

Testing a dual process model of prejudice: Assessment of group threat perceptions and emotions

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Abstract Using American college student samples, two studies were conducted to establish the connection between perceptions of threat posed by people of the Muslim world and intergroup emotions toward this group. Study 1, a correlational study, situated these relationships within Duckitt's (2001) dual process model. Path analyses revealed that perceptions of economic threat from Muslims were predicted by a motivation for hierarchical group relations, as manifested by social dominance orientation. Perceptions of value threat from Muslims were predicted by a motivation for social stability and security, as manifested by right-wing authoritarianism. These economic and value threat perceptions subsequently predicted the intergroup emotions of anger and disgust, respectively. Study 2, an experimental study, involved a manipulation of value threat from Muslims. Results showed that perceiving Muslims to pose a greater threat to Westerners' values heightened feelings of disgust, which subsequently predicted behavioral inclinations to maintain traditional Western values.

Keywords Dual process model · Right wing authoritarianism · Social dominance orientation · Threat perceptions · Intergroup emotions

Introduction

Recent analyses suggest that Americans harbor strong, negative emotions toward Muslims, Arabs, and Middle Easterners (Freyd 2002; Gallup 2009). However, the motivations and cognitions that contribute to distinct emotional responses toward people of the Muslim world among Westerners and the subsequent behaviors stimulated by these emotions have not been fully explored. As such, the factors that may contribute to distinct negative emotions and discriminatory acts against this group remain unclear.

Building from a sociofunctional approach, we conduct two studies to assess the underexplored processes that predict unique emotions and behavioral inclinations toward people of the Muslim world. In addition, based on Duckitt's (2001) dual process model of motivation and cognition, we identify two paths to these perceptions of threat: one through right-wing authoritarianism (RWA) and one through social dominance orientation (SDO). Finally, we examine the extent to which disgust and anger subsequently predict functionally consistent behavioral inclinations.

Intergroup threat perceptions and emotions

A sociofunctional approach to intergroup threat perceptions and emotions proposes that humans have evolved to become group-living animals (Neuberg and Cottrell 2002). This adaptation has likely occurred because group investment provides benefits to individuals beyond what they may achieve alone (Kenrick et al. 2005). Due to the benefits of group membership, mechanisms appear to have developed that ensure the continuation of social groups (Baumeister and Leary 1995). Specifically, humans appear to be attuned to recognize and react to challenges to their group's survival. Challenges to group resources and values

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serve as two of the primary forces that may threaten a group's continuation, and perceptions of these forms of group threat may be associated with the functionally-consistent emotions of anger and disgust, respectively.

Anger

Intergroup emotions, like anger and disgust, appear to serve as adaptive mechanisms that stimulate people to take action. For example, when an outgroup is perceived as threatening ingroup resources or goals, anger will likely result (Gordijn et al. 2006). Anger appears to motivate behavioral inclinations to address economic threats, which include desires to attack another group (Cheung-Blunden and Blunden 2008). Further, all group threats may be considered a blockage of group goals. For example, a threat to values may be considered a blockage to the goal of maintaining the group's cohesion. Thus, even if not an immediate response to a specific threat perception, anger may arise as a secondary response to all intergroup threat perceptions.

Disgust

The intergroup emotion of disgust appears to arise in response to a perceived contamination to one's ingroup (Hodson and Costello 2007; Navarrete and Fessler 2006). This contamination may take the form of a challenge to the ingroup's values, such as when an outgroup is perceived as promoting conflicting social values. Once experienced, disgust may stimulate adaptive behaviors that reduce the potential for contamination from the threatening source, such as preferences to avoid interactions with the outgroup or motivations to preserve societal values (Devos et al. 2003).

Recently, research has begun to assess the associations between disgust and prejudice toward Muslims. For example, Choma et al. (in press) examined the association between disgust sensitivity and Islamophobia, demonstrating that negative emotions moderate the relationship between these constructs. Although this research further supported the connection between disgust and negative intergroup evaluations, it did not examine the association between disgust and distinct threat perceptions of Muslims. Rather, a general favorability thermometer was used to assess Islamophobia. As such, this research could not examine the extent to which distinct emotions are differentially associated with unique perceptions of the threats posed by Muslims. Further, this research did not incorporate measures of behavioral inclinations toward Muslims and therefore could not explore the effects of threat perceptions on behavioral inclinations toward this group.

The sociofunctional approach (Cottrell and Neuberg 2005) proposes that different emotions offer unique adaptive responses to perceived threats. Distinct emotions may follow from different intergroup perceptions and subsequently predict divergent behaviors (see also Cuddy et al. 2007; Mackie et al. 2000). Traditional measures of generalized prejudice may mask the variability in emotions held toward different groups. Therefore, specific intergroup emotions, such as anger and disgust, should be considered separately when attempting to understand the textured nature of intergroup relations. To better understand the relation between different perceptions and emotions, additional exploration of the mechanisms that may contribute to these relationships is needed.

