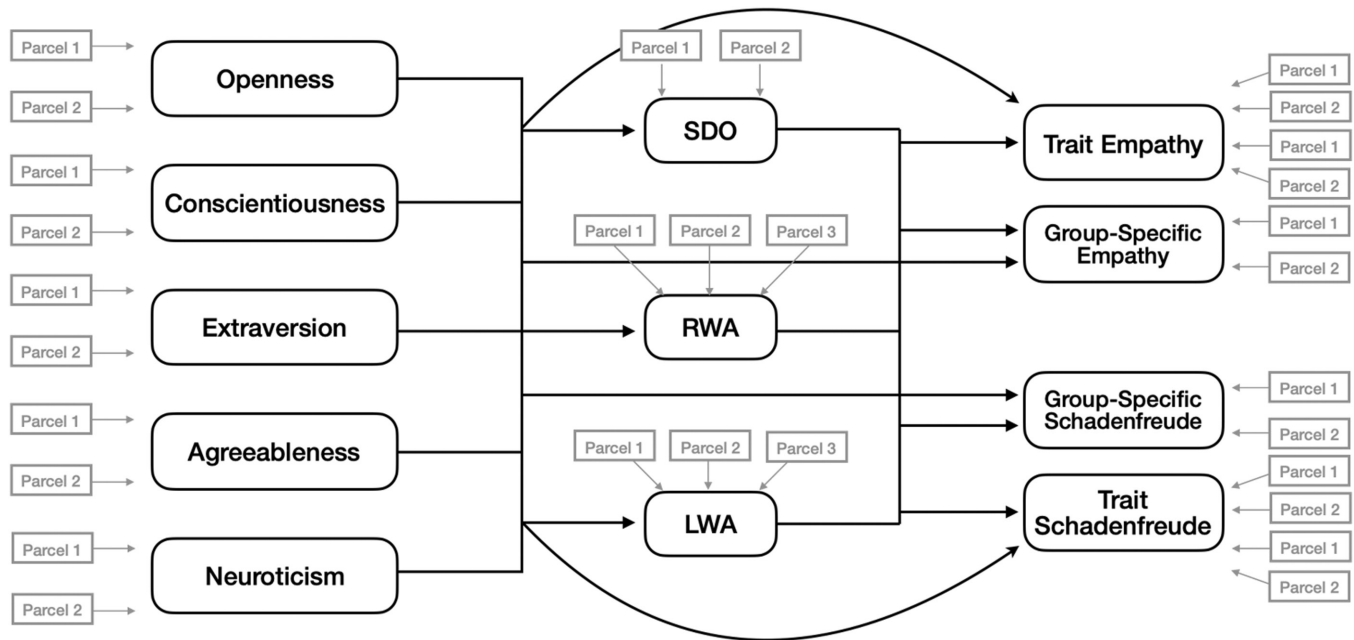
FIGURE 2 Schematic of the general path model between personality, ideology, and emotions. Variables in black represent latent variables while variables in gray represent parcels made from manifest variables. Emotions were regressed onto ideology and personality traits, while ideology was regressed onto personality traits only.

schadenfreude, SDO, as well as each personality trait had two-item parcels. RWA and LWA had three item parcels while trait empathy and schadenfreude had four.

We ran our models using 10,000 bootstrap samples with the *lavaan* package in *R* (Rosseel, 2012) and include standardized maximum likelihood path coefficients in the path figures. We reported the standardized path coefficients for Study 1 in Table 2. In supplementary materials, we reported comparisons on the zero-order correlations using the *r.test* function from the psych package in *R* (Revelle, 2020) to test differences in correlation strength (using absolute values) per our hypotheses.

Based on recommendations (Hu & Bentler, 1999; Schumacker & Lomax, 2004), root mean-square error of approximation (RMSEA) values should be at or less than 0.06, standardized root-mean-square residuals (SRMR) should be at or less than 0.08, comparative fit (CFI) and goodness-of-fit indexes (GFI) should be greater than 0.95, and finally, for large models, the $\frac{x^2}{df}$ ratio should be less than 2. Across each model in Study 1, the fit indices revealed a moderate fit to the data. SRMRs ranged from 0.45 to 0.046, CFIs ranged from 0.93 to 0.94, GFIs ranged from 0.89 to 0.90, RMSEAs ranged from 0.056 to 0.058, and $\frac{x^2}{df}$ ratios ranged from 2.51 to 2.63.

2.2.1 | Personality to ideology

We explored the relationships between personality traits and ideology. We hypothesized that SDO would

be negatively related to agreeableness and openness and found support for that hypothesis. Unexpectedly, SDO was also positively related to conscientiousness and extraversion. Next, we expected that RWA would be negatively related to openness but positively related to conscientiousness, which was supported. Finally, we hypothesized that LWA would be negatively related to conscientiousness and agreeableness, and positively related to neuroticism. We found support for the relationships regarding conscientiousness and neuroticism but not agreeableness, as LWA was not significantly related to levels of agreeableness.

2.2.2 | Personality to emotions

We next explored the relationships between personality traits and emotions. We hypothesized that empathy would be related to greater levels of agreeableness and openness while schadenfreude would be related to increased neuroticism but reduced agreeableness, openness, and conscientiousness. While we believed these patterns would differ based on the group in question, we did not have strong hypotheses as to how. What we found was that both agreeableness and openness were positively related to trait levels of empathy but were not consistently related to group-empathy. Openness was positively related to empathy towards all groups except undocumented immigrants, while agreeableness was related to empathy towards competitive groups (i.e., homeless people and undocumented

TABLE 2 Path model regression coefficients in Study 1.

