

Threat and Outgroup Derogation—A Social Neuroscience Perspective

A Thesis Submitted to the Faculty of Graduate and Postdoctoral Studies
in Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy in Psychology

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Abstract

The overall objective of this program of research was to study the consequences of engaging in outgroup derogation. In particular, we studied if in threatening intergroup contexts, derogation, as suggested by social identity theory, alleviates stress or, in line with the model of intergroup anxiety, exacerbates the negative connotations of a threatening situation, resulting in more stress. To achieve this objective, four studies were conducted with undergraduate students, which varied in the stress-related indicators they measured (salivary cortisol and salivary alpha-amylase), psychological indicators associated with ingroup threats (sentiments of anger and identity), as well as the forms of derogation they investigated (having an opportunity to derogate, engaging in implicit linguistic derogation, and an explicit measure of derogation). The first two studies offer a simple demonstration of the relationship between having an opportunity to derogate and physiological stress, as measured by salivary cortisol in study 1, and salivary alpha-amylase in study 2, in a threatening context. The findings from study 1 (N = 110) revealed that in a threatening intergroup context, even an opportunity to engage in bias is associated with an increase in cortisol, a product of hypothalamic-pituitary-adrenal axis activity. Study 2 (N = 66), however, showed that threatened participants who had an opportunity to derogate did not show higher alpha-amylase concentrations, an indicator of sympathetic-adrenal-medullary axis activity. The third study (N = 169) incorporated a measure of linguistic derogation based on the linguistic intergroup bias paradigm. Findings suggested that reading a threatening passage was associated with an increase in cortisol levels, as was displaying linguistic bias after being threatened. The fourth study (N = 322) addressed some of the limitations of the first three studies by also assessing the

anger and identity-related costs of experiencing a threat and by providing an opportunity to engage in derogation to deal with the perceived threat. A form of explicit derogation was also investigated. The results indicated that following exposure to an intergroup threat, sentiments of anger increased and identification with the ingroup decreased. Among threatened participants, those who engaged in explicit derogation showed more anger and no increase in identification with the ingroup compared to those who did not engage in derogation. Threatened participants who engaged in implicit forms of derogation showed no decrease in anger nor an increase in identification with the ingroup. Together, these studies suggest that exposure to threat is harmful, and is especially so when outgroup derogation is used to deal with it. Overall, the findings from this study address some key methodological limitations in the literature by introducing a neuroscientific approach, as well as furthering the research on the social consequences of outgroup derogation.

Résumé

L'objectif de ce programme de recherche est d'étudier les conséquences de s'engager dans la dérogation d'un exogroupe. En particulier, nous avons étudié si dans des contextes intergroupes menaçants, la dérogation atténue le stress, tel que suggéré par la théorie de l'identité sociale, ou si, en concordance avec le modèle d'anxiété intergroupe, elle exacerbe les connotations négatives d'une situation menaçante, résultant en plus de stress. Afin d'atteindre cet objectif, quatre études ont été menées auprès d'étudiants au baccalauréat. Ces études varient selon les indicateurs de stress qui étaient mesurés (cortisol salivaire, alpha-amylase salivaire, sentiments de colère, et identité), ainsi que selon les formes de dérogation qui ont été examinées (avoir l'occasion de déroger, s'engager dans de la dérogation langagière implicite, et une mesure explicite de dérogation). Les deux premières études offrent une simple démonstration de la relation entre avoir l'opportunité de déroger dans un contexte menaçant et le stress physiologique, tel que mesuré par le cortisol salivaire dans l'étude 1, et l'alpha-amylase salivaire dans l'étude 2. Les résultats de l'étude 1 (N = 110) révèlent que dans un contexte intergroupe menaçant, même une opportunité de s'engager dans des biais est associée avec une augmentation du cortisol, un produit de l'activité de l'axe hypothalamo-hypophyso-surrénalien. Toutefois, l'étude 2 (N = 66) montre que les participants menacés qui ont eu l'occasion de déroger ne manifestent pas de plus grandes concentrations d'alpha-amylase, un indicateur d'activité de l'axe médullosurrénal sympathique. La troisième étude (N=169) incorpore une mesure de dérogation linguistique basée sur le paradigme du biais linguistique intergroupe. Les résultats suggèrent que lire un passage menaçant est associé à une augmentation des niveaux de cortisol. Cette augmentation s'observe aussi lorsque