Antecedents of threat perceptions and intergroup emotions: The dual process model

The sociofunctional approach describes the emotional and behavioral consequences of intergroup threat perceptions, but it has not outlined the antecedents of these perceptions. As such, a theoretical framework considering the factors that contribute to different intergroup threat perceptions and their functionally-associated emotions has not been established. Duckitt's dual process model provides a description of the processes that may underlie perceptions of intergroup threat and emotions (Duckitt et al. 2002). The model suggests two pathways to prejudice through the ideological attitudes of RWA and SDO.

RWA encompasses a threat-driven motivation for societal security and cohesion (Duckitt and Sibley 2009a). The dual process model proposes that RWA is influenced by a social conforming personality and a dangerous worldview (Duckitt 2001). Specifically, a social conforming personality is expected to heighten RWA directly, as well as elevate RWA indirectly through increased perceptions of the world as a dangerous place. When an individual possesses a social conforming personality, they want their social world to be secure and predictable. This inclination makes them sensitive to dangerous threats that may impinge upon their security and leads them to express RWA in order to achieve the motivational goals of societal security and cohesion.

By contrast, SDO encompasses a competition-driven motivation for group dominance (Duckitt and Sibley 2009a). Within the dual process model, SDO is indirectly affected by a tough-minded personality through a competitive worldview. When an individual possesses a tough-minded personality, they tend to view the world as a place in which the strong win over the weak. When people hold this worldview, they express SDO in order to reinforce group dominance within the competitive social hierarchy they perceive (Duckitt et al. 2002).

Recent research suggests that the dual process model facilitates prediction of prejudice toward a group or set of groups that encompass separate concerns for those high in RWA and those high in SDO (Cohrs and Asbrock 2009; Duckitt 2006; Duckitt and Sibley 2009b). For example, Duckitt (2006) showed that RWA, but not SDO, was associated with negative attitudes toward social groups perceived as threatening or deviant, like drug dealers. By contrast, SDO, but not RWA, was associated with negative attitudes toward subordinate groups that arouse dominance motivations, like the unemployed. However, research on the dual process model has not directly assessed the associations between ideological attitudes and perceived threats from another group. Further, although research has begun to assess the associations between ideological attitudes and emotions (e.g., Kossowska et al. 2008), research incorporating the full dual process model has not identified mediated pathways from ideological attitudes to intergroup emotions through intergroup threat perceptions.

We conduct both a correlational and an experimental study to fill these gaps in the literature. In a correlational study (Study 1), we extend the dual process model by examining not only the well-established relationships among personality dimensions, corresponding worldviews, and ideological attitudes (i.e., SDO and RWA; Duckitt and Sibley 2009a), but also the under-studied relationships among ideological attitudes, intergroup threat perceptions, and intergroup emotions. Then, in an experimental study (Study 2), we manipulate levels of value threat to assess the effects of these perceptions on specific intergroup emotions. We also explore the effects of threat perceptions on behavioral inclinations through the mediating role of distinct intergroup emotions.

Study 1: Extension of the dual process model to threat perceptions and intergroup emotions

In this correlational study, we expect to replicate the two paths within the dual process model: from social conformity to RWA through a dangerous worldview and from tough-mindedness to SDO through a competitive jungle worldview. Importantly, we also extend these paths to assess Westerners' threat perceptions and intergroup emotions toward people of the Muslim world. In extending the path encompassing RWA, we hypothesize that RWA will predict perceptions that people of the Muslim world pose a threat to values. Maintenance of values is important to those high in RWA, so they are motivated to detect and address possible challenges to traditional values. Since deviant values are considered an ingroup contamination (Cottrell and Neuberg 2005), we hypothesize that value threat perceptions will strongly predict the emotion of

disgust. We also examine whether anger is associated with perceived value threats, as anger is a secondary emotional response to value threat perceptions (Neuberg and Cottrell 2002).

In extending the path that encompasses SDO, we hypothesize that the motivation for group dominance that is captured by SDO will predict perceptions that people of the Muslim world threaten Westerners' economic resources. We expect that those high in SDO are motivated to find and respond to challenges to group hierarchy, which may include threats to the dominant group's economic resources. Anger is the primary response to economic threat perceptions (e.g., Cottrell and Neuberg 2005). Therefore, we hypothesize these perceptions will predict anger. The concept of contamination is not prevalent within perceptions of economic threat. Thus, we do not expect disgust to be strongly associated with economic threat perceptions.