Effect path	Homeless people β	LCI	UCI	Drug dealers β	LCI	UCI	Undocumented immigrants β	LCI	UCI	Medical specialists β	LCI	UCI
Ideology → Group emotions												
SDO → Empathy	−0.40	−0.56	−0.25	0.32	0.18	0.46	−0.27	−0.42	−0.12	−0.08	−0.24	0.09
RWA → Empathy	0.23	0.10	0.37	−0.12	−0.25	0.00	−0.21	−0.34	−0.09	0.10	−0.06	0.25
LWA → Empathy	0.20	0.09	0.31	0.56	0.46	0.67	0.33	0.23	0.42	0.28	0.15	0.40
SDO → Schadenfreude	0.45	0.30	0.61	0.06	−0.13	0.24	0.45	0.29	0.61	0.36	0.21	0.51
RWA → Schadenfreude	0.04	−0.09	0.16	0.23	0.07	0.39	0.27	0.15	0.39	0.21	0.06	0.35
LWA → Schadenfreude	0.29	0.17	0.40	−0.09	−0.24	0.05	0.10	−0.01	0.21	0.35	0.24	0.46
Personality traits → Group emotions												
Openness → Empathy	0.16	0.03	0.28	0.15	0.04	0.27	0.01	−0.09	0.11	0.16	0.01	0.30
Conscientiousness → Empathy	−0.16	−0.27	−0.04	−0.17	−0.29	−0.06	−0.01	−0.12	0.09	−0.01	−0.14	0.12
Extraversion → Empathy	−0.03	−0.13	0.08	0.05	−0.05	0.15	−0.01	−0.12	0.10	0.02	−0.11	0.16
Agreeableness → Empathy	0.23	0.09	0.36	−0.01	−0.13	0.11	0.16	0.03	0.29	0.10	−0.03	0.24
Neuroticism → Empathy	0.05	−0.06	0.17	0.01	−0.09	0.11	−0.01	−0.11	0.09	−0.02	−0.14	0.10
Openness → Schadenfreude	−0.10	−0.23	0.03	−0.09	−0.22	0.04	0.01	−0.10	0.12	−0.08	−0.20	0.04
Conscientiousness → Schadenfreude	0.05	−0.06	0.16	−0.01	−0.15	0.13	0.00	−0.10	0.09	−0.07	−0.18	0.03
Extraversion → Schadenfreude	0.07	−0.03	0.18	−0.07	−0.19	0.06	0.00	−0.09	0.10	0.02	−0.09	0.12
Agreeableness → Schadenfreude	−0.27	−0.40	−0.15	0.02	−0.13	0.17	−0.19	−0.31	−0.07	−0.15	−0.28	−0.02
Neuroticism → Schadenfreude	−0.04	−0.14	0.06	−0.07	−0.19	0.04	0.07	−0.04	0.17	−0.02	−0.13	0.09

Non-group-specific path coefficients

Personality traits → Ideology	β	LCI	UCI
Openness → SDO	−0.17	−0.31	−0.04
Conscientiousness → SDO	0.23	0.12	0.34
Extraversion → SDO	0.19	0.07	0.31
Agreeableness → SDO	−0.37	−0.50	−0.24
Neuroticism → SDO	−0.04	−0.16	0.09
Openness → RWA	−0.23	−0.35	−0.12
Conscientiousness → RWA	0.27	0.16	0.37
Extraversion → RWA	0.07	−0.04	0.18
Agreeableness → RWA	−0.06	−0.19	0.07
Neuroticism → RWA	−0.08	−0.20	0.04

Ideology → Trait emotions	β	LCI	UCI
SDO → Trait empathy	−0.36	−0.50	−0.23
RWA → Trait empathy	0.13	0.01	0.24
LWA → Trait empathy	−0.10	−0.20	−0.01
SDO → Trait schadenfreude	0.40	0.24	0.57
RWA → Trait schadenfreude	−0.14	−0.27	0.00
LWA → Trait schadenfreude	0.20	0.09	0.32

Personality traits → Trait emotions	β	LCI	UCI
Openness → Empathy	0.13	0.01	0.24
Conscientiousness → Empathy	−0.09	−0.18	0.01

TABLE 2 (Continued)

Non-group-specific path coefficients

Path	Beta	LCI	UCI
Openness → LWA	−0.11	−0.24	0.02
Conscientiousness → LWA	−0.18	−0.30	−0.07
Extraversion → LWA	0.01	−0.10	0.13
Agreeableness → LWA	0.08	−0.05	0.22
Neuroticism → LWA	0.15	0.03	0.26
Extraversion → Empathy	−0.01	−0.10	0.08
Agreeableness → Empathy	0.58	0.46	0.70
Neuroticism → Empathy	0.07	−0.02	0.16
Openness → Schadenfreude	−0.17	−0.29	−0.05
Conscientiousness → Schadenfreude	0.06	−0.05	0.18
Extraversion → Schadenfreude	0.06	−0.06	0.18
Agreeableness → Schadenfreude	−0.28	−0.42	−0.14
Neuroticism → Schadenfreude	0.10	−0.02	0.22

Note: The beta values are standardized.

Abbreviations: LCI, lower 95% confidence interval; UCI, upper 95% confidence interval.

immigrants). Interestingly, agreeableness was NOT related to empathy towards non-competitive groups (i.e., drug dealers and medical specialists). Instead, lower levels of conscientiousness were related to increased levels of empathy towards drug dealers. In terms of schadenfreude, agreeableness was a strong negative predictor for all forms of schadenfreude except for drug dealers, while neuroticism nor conscientiousness were not related to any forms of schadenfreude. Reduced openness was related to increased trait schadenfreude only, which corroborates previous research.

2.2.3 | Ideology to emotions

We last explored the relationship between ideology and emotions. We hypothesized that SDO would be negatively related to empathy and positively related to schadenfreude while RWA should be negatively related to empathy and weakly/not related to schadenfreude. We also expected that LWA would be positively related to empathy and schadenfreude, without strong hypotheses regarding the relative strength compared to SDO and RWA. Starting with empathy, we find broad support for our hypotheses regarding SDO and LWA. SDO was negatively related to trait empathy, as well as to empathy towards competitive groups (i.e., homeless people and undocumented immigrants). Interestingly, SDO was *positively* related to empathy towards drug dealers. RWA showed less consistent patterns, as it was positively related to trait empathy, which went against hypotheses, as well as positively related to empathy towards homeless people. The only time RWA was negatively related to an empathy measure was for undocumented immigrants, which was expected. However, we also expected there to be a negative relationship between RWA and empathy for drug dealers and there was no significant relationship. Last, LWA was positively related to trait empathy as well as to empathy towards all groups, which we hypothesized.

Regarding schadenfreude, again SDO had the most consistent patterns. As expected, SDO was positively associated with trait schadenfreude and schadenfreude towards competitive groups. SDO was unexpectedly also positively related to schadenfreude towards medical specialists and unrelated to schadenfreude towards drug dealers. RWA was negatively related to trait schadenfreude, which fell into our expected patterns. Beyond that, RWA was positively related with schadenfreude towards dangerous groups (i.e., drug dealers and undocumented immigrants) but also with schadenfreude towards medical specialists. Finally, LWA was positively related to trait schadenfreude, and schadenfreude towards groups low in dangerousness (i.e., undocumented immigrants and medical specialists).

2.2.4 | Comparing the ideology to emotion pathways

We compared the path coefficients between ideologies and emotions within groups by bootstrapping the difference between the absolute values of the coefficient, as we expected these relationships to depend on the group in question. More specifically, we hypothesized that SDO and LWA would have stronger relationships with competitive but not dangerous groups (i.e., homeless people) while RWA would have stronger relationships with dangerous but not competitive groups (i.e., drug dealers). We expected few differences for the groups that were equally dangerous and competitive (i.e., drug dealers and medical specialists).