les participants avaient l'occasion de montrer un biais linguistique suite à une menace. La quatrième étude (N = 322) aborde quelques limites des trois premières études, en évaluant aussi la colère et les conséquences pour l'identité en lien avec l'expérience d'une menace, suivie d'une opportunité de déroger pour gérer la menace perçue. Une forme de dérogation explicite était aussi étudiée. Les résultats indiquent que, suite à l'exposition à une menace intergroupe, la colère augmente et l'identification à l'endogroupe diminue. Parmi les participants menacés, ceux qui étaient engagés dans la dérogation explicite montrent plus de colère et aucune augmentation de l'identification à l'endogroupe, en comparaison avec ceux qui ne s'engagent pas dans la dérogation. Les participants menacés qui s'engagent dans des formes implicites de dérogation ne montrent aucune diminution de la colère ni une augmentation de l'identification à l'endogroupe. Dans leur ensemble, ces études suggèrent que l'exposition à une menace est nuisible, et l'est particulièrement lorsque la dérogation exogroupe est utilisée pour la gérer. De façon générale, les résultats de ces études touchent à des limites méthodologiques clés en introduisant une approche neuroscientifique, tout en avançant la recherche sur les conséquences sociales de la dérogation exogroupe.

Acknowledgments

To my supervisor, Richard Clément, I would like to express my gratitude for his mentorship, in-depth feedback, immense knowledge, and overall guidance. To my co-supervisor, Catherine Bielajew, I thank her for her support, insights, and expertise.

To my thesis committee members, Richard Bourhis, Nafissa Ismail, Dave Miranda, and Luc Pelletier, thank you for your valuable input and suggestions.

My time in graduate school was greatly aided by friends from close and afar:

To my lab mates, Katie, Nathalie and Odilia, who quickly became great friends, thank you for the countless stimulating discussions, both light-hearted and deep, laughter, adventures around the world, and continuous support.

To my work buddies, Kelly, Leah, Carleigh, and Meredith, thanks for the countless work sessions. Thank you for always motivating me and encouraging me, exploring different coffee shops around the city, and hearing me complain incessantly about the little struggles without getting annoyed.

To my PS sisters, Sam, Stacey, Megan, and Jane—thank you for your openness and warmth, for those beautiful discussions, for inspiring me, and for always being ready to craft, to dance, and for the next adventure.

To my friends, Kathy, Susanna, Jacky, and Maude, thank you for being there through all the triumphs and struggles, laughter and tears, and for your kindness, warmth, and love through it all.

To my parents, thank you for exemplifying hard work, perseverance, and dedication. To my sisters, I am eternally thankful for all your support and love, and for you being my people. Lastly, thank you to my nieces for the countless dance parties, cuddles, and all-around silliness.