In addition to examining the two pathways in the dual process model, we also hypothesize there will be several links between the pathways. First, we expect economic threat perceptions to predict value threat perceptions. Sidanius and his colleagues postulated that threat perceptions function as legitimizing myths, or beliefs that justify subordination of threatening groups (Sidanius and Pratto 1999). In line with this reasoning, we test the possibility that perceptions that Muslims possess threatening values are the result of efforts to legitimize the ingroup's economic dominance in the face of economic threats. In addition, we also expect to replicate previously-shown links between the dual process pathways (Duckitt 2001). These include a link from a social conforming personality to a tough-minded personality, a link from a competitive jungle worldview to a dangerous worldview, and a reciprocal link between SDO and RWA.

Method

Participants

Undergraduate students (109 female; 49 male) at an American college participated in a 30-min survey. Participants received course credit for their participation and ranged in age from 17 to 22 years ($M = 19.27$, $SD = 1.10$).

Measures

A subset of items from a larger survey was used for this study. Participants indicated the extent to which several adjectives were characteristic or uncharacteristic of their personality and behavior. They responded on a scale ranging from 1 (*most uncharacteristic*) to 7 (*most characteristic*; Duckitt 2001). A social conforming personality was assessed by averaging responses to the following items:

(a) conforming and (b) conventional ($\alpha = .75$). A tough-minded personality was assessed by averaging responses to the following items: (a) ruthless, (b) brutal, (c) kind (reverse-coded), and (d) caring (reverse-coded; $\alpha = .76$).

Participants responded to several items regarding their worldviews through use of a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; see Duckitt et al. 2002). The following items were used to assess a dangerous worldview: (a) “There are many dangerous people in our society who will attack someone out of pure meanness, for no reason at all,” (b) “Every day as society becomes more lawless and bestial, a person’s chances of being robbed, assaulted, and even murdered go up,” (c) “If a person takes a few sensible precautions, nothing bad is likely to happen to him or her; we do not live in a dangerous world” (reverse-coded), and (d) “My knowledge and experience tells me that the social world we live in is basically a safe, stable and secure place in which most people are fundamentally good” (reverse-coded). This scale showed adequate reliability ($\alpha = .68$), and the items were averaged. The following items were used to assess a competitive jungle worldview: (a) “Winning is not the first thing; it’s the *only* thing,” (b) “If it’s necessary to be cold-blooded and vengeful to reach one’s goals, then one should do it,” and (c) “It is much more important in life to have integrity in your dealings with others than to have money and power” (reverse-coded). These items were also averaged ($\alpha = .48$).

Using methods from previous research examining the dual process model (e.g., Duckitt 2006), RWA and SDO were assessed through use of shortened measures of these constructs. Participants responded to items using a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Items were scaled such that higher scores indicated higher levels of RWA and SDO. RWA was assessed through use of five positively-worded and three negatively-worded items from the RWA scale (Altemeyer 1996). These items were averaged ($\alpha = .76$). SDO was assessed through use of four positively-worded and four negatively-worded items from the SDO₆ scale (Sidanius and Pratto 1999). These items were also averaged ($\alpha = .83$).

Threat perceptions were assessed through use of two items each (see Cottrell and Neuberg 2005). Participants were asked to provide their impressions of people who live in the Muslim world by responding to various statements about this group using a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Perceptions of threat to the ingroup’s values were assessed through use of the following items: (a) “They, as a group, possess values that directly oppose the values of people like me” and (b) “They, as a group, hold values that are morally inferior to the values of people like me.” These items were averaged ($\alpha = .66$).

Perceptions of threat to the ingroup’s economic resources were assessed through use of the following items: (a) “They, as a group, take economic opportunities away from people like me” and (b) “They, as a group, decrease the economic opportunities available to people like me.” These items were also averaged ($\alpha = .88$).

In single items, participants indicated how strongly they felt disgust and anger toward people of the Muslim world. They responded on a scale ranging from 1 (*not at all*) to 7 (*very strongly*).

Results

Table 1 provides descriptive statistics and correlations for all variables in Study 1. Path analyses were conducted using maximum likelihood estimation of parameters with AMOS 18.0. Figure 1 provides the standardized path coefficients for the model. Fit indices indicated the model was a good fit of the data ($\chi^2 = 30.72$, $df = 28$, $p = .33$, CFI = .99, NFI = .99, RMSEA = .03). The model accounted for 14% of the variance in perceptions of value threat and 12% of the variance in economic threat perceptions. In addition, 19% of the variance in anger and 16% of the variance in disgust was accounted for by the model. The proportion of variance accounted for in each of the criterion variables (R^2) is provided in Fig. 1.

As seen in Fig. 1, the primary paths within the dual process model were supported. The paths from a social conforming personality to a dangerous worldview and from a dangerous worldview to RWA were each statistically significant. A social conforming personality also directly predicted RWA. The paths from a tough-minded personality to a competitive jungle worldview and from a competitive jungle worldview to SDO were also significant.