Examining competitive but not dangerous groups, SDO had a significantly stronger relationship than did RWA regarding empathy for homeless people, $\beta_{diff} = 0.17$, $p = 0.030$, 95% CI [0.02, 0.32]. SDO was not significantly more related to empathy compared to LWA, $\beta_{diff} = 0.20$, $p = 0.059$, 95% CI [−0.01, 0.41]. The results for schadenfreude completely conformed to expectations, as SDO had a significantly stronger relationship with schadenfreude towards homeless people compared to RWA, $\beta_{diff} = 0.42$ $p = 0.001$, 95% CI [0.18, 0.66] and compared to LWA, $\beta_{diff} = 0.17$, $p = 0.035$, 95% CI [0.01, 0.33].

Our expectations were not supported regarding the dangerous but not competitive group. RWA was actually more weakly related to drug dealer empathy than SDO, $\beta_{diff} = -0.20$, $p = 0.001$, 95% CI [−0.32, −0.08] and LWA, $\beta_{diff} = -0.44$, $p < 0.001$, 95% CI [0.27, 0.61]. RWA did not differ from either ideology in their relationship with drug dealer schadenfreude: SDO $\beta_{diff} = 0.17$, $p = 0.242$, 95% CI [−0.12, 0.46]; LWA $\beta_{diff} = 0.14$, $p = 0.260$, 95% CI [−0.10, 0.38].

Examining the group that was both dangerous and competitive, as hypothesized SDO was equally as related to empathy for undocumented immigrants compared to RWA ($\beta_{diff} = 0.06$, $p = 0.659$, 95% CI [−0.19, 0.30]). This was true for LWA as well, $\beta_{diff} = -0.06$, $p = 0.592$, 95% CI [−0.26, 0.15]. We found support for our hypotheses regarding schadenfreude as well, as SDO was equally as related to RWA, $\beta_{diff} = 0.18$, $p = 0.184$, 95% CI [−0.09, 0.44]. SDO was more strongly related than was LWA, $\beta_{diff} = 0.35$, $p < 0.001$, 95% CI [0.19, 0.51]. Finally examining the group that was neither dangerous or competitive, SDO was equally related to empathy and schadenfreude towards medical specialists as was RWA (empathy: $\beta_{diff} = -0.02$, $p = 0.774$, 95% CI [−0.17, 0.11]; schadenfreude $\beta_{diff} = 0.15$, $p = 0.312$, 95% CI [−0.14, 0.45]) and LWA (empathy: $\beta_{diff} = -0.20$, $p = 0.048$, 95% CI [−0.38, 0.02]; schadenfreude: $\beta_{diff} = 0.01$, $p = 0.829$, 95% CI [−0.18, 0.14]).

3 | STUDY 2: A PRE-REGISTERED DIRECT REPLICATION OF STUDY 1

Results from Study 1 had many results that conformed to hypotheses but there were several unexpected findings. As we did not pre-register our hypotheses, in Study 2 we conducted a pre-registered direct replication of Study 1 with a larger sample to have greater faith in our findings.

3.1 | Methods

3.1.1 | Participants

We based our sample size for Study 2 on Study 1. We used the *pwrSEM* Shiny app (Wang & Rhemtulla, 2021) to conduct sensitivity analyses. Running 1000 bootstrap samples estimating the power of each regression coefficient, we had 80% power to detect a b as low as |0.14| (which corresponded to β values around $\beta = 0.10$). Increasing the sample size did not substantively lower the detectable b value, so in Study 2 we increased the sample size as much as we could due to monetary constraints ($n = 800$). Study 2's sample was representative in terms of gender, age, and ethnicity in the U.S. from Prolific (https://prolific.co/). We again employed a bot check before restricting the sample to U.S. participants who were at least 18 years old and had above a 95% approval rating.

We recruited a total of 822 participants in Study 2, with 44 participants removed due to not completing all the study measures. That left us with 786 participants, the majority of whom self-identified as White ($n = 594$). Ninety-two self-identified as Black, 44 as Asian, 22 as Latino, one as Middle Eastern, and 31 as multiracial. The mean age of the sample in Study 2 was 45.61, $SD = 15.96$, with 387 self-identified women, 377 self-identified men, 15 nonbinary/gender queer, and seven preferring not to answer or identified as something else. We again had more participants identifying as liberal ($n = 439$) than as conservative ($n = 189$) or neither ($n = 158$).

3.1.2 | Procedures and measures

The procedure in Study 2 was identical to Study 1. An EFA on the Big Five scale again supported a five-factor solution by personality factor, with each factor explaining between 8% and 12% of the variance. We measured SDO, LWA, and RWA in the same way as in Study 1. LWA and RWA were again negatively correlated, $r(786) = -0.30$, $p < 0.001$. Finally, we measured trait and group-specific empathy and schadenfreude identically to Study 1. An EFA using parallel analysis showed adequate separation of empathy

and schadenfreude by target. Empathy (factor loadings between 0.74 and 0.93) and schadenfreude (factor loadings between 0.54 and 0.84) accounted for 38% and 29% of the variance respectively for homeless people. For drug dealers, empathy (factor loadings between 0.81 and 0.91) accounted for 38% of the variance, while schadenfreude (factor loadings between 0.65 and 0.87) accounted for 32% of the variance. For undocumented immigrants, empathy (factor loadings between 0.83 and 0.91) accounted for 39% of the variance while schadenfreude (factor loadings between 0.67 and 0.88) accounted for 34% of the variance. Finally, for medical specialists, empathy (factor loadings between 0.73 and 0.89) and schadenfreude (factor loadings between 0.74 and 0.81) each accounted for 33% of the variance.

3.2 | Results

We pre-registered using the *r.test* function from the *psych* package in *R* (Revelle, 2020) to test differences in correlation strength (using absolute values) as well as the same path analyses as in Study 1. We placed the *r.test* analyses in the supplementary materials for space concerns. We again ran our models using 10,000 bootstrap samples with the lavaan package in *R* (Rosseel, 2012) and include standardized maximum likelihood path coefficients in the path figures. We report the standardized path coefficients in Table 3. Across each model in Study 2, the fit indices revealed a moderate fit to the data. SRMR values were above threshold (ranging from 0.045 to 0.047), but the CFIs (ranging from 0.93 to 0.94), GFIs (ranged from 0.82 to 0.90), RMSEAs (ranging from 0.064 to 0.065), and $\frac{\chi^2}{df}$ ratios (ranging from 4.08 to 4.29) were all slightly below threshold.

While we ran models within each target group, we visualize the results according to our hypotheses outlined in Figure 1. Significant paths found in both Studies 1 and 2 can be found in Figures 3–5.

3.2.1 | Personality to ideology

We pre-registered the hypotheses that SDO would be negatively to agreeableness and openness, RWA would be positively related to conscientiousness and negatively related to openness, while LWA would be negatively related to conscientiousness and agreeableness, and positively related to neuroticism. We found that lower levels of agreeableness were related to higher levels of SDO but not lower levels of openness. Instead, lower levels of neuroticism and increased levels of extraversion was related to increased levels of SDO. In terms of RWA, we found the expected relationships with openness and conscientiousness, but

unexpectedly, extraversion was positively related to RWA as well. Finally, LWA was significantly related to decreased conscientiousness and increased neuroticism but not related to agreeableness.