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General Introduction

Discrimination and prejudice persist in contemporary society and are major challenges to social integration and harmony (Eurobarometer, 2012). Language is the primary means through which biased and discriminatory beliefs are transmitted and maintained, and through which biased representations of social reality become shared (e.g., Allport, 1954; Bourhis & Maass, 2005; Collins & Clément, 2012; Fiedler & Schmid, 2001; Maass, 1999; Wigboldus, Spears, & Semin, 2005). Outgroup derogation, which often takes the form of verbal behaviour, has been frequently studied in social psychology (e.g., Brewer, 1979; Messick & Mackie, 1989; Mullen, Brown, & Smith, 1992; Tajfel, 1982), and is associated with perceptions of threat (See Riek, Mania, & Gaertner, 2006, for review). This relationship between intergroup threat and behaviour has historically been studied using self-report measures, but has recently been revitalized with the introduction of neuroscience methodologies. This area of research lends itself directly to social neuroscience approaches because they help circumvent some of the important measurement-related issues associated with directly measuring the impact of threat as well as those inherent in the use of self-report measures (Scheepers, 2013). This program of research aims to better understand how perceptions of intergroup threat, physiological stress, and emotions interact to result in outgroup derogation. In order to do so, we will draw on the following theories: (1) Social Identity Theory (SIT; Tajfel & Turner, 1979) and Intergroup Emotions Theory (IET; Smith & Mackie, 2000), and (2) the Model of Intergroup Anxiety (MIA; Stephan & Stephan, 1985) and investigate them following social psychological and neuroscience approaches.

Group Membership

Humans are social beings. For early humans, the ability to communicate and to live in a group setting were some of the key features that allowed for survival over time (Correll & Park, 2005). Living in a group setting and belonging to a group required co-operation with other group members and interdependence, and ultimately led to reciprocal relationships that benefited group members. However, increased dependence on ingroup members and a desire to maximize opportunities arising from group living made people sensitive to and vigilant about threats to the ingroup, whether such threats were to resources (e.g., land) or to other behaviours that might prevent the ingroup from functioning both effectively and efficiently (Cottrell & Neuberg, 2005; Neuberg & Cottrell, 2002). Sharing and co-operating with outgroups has been more complicated, because it was harder to know their intentions, if they could be trusted, and whether they would reciprocate. Thus, while living in a group setting resulted in a number of material and symbolic advantages in our evolutionary past, it has also made people warier of outgroups and sensitive to threats originating from outside their communities.

In the present world, groups can vary in size from as small as a couple, to as large as a political party, to even larger groups, such as gender or race. The groups that people belong to have an enormous influence on them, impacting how they “think about the world, how they feel, and how they behave—indeed, all behaviour—is guided and sometimes constrained by the group(s) to which they belong” (Yzerbyt & Demoulin, 2010, p. 1024). Moreover, categorizing people into “us” and “them” significantly impacts the treatment of ingroup and outgroup members. Social conflicts arise when groups rely on each other for important resources or outcomes and, through the actions of one group or both, deprive one another of these resources/outcomes (de Dreu, 2010).

Intergroup Relations and Intergroup Threat

Intergroup relations is the umbrella term for research studying how people are influenced “by their own or their partner’s group membership” (Yzerbyt & Demoulin, 2010, p. 1024). Seminal work by Sherif (1966) set the stage for the emergence of a field of study on intergroup threats and conflict (De Dreu, 2010). His original study involved recruiting 22 twelve-year-old boys who were under the assumption that they would be going to a summer camp. Participants were not made aware that there were two groups of boys, and they only met those from their group. They were told later on about the existence of a second group and were put in situations in which the groups directly competed in various games, in which only one winner emerged. These conditions led to outgroup derogation and hostility, causing Sherif to suggest that prejudice and discrimination result when groups perceive a threat from other groups. These threats can result from perceived competition for resources, be it symbolic items, such as prestige and power, or material resources, such as land and goods (Jackson, 1993).

More recent research also points to a relationship between perceptions of intergroup threat and intergroup bias or negative attitudes towards the outgroup (Riek et al., 2006). An ingroup threat is perceived as such when the behaviours and actions of an outgroup challenge the ingroup’s goals or well-being. Several theories (e.g., integrated threat theory; Stephan & Renfro, 2002; Stephan & Stephan, 2000) and taxonomies (e.g., Branscombe, Ellemers, Spears & Doosje, 1999) explore how different types of intergroup threats, in conjunction with factors such as feelings of commitment to the group, influence outgroup treatment. The integrated threat theory suggests that threats fall into two broad categories: realistic (threats to the political/economic power of the group, the