RWA was a marginally significant predictor of value threat perceptions, and value threat perceptions significantly predicted disgust and anger. SDO significantly predicted economic threat perceptions. Economic threat perceptions significantly predicted anger and marginally significantly predicted disgust.

As expected, economic threat perceptions significantly predicted value threat perceptions. The path from a social conforming personality to a tough-minded personality demonstrated marginal significance. However, the path from a competitive jungle worldview to a dangerous worldview was not significant. Although RWA was a significant predictor of SDO, SDO did not significantly predict RWA. Although not significant, the paths from a competitive jungle worldview to a dangerous worldview and from SDO to RWA were not removed in order to maintain the dual process model replication (for a similar procedure see Sibley et al. 2007, Study 2).

Table 1 Descriptive statistics and correlations among variables in study 1

Variable	1	2	3	4	5	6	7	8	9	10
1. Social conformity	–									
2. Tough-mindedness	–.14 ⁺	–								
3. Dangerous worldview	.17*	–.04	–							
4. Competitive jungle worldview	.04	.24**	.00	–						
5. RWA	.29***	.11	.27***	.20*	–					
6. SDO	.25***	.17*	.14 ⁺	.36***	.55***	–				
7. Perception of value threat	.17*	.09	.17*	.07	.22**	.28***	–			
8. Perception of economic threat	.20*	.05	.18*	.10	.27***	.35***	.36***	–		
9. Anger	.11	.14 ⁺	.12	.04	.26***	.22**	.38***	.34***	–	
10. Disgust	.14 ⁺	.11	.07	.05	.20*	.20*	.39***	.25***	.76***	–
M	3.80	2.04	3.80	2.25	3.15	2.33	2.95	2.02	2.84	2.13
SD	1.20	.88	1.14	.94	.91	.94	1.42	1.14	1.71	1.49

$n = 158$ for all correlations

⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

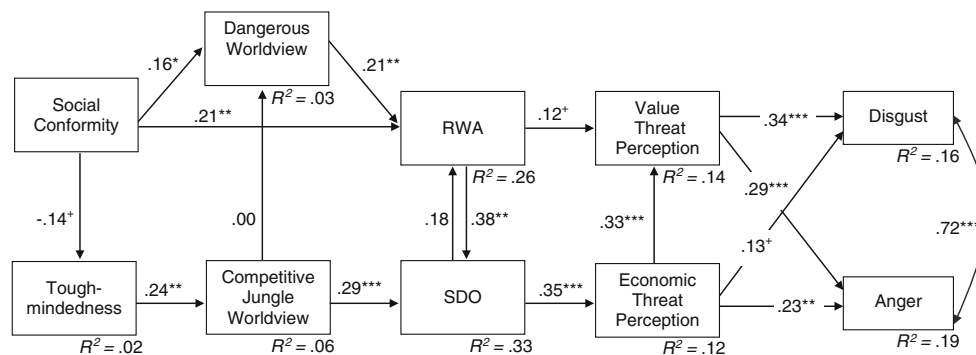


Fig. 1 Standardized path coefficients for the path model predicting perceptions of threat and intergroup emotions toward people of the Muslim world. ⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Post hoc modification indices suggested that only one additional path from a social conforming personality to SDO should be added to the model. There was not a strong theoretical basis for the path's inclusion (Duckitt 2001). Due to the likelihood that inclusion of this path would involve capitalization on a chance relationship and because its inclusion would have decreased the parsimony of the model, the path was not included in the final model.

Testing alternative models

Several alternative models were also considered. In the first, the extent to which value threat perceptions predicted economic threat perceptions was considered, instead of the path going from economic threat to value threat ($\chi^2 = 33.90$, $df = 28$, $p = .20$, $CFI = .98$, $NFI = .97$, $RMSEA = .04$). In a second model, we modified the original model by adding a path from RWA to economic threat perceptions and a path from SDO to value threat perceptions. This created a less parsimonious model than

the original model, and both paths failed to achieve significance ($\beta = .11$, $p = .19$; $\beta = .14$, $p = .11$, respectively). Third, we tested the possibility that, like intergroup threat perceptions, dangerous and competitive worldviews are more appropriately modeled as outcomes rather than predictors of ideological attitudes. The dual process approach makes an important distinction between worldviews and threat perceptions. According to the dual process model, worldviews involve general belief structures regarding the characteristics of the social world (Perry and Sibley 2010). By contrast, intergroup threat perceptions involve specific perceptions of threat regarding a particular group (Sibley et al. 2007). General belief structures about the social world (i.e., worldviews) should precede general ideological orientations (i.e., SDO and RWA), and ideological orientations should predict more specific intergroup threat perceptions (i.e., economic and value threats posed by Muslims). Although we modeled these relationships within our original model, we also assessed the possibility that worldviews may be more appropriately modeled as