Thus, across both studies (Figure 3), RWA showed personality correlates that were exactly as hypothesized, while SDO and LWA did not conform as strongly to hypotheses. SDO was hypothesized to be negatively related to agreeableness, which was supported. However, SDO was also consistently positively related to extraversion, which was not hypothesized nor found in previous studies. Finally, LWA showed consistent patterns for two out of the three expected personality correlates, namely low conscientiousness and high neuroticism. Agreeableness was not related to LWA in either study.

3.2.2 | Personality to emotions

We re-registered that empathy would be related to greater levels of agreeableness and openness while schadenfreude would be related to increased openness and neuroticism but reduced agreeableness and conscientiousness. We did not pre-register hypotheses as to how these patterns would differ based on the group in question. What we found was that agreeableness was positively related to trait empathy and empathy towards all groups except towards drug dealers. Instead, lower levels of conscientiousness were related to increased levels of empathy towards drug dealers. Not conforming to hypotheses, openness was unrelated to any form of empathy. In terms of schadenfreude, agreeableness was a strong negative predictor for trait schadenfreude and all group schadenfreude except for drug dealers. while neuroticism nor openness were unrelated all forms. Conscientiousness was related to increased trait schadenfreude only, while unexpectedly extraversion also was positively related to trait schadenfreude.

Comparing patterns across studies (Figure 4), agreeableness is the personality factor that is most related to empathy and schadenfreude. Agreeableness was consistently related to trait emotions as well as related to groups deemed competitive. Agreeableness was unrelated to empathy or schadenfreude towards drug dealers, suggesting this is a unique group. The only personality factor that consistently related to emotions towards drug dealers was the negative relationship between conscientiousness and drug dealer empathy.

3.2.3 | Ideology to emotions

Finally, we pre-registered that SDO would be negatively related to empathy and positively related to schadenfreude,

TABLE 3 Path model regression coefficients in Study 2.

Effect path	Homeless people			Drug dealers			Undocumented immigrants			Medical specialists		
	β	LCI	UCI	β	LCI	UCI	β	LCI	UCI	β	LCI	UCI
Ideology → Group emotions												
SDO → Empathy	−0.38	−0.50	−0.27	0.06	−0.06	0.18	−0.33	−0.45	−0.22	−0.17	−0.32	−0.02
RWA → Empathy	0.09	0.00	0.18	−0.09	−0.19	0.02	−0.19	−0.28	−0.09	0.15	0.03	0.28
LWA → Empathy	0.12	0.04	0.20	0.25	0.15	0.35	0.24	0.16	0.32	0.17	0.07	0.27
SDO → Schadenfreude	0.60	0.46	0.73	0.16	0.03	0.29	0.53	0.38	0.67	0.21	0.08	0.34
RWA → Schadenfreude	0.10	0.00	0.20	0.14	0.02	0.27	0.22	0.12	0.32	0.23	0.12	0.34
LWA → Schadenfreude	0.30	0.21	0.39	0.09	−0.02	0.19	0.11	0.03	0.19	0.29	0.19	0.39
Personality traits → Group emotions												
Openness → Empathy	−0.04	−0.14	0.06	0.09	0.00	0.19	−0.04	−0.13	0.04	0.03	−0.08	0.14
Conscientiousness → Empathy	0.00	−0.08	0.08	−0.15	−0.24	−0.05	−0.06	−0.13	0.01	0.02	−0.09	0.12
Extraversion → Empathy	−0.06	−0.14	0.02	0.05	−0.04	0.15	0.01	−0.06	0.09	0.00	−0.11	0.11
Agreeableness → Empathy	0.47	0.38	0.57	−0.02	−0.12	0.09	0.26	0.16	0.36	0.28	0.16	0.39
Neuroticism → Empathy	0.07	−0.01	0.15	0.08	−0.01	0.17	−0.02	−0.09	0.06	0.01	−0.09	0.11
Openness → Schadenfreude	0.03	−0.06	0.12	−0.09	−0.20	0.02	0.04	−0.05	0.12	0.07	−0.03	0.16
Conscientiousness → Schadenfreude	−0.05	−0.14	0.03	0.10	0.00	0.19	0.02	−0.06	0.09	−0.08	−0.17	0.02
Extraversion → Schadenfreude	0.08	−0.01	0.16	−0.05	−0.16	0.05	0.06	−0.03	0.14	0.07	−0.02	0.16
Agreeableness → Schadenfreude	−0.21	−0.31	−0.11	0.10	−0.02	0.21	−0.12	−0.23	0.00	−0.23	−0.34	−0.13
Neuroticism → Schadenfreude	−0.06	−0.14	0.02	−0.04	−0.14	0.07	0.03	−0.05	0.10	0.06	−0.03	0.15

Non-group-specific path coefficients

Personality traits → Ideology	β	LCI	UCI
Openness → SDO	−0.07	−0.18	0.04
Conscientiousness → SDO	0.06	−0.03	0.15
Extraversion → SDO	0.20	0.11	0.30
Agreeableness → SDO	−0.40	−0.50	−0.31
Neuroticism → SDO	−0.10	−0.20	−0.01
Openness → RWA	−0.26	−0.36	−0.16
Conscientiousness → RWA	0.17	0.08	0.26
Extraversion → RWA	0.23	0.14	0.32
Agreeableness → RWA	−0.10	−0.19	0.00
Neuroticism → RWA	−0.10	−0.20	0.00

Ideology → Trait emotions	β	LCI	UCI
SDO → Trait empathy	−0.26	−0.36	−0.16
RWA → Trait empathy	0.09	0.02	0.17
LWA → Trait empathy	−0.05	−0.11	0.02
SDO → Trait schadenfreude	0.35	0.21	0.49
RWA → Trait schadenfreude	−0.07	−0.17	0.03
LWA → Trait schadenfreude	0.24	0.12	0.36

Personality traits → Trait emotions	β	LCI	UCI
Openness → Empathy	0.02	−0.05	0.08
Conscientiousness → Empathy	0.02	−0.04	0.09

TABLE 3 (Continued)

Non-group-specific path coefficients	β	LCI	UCI
Openness → LWA	−0.06	−0.16	0.04
Conscientiousness → LWA	−0.15	−0.25	−0.05
Extraversion → LWA	−0.04	−0.14	0.06
Agreeableness → LWA	0.10	0.00	0.21
Neuroticism → LWA	0.20	0.10	0.29
Extraversion → Empathy	−0.05	−0.12	0.01
Agreeableness → Empathy	0.79	0.72	0.86
Neuroticism → Empathy	0.06	0.00	0.12
Openness → Schadenfreude	0.01	−0.09	0.12
Conscientiousness → Schadenfreude	−0.12	−0.22	−0.03
Extraversion → Schadenfreude	0.11	0.02	0.21
Agreeableness → Schadenfreude	−0.30	−0.42	−0.18
Neuroticism → Schadenfreude	0.08	−0.01	0.17

Note: The beta values are standardized.