outcomes rather than predictors of ideological attitudes. To do so, we assessed an alternative model in which we switched the positions of RWA and SDO with those of the worldviews in the original model ($\chi^2 = 50.50$, $df = 28$, $p = .006$, CFI = .93, NFI = .89, RMSEA = .07). In a final alternative model, we modified the original model by aggregating disgust and anger ($\alpha = .86$). Paths from both economic and value threat perceptions to this aggregate emotion variable were included ($\beta = .20$, $p = .01$; $\beta = .33$, $p < .001$, respectively; $\chi^2 = 28.43$, $df = 22$, $p = .12$, CFI = .97, NFI = .94, RMSEA = .04, $\chi^2_{diff}[6] = 2.29$, $p = .89$). All of the alternative models failed to improve upon the fit of the original model.

Study 2: Effects of threat perceptions on intergroup emotions and behavioral inclinations

To explore the causal effects of threat on intergroup emotions and behaviors, Study 2 incorporates an experimental manipulation of value threat from people of the Muslim world and measures its effects on disgust, anger, and passive behavioral inclinations toward Muslims related to preserving the ingroup's values.¹ Passive behavioral actions have repercussions for the target group but are not deliberately conducted for the purpose of affecting that group (Cuddy et al. 2007). Based on previous research and theory (e.g., Devos et al. 2003), we expected value threat to provoke disgust, and disgust to be associated with passive behavioral inclinations to reject or isolate one's group from the source of value threat, as these behaviors serve to reinforce the ingroup's values in the face of a perceived value contamination (Cottrell and Neuberg 2005). Furthermore, we expected a mediational model to show that the effect of value threat on passive behavioral inclinations to preserve values operates through disgust, but not anger.

Method

Participants

Undergraduate students (89 female; 73 male) at an American college participated in a 30-min survey. Participants

¹ In another experiment, American participants were randomly assigned to read an article describing relations between the Muslim and Western worlds as involving either high or low *economic* threat. However, a manipulation check indicated that the two groups did not significantly differ in their perceptions of economic threat ($t[51] = -.17$, $p = .86$). This suggests that the manipulation of economic threat was ineffective, perhaps for the same reason there may have been a restriction of range on perceptions of economic threat in Study 1: threats from Muslims toward Westerners in the global economy may be low in ecological validity.

received course credit for their participation and ranged in age from 18 to 23 years ($M = 19.23$, $SD = 1.08$), with one participant declining to report age. No participants identified as Muslim.

Design and procedure

Participants were randomly assigned to read an article in which people of the Muslim world were described as either opposing the values and norms of Westerners (high value threat condition, $n = 82$), or appreciating Western values (low value threat condition, $n = 80$). The article topics utilized in this study resemble those of widely distributed news reports (e.g., Efron 2007). After reading the article, participants answered questions about the perceived threats that people of the Muslim world pose. Participants then responded to items regarding their emotions and behavioral inclinations toward this group. Upon study completion, participants were fully debriefed regarding the fictitious nature of the article and study purpose.

Measures

Participants completed two items regarding their value threat perceptions ($\alpha = .80$) and two items regarding their economic threat perceptions ($\alpha = .95$). These two sets of items were counterbalanced, and were identical to the items used in Study 1.

To assess intergroup emotions, participants responded on a scale ranging from 1 (*not at all*) to 7 (*extremely*; see Cottrell and Neuberg 2005). Two items were used to assess anger. Participants indicated how angry and how mad they were at people of the Muslim world, as a group. Disgust was also measured through use of two items. Participants indicated how morally disgusted and how morally sickened they were by people of the Muslim world, as a group. Both measures of anger ($\alpha = .61$) and disgust ($\alpha = .83$) showed acceptable reliabilities, and the items in each scale were averaged to create two composite variables.²

² In order to further investigate the internal consistency of the anger measure, a crosstabulation of participant responses to the two items assessing anger was conducted. This analysis showed that two participants provided contradictory responses to these two items, namely a 1 for one item and either a 5 or 6 for the other (no participant reported a 7). Removal of these two participants increased the Cronbach's alpha of the scale to .66. However, when these two participants were not included in the remainder of analyses for Study 2, results showed little variation from the original analyses in which these participants were included. Specifically, the direction of all relationships remained the same and the strength of the effects showed minimal variation. Thus, all analyses reported within Study 2 include these two participants.

To assess passive behavioral inclinations related to preserving values, participants indicated the extent to which they would consider performing a series of acts regarding avoiding information about people of the Muslim world. They responded to the following items on a scale ranging from 1 (*I would not consider this at all*) to 7 (*I would consider this extremely seriously*): (a) “opposing the teaching of the values of people of the Muslim world to children in my community,” (b) “preventing a child from reading books written by people of the Muslim world or watching TV shows showing their lifestyles,” and (c) “refusing to watch television programs and movies featuring people of the Muslim world.” This scale showed acceptable reliability ($\alpha = .74$), and the items were averaged.

Manipulation check

First, the effectiveness of the manipulation was assessed through use of an independent samples *t*-test. As expected, participants in the high value threat condition ($M = 3.02$, $SD = 1.38$) demonstrated significantly greater perceptions of value threat than those in the low value threat condition ($M = 2.21$, $SD = 1.37$), suggesting the manipulation was effective; $t(160) = -3.90$, $p < .001$. A second test revealed that the two groups did not significantly differ in their perceptions of economic threat from people of the Muslim world; $t(159) = -.81$, $p = .42$.

Results

Table 2 provides descriptive statistics and correlations for the variables within these analyses. Participants in the high value threat condition ($M = 1.92$, $SD = .87$) reported stronger value behavioral inclinations than those in the low value threat condition ($M = 1.50$, $SD = 1.09$; $r[160] = .20$, $p = .01$).

A path analysis using maximum likelihood estimation of parameters with AMOS 18.0 was used to assess the extent to which disgust and anger mediated the relationship between the value threat condition and behavioral inclinations. Figure 2 provides the standardized path coefficients for the mediation model. As seen in the figure, the error terms of disgust and anger were allowed to covary. The fit indices indicated that the model was a good fit of the data ($\chi^2 = 2.08$, $df = 1$, $p = .15$, $GFI = .99$, $CFI = .99$, $NFI = .97$, $RMSEA = .08$). The model accounted for 5% of the variance in disgust and 1% of the variance in anger. In addition, 32% of the variance in value behavioral inclinations was accounted for by the model. As seen in Fig. 2, the manipulation of value threat significantly predicted disgust ($\beta = .23$, $p = .002$), but not anger ($\beta = .11$, $p = .15$). Both disgust and anger significantly

Table 2 Descriptive statistics and correlations among variables in study 2

Variable	1	2	3	4
1. Value threat condition (0 = low value threat; 1 = high value threat)	–			
2. Disgust	.23**	–		
3. Anger	.11	.74***	–	
4. Value behavioral inclinations	.20**	.55***	.51***	–
M	.51	1.93	1.90	1.71
SD	.50	1.11	1.06	1.00

$n = 162$ for all correlations

** $p < .01$; *** $p < .001$

predicted value behavioral inclinations ($\beta = .38$, $p < .001$; $\beta = .23$, $p = .02$, respectively).³

Two mediation analyses were tested to further examine the relationships among the variables in the model. First, the extent to which disgust mediated the relationship between the value threat condition and value behavioral inclinations was assessed using a bootstrapping-based procedure (Preacher and Hayes 2004). This procedure examined whether this indirect pathway significantly differed from zero, which is the case when the upper and lower limits of the 95% confidence interval (CI) do not include zero. As expected, the 95% CI did not include zero (95% CI = .08 to .43, $p = .004$), indicating a significant indirect pathway through disgust. The indirect pathway from the value threat condition to value behavioral inclinations through anger was assessed next. In this second mediation analysis, the 95% CI did include zero (95% CI = $-.04$ to .27, $p = .15$), indicating a non-significant indirect pathway through anger.

An alternative to the model shown in Fig. 2 was also assessed. Within this model, the positions of the intergroup

³ We also conducted analyses in which we controlled for the possibility that intergroup emotions may provoke particular behavioral inclinations because they are more extreme than other behaviors. To do so, perceptions of the extremity of each of the three behaviors were assessed and aggregated ($\alpha = .89$). The composite of the value behavioral inclinations was then regressed on the extremity ratings and a residualized value behavioral inclination variable was computed. This residualized variable served as the dependent variable in the new model. The model was a good fit of the data ($\chi^2 = 1.06$, $df = 1$, $p = .30$, $CFI = 1.00$, $NFI = 1.00$, $RMSEA = .02$). The indirect pathway from the value threat condition to residualized value behavioral inclinations was significant through disgust (95% CI = .06 to .36, $p = .006$), but not through anger (95% CI = $-.04$ to .23, $p = .17$). Further, disgust significantly predicted residualized value behavioral inclinations ($\beta = .37$, $p < .001$), and anger marginally significantly predicted these residualized inclinations ($\beta = .19$, $p = .06$). This suggests that part of the association between anger and non-residualized value behavioral inclinations was due to the association between anger and more extreme acts.