Abbreviations: LCI, lower 95% confidence interval; UCI, upper 95% confidence interval.

RWA would be negatively (or unrelated) related to empathy and schadenfreude, while LWA would be positively related to both empathy and schadenfreude. Starting with empathy, we find broad support for our hypotheses regarding SDO and LWA. SDO was negatively related to trait empathy, as well as for empathy towards homeless people and undocumented immigrants, the two competitive groups for whom we hypothesized SDO would have a particular strong relationship towards. SDO was also negatively related to empathy towards medical specialists. SDO was again unrelated to empathy towards drug dealers. LWA was positively related to empathy towards all groups but not trait empathy. Finally, RWA showed less consistent patterns, as it was positively related to trait empathy and empathy towards medical specialists, which went against hypotheses. RWA was negatively related to empathy towards undocumented immigrants (as hypothesized), but we did not find the negative relationship between RWA and empathy for drug dealers. That relationship was not significant.

Regarding schadenfreude, SDO was positively associated with schadenfreude for all forms. While we assumed SDO would be positively related to schadenfreude specifically for groups that were deemed competitive, exploratory *r.tests* comparisons on the zero-order correlations reveal that SDO's relationships with empathy and schadenfreude towards competitive groups were significantly stronger than SDO's relationships towards non-competitive groups ($ts < 8.22$, $ps < 0.001$). RWA was unrelated to trait schadenfreude but beyond that, RWA was positively related with schadenfreude towards all groups. Doing similar exploratory analyses, we find that RWA's relationships with empathy and schadenfreude towards undocumented immigrants were significantly stronger than those same relationships with non-dangerous groups (i.e., homeless people and medical specialists, $ts < 4.71$, $ps < 0.001$). In contrast, RWA's relationships regarding empathy and schadenfreude towards drug dealers were not consistently stronger. Finally, LWA was positively related to trait schadenfreude, and schadenfreude towards all groups but drug dealers.