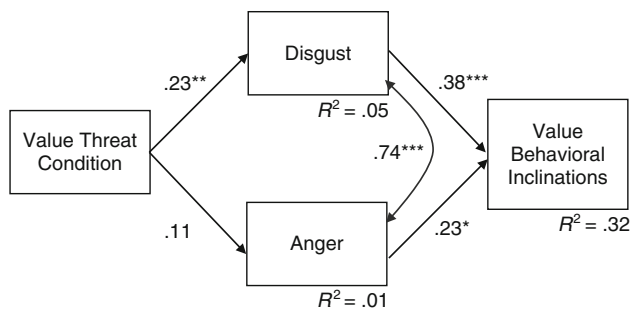


Fig. 2 Standardized path coefficients for the path model predicting intergroup emotions and value behavioral inclinations toward people of the Muslim world. * $p < .05$; ** $p < .01$; *** $p < .001$

emotions and the value behavioral inclinations were switched. This alternative model yielded a poorer fit than the original model ($\chi^2 = 5.56$, $df = 2$, $p = .04$, CFI = .98, NFI = .95, RMSEA = .11, $\chi^2_{diff}[6] = 2.29$ $p = .06$). This suggests that the original, hypothesized model served as a better representation of the variable relationships than did the alternative model.

General discussion

The dual process model proposes two pathways to prejudice (Duckitt 2001). These paths proceed from unique personalities to corresponding worldviews and from these worldviews to functionally-relevant ideological attitudes and prejudice. However, assessment of the extent to which these paths predict distinct intergroup threat perceptions and emotions has not been examined. One purpose of this research was to extend the dual process model to threat perceptions and emotions toward people of the Muslim world, thereby establishing whether different threat perceptions mediate the relationships between ideological attitudes (i.e., RWA and SDO) and intergroup emotions (i.e., disgust and anger). As such, this research permitted assessment of who in the Western world may be more likely to perceive distinct threats and feel different emotions toward Muslims.

Study 1 demonstrated that the motivational goals encompassed within RWA and SDO extend to unique perceptions of the threats posed by people of the Muslim world, and new to this assessment of the dual process model, results suggested that these perceptions predict different emotions toward this group. Specifically, higher levels of SDO predicted greater perceptions that people of the Muslim world pose economic threats to Westerners. Thus, a motivation for group dominance, as encompassed by SDO, appears to be associated with perceptions that an outgroup is challenging the global hierarchy by attempting to take away resources from the dominant ingroup. Economic threat perceptions also significantly predicted

perceptions that people of the Muslim world threaten the ingroup's values. This suggests that value threat perceptions serve as legitimizing myths (Sidanius and Pratto 1999). When members of an economically dominant group (e.g., Westerners) feel their resources are threatened, they may try to justify their own group's superiority by derogating the other group's values. Further, as expected, the emotional response to economic threat perceptions was anger. This suggests that anger arises in response to an obstacle to maintaining group-based dominance, which includes threats to economic resources. However, economic threat perceptions are not associated with a contamination to the ingroup, and results showed that these perceptions were a weaker predictor of disgust.

RWA positively predicted perceptions that people of the Muslim world pose a threat to Western values. These perceptions strongly predicted disgust but also significantly predicted anger. Those high in RWA are motivated to maintain their societal values and norms (Duckitt et al. 2002), and this motivational goal appears to lead them to be more vigilant to the possibility that another group may challenge their society's values. Once they perceive that their social values are threatened, those high in RWA subsequently feel disgust toward the threatening group, which serves as the primary emotional response to a perceived contamination of values (Neuberg and Cottrell 2002). Anger appears to serve as a secondary emotional response to this perception. This is not surprising. A threat to values presents an obstacle to the maintenance of one's society, and anger is an emotional response to the blocking of ingroup goals (Cottrell and Neuberg 2005).

Although worldviews and intergroup threat perceptions both address perceptions of threat, worldviews address an individual's beliefs regarding the general characteristics of the social world (Perry and Sibley 2010). Specifically, a dangerous worldview measures an individual's perception that the world, in general, is a dangerous and chaotic place (see Sibley et al. 2007). By contrast, intergroup threat perceptions concern an individual's perception that a particular group poses distinct threats to one's ingroup. The weak to moderate associations among worldviews and intergroup threat perceptions reported within Study 1 support the contention that these are separate and distinct constructs. Further, the results reported in this study demonstrate that worldviews are best conceptualized as predictors of ideological attitudes, and ideological attitudes are best conceptualized as predictors of specific intergroup threat perceptions.

Overall, perceptions that people of the Muslim world threaten the ingroup's values appear to serve as a stronger direct predictor of emotions felt toward Muslims than perceptions that this group threatens economic resources. Perceptions of value threat may have been more influential

in driving emotions toward people of the Muslim world because these perceptions were greater and more variable than economic threat perceptions. Indeed, both the mean and standard deviation of value threat perceptions ($M = 2.95$, $SD = 1.42$) were higher than those of economic threat perceptions ($M = 2.02$, $SD = 1.14$). An artificial restriction of range on economic threat (possibly due to perceptions of the limited economic competitiveness of the Muslim world) also may have been responsible for its weaker associations with the emotions.