Comparing across Studies 1 and 2 (Figure 5), we find support for most of our hypotheses. As predicted, SDO was consistently negatively related to trait empathy and empathy only towards competitive groups. RWA was positively related to trait empathy and negatively related to empathy towards only one of the dangerous groups (undocumented immigrants but not drug dealers), while LWA was consistently positively related to empathy towards all groups (as expected) but not towards trait empathy (contrary to hypotheses). Regarding schadenfreude, SDO was consistently positively related to schadenfreude for trait and group-schadenfreude except for drug dealers.
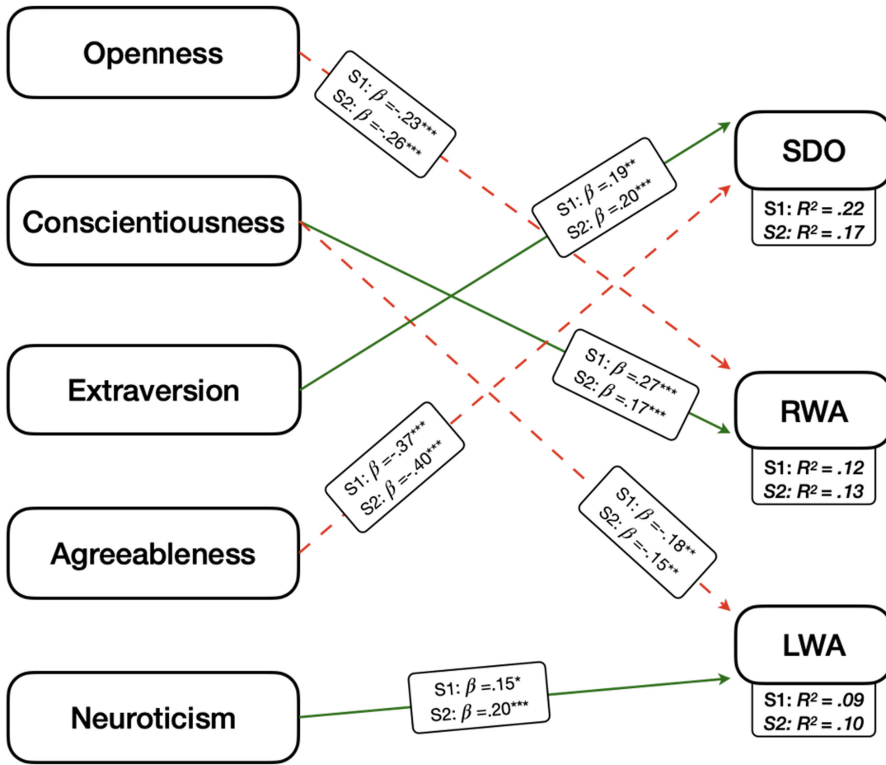
FIGURE 3 Path models: Five personality traits predicting three ideologies in Studies 1 and 2. Presented are standardized regression weights. Only significant pathways that were present in both Studies 1 and 2 are shown in the model. The red dashed lines represent a negative relationship, while the green solid lines represent a positive relationship. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
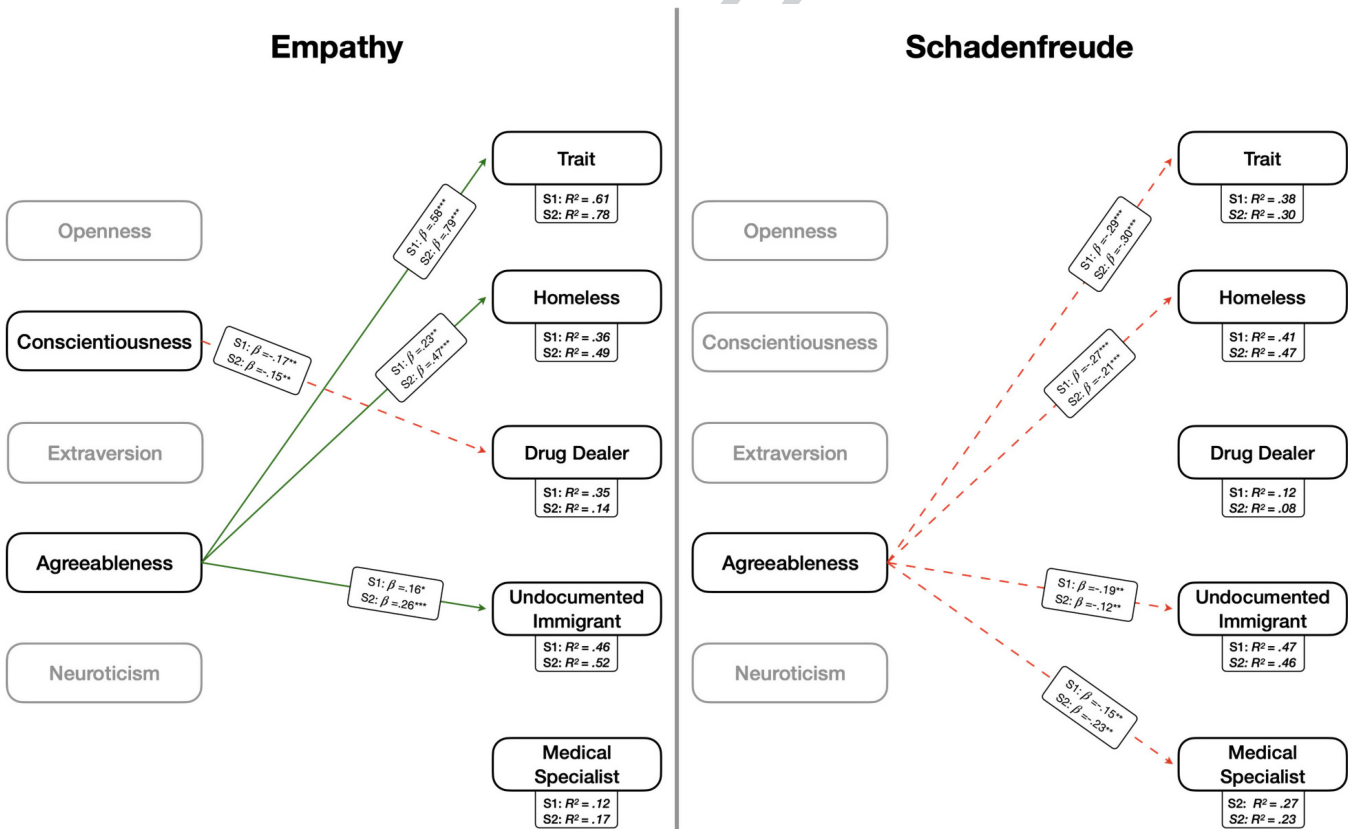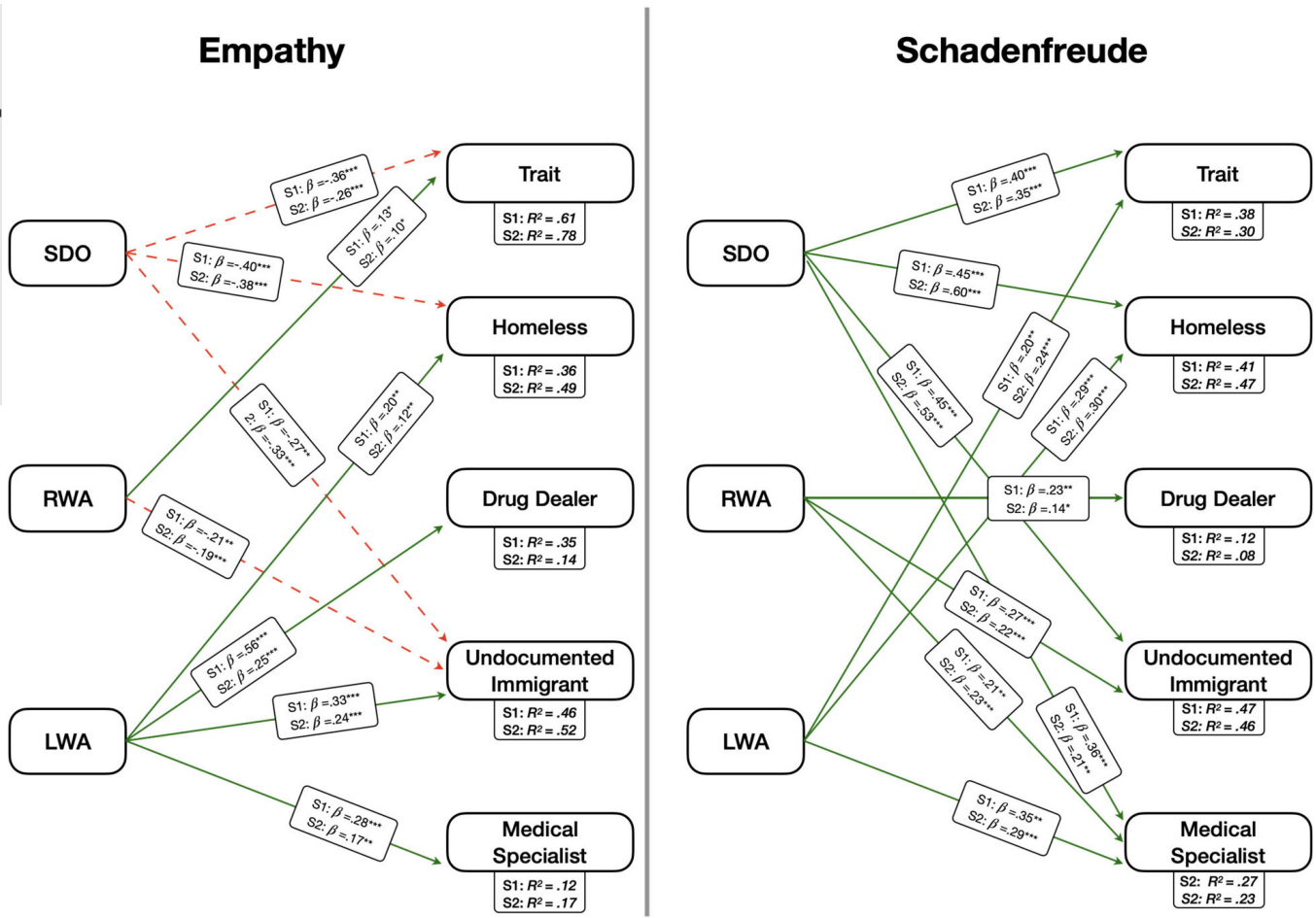

FIGURE 4 Path models: Five personality factors predicting trait- and group-specific empathy and schadenfreude in Studies 1 and 2. Presented are standardized regression weights. Only significant pathways that were present in both Studies 1 and 2 are shown in the model. The gray variables are ones that did not consistently correlate with any emotions. The red dashed lines represent a negative relationship, while the green solid lines represent a positive relationship. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

FIGURE 5 Path models: Three ideologies predicting trait- and group-specific empathy and schadenfreude. Presented are standardized regression weights. Only significant pathways that were present in both Studies 1 and 2 are shown in the model. The red dashed lines represent a negative relationship, while the green solid lines represent a positive relationship. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

RWA was consistently related to schadenfreude towards dangerous groups and medical specialists, while LWA was consistently related to trait levels of schadenfreude and schadenfreude towards non-dangerous groups.

3.2.4 | Comparing the ideology to emotion pathways

We again compared the path coefficients between ideologies and emotions within groups, hypothesizing that SDO (and possibly LWA) would have stronger relationships with competitive but not dangerous groups while RWA would have stronger relationships with dangerous but not competitive groups. We expected few differences for the groups that were equally dangerous and competitive.

First examining competitive but not dangerous groups, our hypotheses were supported completely. SDO had a significantly stronger relationship than did RWA, $\beta_{\text{diff}} = 0.30$, $p < 0.001$, 95% CI [0.20, 0.39], and LWA, $\beta_{\text{diff}} = 0.26$,

$p = 0.002$, regarding empathy for homeless people. This was also true for schadenfreude, as SDO had a significantly stronger relationship compared to RWA, $\beta_{\text{diff}} = 0.50$, $p < 0.001$, 95% CI [0.29, 0.70], and LWA, $\beta_{\text{diff}} = 0.29$, $p < 0.001$, 95% CI [0.16, 0.43]. In contrast, our expectations were not supported regarding the dangerous but not competitive group. RWA was not more related to drug dealer empathy compared to SDO ($\beta_{\text{diff}} = 0.03$, $p = 0.612$, 95% CI [−0.08, 0.13]) and was actually weaker than LWA, $\beta_{\text{diff}} = -0.16$, $p = 0.031$, 95% CI [−0.02, −0.31]. Further, RWA did not differ from either ideology in their relationship with drug dealer schadenfreude: SDO $\beta_{\text{diff}} = -0.01$, $p = 0.910$, 95% CI [−0.24, 0.21]; LWA $\beta_{\text{diff}} = 0.06$, $p = 0.479$, 95% CI [−0.10, 0.21].

Examining the group that was both dangerous and competitive, as hypothesized SDO was equally as related to empathy for undocumented immigrants compared to RWA ($\beta_{\text{diff}} = 0.15$, $p = 0.136$, 95% CI [−0.05, 0.34]) and LWA ($\beta_{\text{diff}} = 0.10$, $p = 0.270$, 95% CI [−0.07, 0.26]). Our hypotheses were not supported regarding schadenfreude, as SDO

was *more* strongly related to schadenfreude towards undocumented immigrants than was RWA, $\beta_{\text{diff}} = 0.31$, $p = 0.008$, 95% CI [0.08, 0.53], and LWA, $\beta_{\text{diff}} = 0.42$, $p < 0.001$, 95% CI [0.29, 0.55]. Finally examining the group that was neither dangerous or competitive, SDO was equally related to empathy and schadenfreude towards medical specialists as was RWA (empathy: $\beta_{\text{diff}} = 0.01$, $p = 0.890$, 95% CI [−0.12, 0.14]; schadenfreude $\beta_{\text{diff}} = -0.02$, $p = 0.851$, 95% CI [−0.25, 0.20]) and LWA (empathy: $\beta_{\text{diff}} = -0.01$, $p = 0.896$, 95% CI [−0.21, 0.22]; schadenfreude: $\beta_{\text{diff}} = -0.08$, $p = 0.169$, 95% CI [−0.23, 0.04]).

4 | GENERAL DISCUSSION

Across two studies, we corroborated and extended past research on the connections between personality, ideology, and emotions. Overall, we find that while both personality and ideology related to trait levels of empathy and schadenfreude (mostly) as predicted, the specific target group assessed mattered. For example, as predicted SDO was negatively related to trait empathy and positively related to trait schadenfreude, and to a greater degree than both RWA and LWA. However, SDO was not always more strongly related to each emotion on the group level. SDO was more strongly related to schadenfreude, compared to RWA, for most groups except for drug dealers, where RWA was more strongly related to schadenfreude. As another example, RWA was positively associated with trait empathy but negatively related to empathy towards undocumented immigrants. There was less evidence that the social group mattered for personality, as the same personality correlates of trait empathy and schadenfreude were also personality correlates of the group-specific emotions, with few caveats. For example, agreeableness was related to empathy and schadenfreude for all targets expect drug dealers. Similarly, conscientiousness was not related to trait empathy but was negatively related to empathy towards drug dealers. These findings underscore the fact that the relationships between ideology, personality traits, and empathy/schadenfreude are not monolithic. Instead, they are sensitive to the context and perhaps the prototypicality of the target in question.

Drug dealers and medical specialists in particular highlighted the limitations of separating groups based on perceived competitiveness and dangerousness, as they were the targets for which the ideological and personality correlates were most dissimilar from predictions. What made drug dealers and medical specialists unique, although their perceived competitiveness and dangerousness were in line with expectations? While we did not measure deservingness or perceptions of fairness, it is likely that drug dealers and medical specialists are seen to be groups that

are undeserving of empathy, albeit for different reasons. Drug dealers are inherently unsympathetic targets, as they contribute to social crises of addictions and cycles of violence (McCorkle, 1993). Thus, any misfortunes that comes to drug dealers likely feel justified and perhaps even celebrated (e.g., decreased empathy and increased schadenfreude) In contrast, while medical specialists were perceived as low in dangerousness and competitiveness, people might not have ever wondered how much empathy or schadenfreude they felt towards medical specialists, rendering this group invisible.

Another reason why these groups might be distinct is due to societal variability in their perceived competitiveness and dangerousness. Part of the reason we conducted a pilot study assessing competitiveness and dangerousness is because the relationships between ideology and emotions should be dependent upon these perceptions, which can change over time. For example, whether SDO or RWA is related to support for strict immigration policies and aggression towards immigrants is dependent upon whether these immigrant are framed as an economic (relevant to those high in SDO) or cultural (relevant to those high in RWA) threat (Guimond et al., 2010; Thomsen et al., 2008). In an era where both drug dealers and medical specialists might be politicized due to the COVID-19 pandemic as well as rising legalization of recreational drugs, perceptions of these targets might be shifting in ways that influence their personality and ideological correlates.

Thus, outcomes related to trait levels of empathy and schadenfreude might only extend to specific groups insofar as they are seen as prototypical recipients of the emotion and deserving of it. Agreeableness's relationship with empathy and schadenfreude was robust and replicable for trait and group specific emotions with the glaring exception of drug dealers. It begs the question as to whether the prosociality associated with being agreeable would extend to drug dealers. This further implies that work on the connections between personality, emotions, and downstream behaviors needs to incorporate the context. In the studies presented, there seemed to be unique personality trait signatures of empathy and schadenfreude for particular groups. Elucidating whether these signatures are replicable and why they manifest is a fruitful endeavor for future research and could help explain why unexpected weak correlations appear in personality→emotions research. The specific groups that people are implicitly thinking of when answering trait empathy and schadenfreude measures across research studies might influence which personality traits become correlated.

While the target-dependency was clearer for ideology than for personality, we did not support our hypotheses across the ideologies equally. RWA and LWA's patterns were not as consistent with hypotheses as SDO's patterns.