A second purpose of this research was to advance assessment of the sociofunctional approach to prejudice (Neuberg and Cottrell 2002). The mediational analyses of Study 2 suggest that threats to values from another group causally influence passive behavioral inclinations to preserve and maintain the ingroup's values through feelings of disgust, but not through feelings of anger. This suggests that these inclinations are specific to certain perceptions of threat regarding people of the Muslim world, and demonstrates the distinct role played by disgust in mediating this effect of value threat on value behavioral inclinations. These analyses support research addressing the specificity of certain intergroup emotions in mediating the relationships between particular intergroup appraisals and actions (Cuddy et al. 2007; Mackie et al. 2000).

Implications for understanding intergroup relations

This is the first research to extend the dual process model to different emotions felt toward another group. To the extent that specific intergroup emotions predict specific intergroup behaviors, these results have implications for international relations. On an international scale, the behavioral response of an angry populace is likely to be one of aggression toward the offending group. Alternatively, feelings of disgust may be associated with attempts to maintain traditional values. These findings highlight the possibility that different interventions may be needed to address the distinct motivations that predict Westerners' perceptions and emotions toward people of the Muslim world. For example, interventions emphasizing value parallels between the Muslim and Western worlds may help to reduce disgust and inclinations to avoid information from and interactions with people of the Muslim world (Hodson & Costello 2007). However, interventions emphasizing cooperative economic collaborations may be more effective in reducing anger.

The present research also suggests that news articles emphasizing a clash of values between the Muslim and Western worlds have a strong potential to increase feelings of disgust toward Muslims and thereby heighten inclinations among Westerners to behave in ways that preserve their values. In our study, even a mild manipulation

suggesting that people of the Muslim world oppose Western values was able to significantly impact Westerners' perceptions of value threat from this group. This suggests that Westerners perceive value threat from Muslims as a legitimate concern, and are willing to react quickly to it in terms of their cognitions, emotions, and behavioral inclinations. Future research should continue to assess the impact of both economic and value threat manipulations on intergroup and intragroup behavioral inclinations, including additional measures of active and passive behavioral inclinations (see Cuddy et al. 2007).

Limitations

This research is not without limitations. The extent to which these results generalize to perceptions of another group is not known. Perceptions of value threat may have been particularly easy to influence regarding people of the Muslim world because the description of "Muslim" stimulated Westerners' thoughts regarding religious values. Further, it may be difficult to effectively manipulate Westerners' perceptions of economic threat regarding people of the Muslim world, as Muslim countries, on average, tend to be much poorer than non-Muslim countries (USAID 2004). To assess the theoretical propositions of this research, another group may be more easily framed as posing an economic and value threat to Westerners (e.g., Chinese).

In addition, although the studies' hypotheses were supported, some of the effects were relatively weak. For example, in Study 1, RWA was a marginally significant predictor of perceptions of value threat. We utilized relatively few measures of each construct in order to reduce the potential for participant fatigue. However, use of fewer measures has several limitations. Use of these brief scales may have reduced our ability to capture the full variability of participants' perceptions and emotions toward people of the Muslim world, and these measures also may have reduced the power of our analyses, limiting our detection of certain effects. Further, use of the simple, single-item measures of anger and disgust in Study 1 may have contributed to the high interrelationship between these constructs ($r = .76$). Future research should incorporate highly reliable multi-item measures in order to address these limitations.

This research also utilized a narrow subset of the American population, a college student sample. This group possesses a series of unique characteristics that differentiate them from the broader population (Oakes 1972). Thus, these results may not generalize to all Americans or all Westerners. For example, standing in contrast to previous research suggesting strong negative sentiments toward people of the Muslim world among Westerners (Freyd 2002; Gallup

2009), our undergraduate student participants reported relatively low levels of anger and disgust toward Muslims ($M = 2.84$, $SD = 1.71$ and $M = 2.13$, $SD = 1.49$, respectively, on scales ranging from 1 = *not at all* to 7 = *very strongly*). However, the present research enhances understanding of the basic and applied processes within the dual process model and the sociofunctional approach to prejudice. Use of undergraduate samples permitted initial examination of these processes, and we would expect similar processes to operate among other Western samples. However, a replication of this research using a random sample of adults in the general population would offer a welcome increase in the generalizability of these results.

Conclusion

The dual process model provides a theoretical framework for understanding the antecedents of intergroup emotions and behaviors. Use of the model can help predict who is likely to feel disgust and anger toward people of the Muslim world, and thus, who is more likely to discriminate against this group in certain ways. Although threat perceptions, emotions, and behaviors toward another group may serve an adaptive purpose, they can also have a detrimental impact on peaceful intergroup relations. An understanding of why people hold different intergroup perceptions and how these perceptions influence emotions and behaviors can help reduce prejudice and improve intergroup relations.

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