We expected RWA to be negatively related to empathy for drug dealers and undocumented immigrants, while LWA would be positively related to empathy for homeless and undocumented immigrants. RWA was only negatively related to empathy for one dangerous group (undocumented immigrants) but not the other (drug dealers). Further, LWA was positively related to empathy for almost all groups, which contrasted with its non-existent relationship with trait empathy. LWA was also related to increased schadenfreude towards medical specialists and homeless people but wasn't consistently related to schadenfreude for drug dealers and undocumented immigrants.

Thus, while we hypothesized that people with higher levels of LWA would show increased empathy and decreased schadenfreude towards the groups that people with higher levels of SDO or RWA would deem a threat to their worldview, these findings suggest that LWA might be sensitive to a third, untapped dimension. Given the wording of several LWA items that center racism and prejudice, LWA might be particularly reactive to marginalized groups most in the public eye, such as race, gender, and perhaps sexual orientation. Of the groups for which LWA did not relate to levels of schadenfreude (i.e., drug dealers and undocumented immigrants), these were the social groups with strong racial connotations (Ghavami & Peplau, 2013). Future research is needed to understand exactly what the effect of authoritarianism is on downstream intergroup outcomes, separated from the ideological lean towards the left or the right. While our results are most consistent with SDO being most relevant for competitive groups, RWA to dangerous groups, and LWA to marginalized groups, it is still unclear what the separations of these dimensions are. Examining these questions would deepen the theoretical impact of the DPM.

Overall, the results suggest that unlike anger and fear, SDO might be more related to moral emotions of empathy and schadenfreude than is RWA or LWA. Indeed, early theorizing about SDO placed a lack of concern for others as a hallmark for someone with high levels of SDO (Pratto et al., 1994), suggesting a more fundamental link between SDO and empathy overall. And as we argued in the introduction, both SDO and schadenfreude become more relevant in competitive, zero-sum situations. The stronger connection between SDO and empathic and counter-empathic emotions does not erase the fact that RWA and LWA were also target-dependent. Thus, there is evidence that the dual process model can be expanded into the realm of empathy and schadenfreude. Future studies should replicate these findings as well as assess perceived competitiveness, dangerousness, and marginalization as relevant precursors to group-specific emotions.

Additionally, future studies should see the extent to which emotions regarding affiliation and disaffiliation more broadly is an important aspect of the dual process model. How interconnected are anger, contempt, fear, and schadenfreude in terms of mediating ideology's impact on intergroup outcomes? There might be latent clusters of emotions relating to positivity/negativity, or affiliation/disaffiliation, that are aligned with the ideological underpinnings of the ideology. These emotional clusters might better explain the connection between ideology and prejudicial behavior rather than studying the emotions in isolation. Only by studying, and manipulating, emotions in various contexts will we be able to answer these questions.

It is important that future research also extends this model to behaviors. We know that SDO and RWA are most predictive of intergroup behaviors towards ideology-relevant groups. Is this also true for LWA and does the amount of empathy and schadenfreude felt facilitate the connection between ideology and behavior? One unpublished set of studies finds that empathy is an emotional mediator between SDO and a decrease in support for helpful intergroup policies, while schadenfreude is an emotional mediator between SDO and an increase in support for harmful policies (Hudson et al., 2022). However, the groups tested were low status. There is an outstanding question as to whether RWA and LWA would predict a decrease in helpful behaviors and an increase in harmful behaviors, but specifically towards groups deemed as dangerous or marginalized, respectively. In line with this idea, that same set of studies found that SDO was not strongly related to schadenfreude for LGBTQ+ people in the United States, a group that is often associated with prejudice from those higher in RWA.

4.1 | Limitations

The present research has several limitations, the first revolving around the nature and length of the scales used. The specific questionnaire used to measure empathy, schadenfreude, personality, and ideologies likely influenced the results, including less precise measurements of a given construct to inconsistent results. Indeed, even in generating the predictions for the direction and strength of the correlations within this study proved difficult due to differences in past operationalizations. Many of the significant relationships replicated from Study 1 to Study 2 but others did not, suggesting the need for future research to understand why. Beyond the limitation of the specific scales used, there is a limitation regarding correlating self-report measures with other self-report measures.

Correlating self-reports with self-reports makes the present results vulnerable to the issue of common method variance. Future studies should measure emotions and personality factors beyond self-report, including relevant behavioral methods. For example, agreeableness can be measured by self-report or by engagement in prosocial behaviors (Graziano et al., 2007). Measuring the connections between personality, ideology, and emotions in different ways will be fruitful in determining the veracity of these relationships.

Furthermore, the groups listed here are rooted in an U.S. context, making their generalizability suspect beyond the United States. Given that these groups should only elicit the personality → ideology → emotions pathway depending on their perceived competitiveness and dangerousness, these specific correlations are embedded in a unique time and place. In other contexts, for example, medical specialists might be perceived as competitive or dangerous, whereas in the U.S. (at the time we ran these studies) they were not. Similarly, the social group that comes to mind when thinking of an "undocumented immigrant" is location- and historically embedded, making these patterns subject to change. While the underlying theory should remain constant (e.g., SDO should be related to reduced empathy and increased schadenfreude towards *competitive* social groups, not dangerous ones), the specific instantiations are likely to fluctuate by context.

As another example of the limitation regarding generalizability, how personality factors manifest and connect with ideology might be subject to context effects. For example, mean levels of SDO varies by country (Fischer et al., 2012), influenced by economic markers of growth. Mean levels of personality factors can also vary by country (Schmitt et al., 2008) and the method of measurement (Heine et al., 2008), as, for example, what it means to "talk a lot" as a measurement of extraversion depend on cultural norms. These dynamics together make it plausible that the impact of personality and ideology on emotions depend on cultural factors that were not studied here. We still believe these studies add to the growing literature on personality, ideology, and (counter)-empathic emotions and can spark generative future research despite the limitations.

5 | CONCLUSION

Understanding the personality and ideological correlates of moral intergroup emotions is critical to leveraging these emotions towards positive intergroup change. To our knowledge, these are the first studies to examine personality correlates of empathic and counter-empathic emotions across targets, to expand the DPM to include empathy and schadenfreude, and to investigate the relationship between RWA/LWA and schadenfreude. Results highlight the importance of target specificity when examining these relationships and encourage future researchers to be explicit regarding which targets they want participants to imagine when generating their empathic and counter-empathic emotions.

DATA AVAILABILITY STATEMENT
Study 2's design and analysis plans were pre-registered prior to collecting the data; Study 2's pre-registration and all study materials, data, code, and supplementary materials can be found on OSF at the following link: https://osf.io/dqp2x/.

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ENDNOTE
[1] We measured ecological dominance orientation (Uenal et al., 2022) as an exploratory measure. We do not discuss it further.

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