material well-being of the group, or its very existence) and symbolic (threats to the group's worldview, morals, values, religion, etc.). It posits that perceptions of these threats lead to negative reactions such as prejudice against the outgroup. It is likely that threat may generate feelings of stress and thereby motivate group members to engage in different strategies to alleviate it (Hogg & Abrams, 1990; Yzerbyt & Demoulin, 2010). Stephan and Renfro (2002) report evidence supporting a relationship between threat and prejudice from both correlational and experimental studies with a wide range of target groups. Elsewhere, researchers have included intergroup anxiety and negative stereotypes to constitute additional threats (Riek et al., 2006), as well as threats to group distinctiveness and group esteem (Riek et al., 2006; Tajfel & Turner, 1979). Overall, Riek and colleagues' meta-analysis investigating various forms of threats showed that they are indeed positively related with negative outgroup attitudes (Riek et al., 2006).

Social Identity

One reason that perceptions of intergroup threat evoke strong reactions is because they bring social identity to the fore. According to Hoggs, Abrams, and Brewer (2017), research on social identity has grown exponentially since Tajfel and Turner's (1979) social identity theory (SIT) of intergroup relations was first published. Social identity is that part of one's identity used to derive meaning about oneself and to evaluate oneself (Tajfel & Turner, 1979). Identification encompasses cognitive and evaluative components. The cognitive component involves being aware of belonging to a group, and the evaluative component involves being aware that there is some value associated with belonging to the group (Tajfel, 1974, 1982). These components are frequently associated with an emotional investment in the group. Social identity theorists argue that threats to

social identity provoke strong reactions because there are psychological advantages associated with belonging to a group (Correll & Park, 2005; Tajfel & Turner, 1986). Specifically, identification with highly valued groups in society fulfills several important needs, namely, helping maintain a positive self-identity and providing a sense of acceptance and social support. Moreover, group membership helps guide behaviour and provides a sense of control through established group beliefs, norms, and values for different social situations (Crocker & Luhtanen, 1990). Identifying with highly valued groups promotes behaviours that protect and advance the group's interests and goals, increases feelings of empathy towards other ingroup members, and also leads to pressure to defend the group (Lickel et al., 2006). It is therefore not surprising that threats to the ingroup generate stress and motivate group members to engage in strategies to alleviate it (Branscombe et al., 1999; Tajfel & Turner, 1986; Yzerbyt & Demoulin, 2010).

These strategies either follow the form of (1) ingroup favouritism or (2) outgroup derogation. Ingroup favouritism refers to preferentially treating ingroup members, making social comparisons that favour the ingroup, and has been found to occur frequently in experimental research (e.g., Brewer, 1999, 2012; Mummendey & Otten, 1998; Otten & Mummendey, 2000; Turner, Brown, & Tajfel, 1979). Examples of ingroup favouritism include distributing more resources to the ingroup and preferring ingroup members to be elected or obtain important positions (Yzerbyt & Demoulin, 2010). Outgroup derogation may involve “punishing, insulting, beating, torturing, or even killing outgroup members” (Yzerbyt & Demoulin, 2010, p. 1052).

Elsewhere in the literature, outgroup derogation refers to denigrating or discriminating against an outgroup (Hewstone, Rubin, & Willis, 2002; Moscatelli,

Hewstone, & Rubini, 2016). Examples include treating the outgroup with hostility, making negative evaluations about the outgroup (e.g., Brewer, 2001; Bettencourt, Charlton, Dorr, Hume, 2001; Hewstone et al., 2002; Moscatelli et al., 2016), and attributing negative traits and responsibility for negative incidents to outgroup members (Tajfel, 1982). This willingness to benefit the ingroup and having more positive sentiments towards the ingroup is a subtle form of prejudice, in comparison to blatant forms that involve derogation and outgroup hostility, which aim to harm the outgroup (Pettigrew & Meertens, 1995). The reviewed literature suggests that perceived threats result in strong reactions because they evoke emotions about the ingroup.

Emotions

Emotions are “episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action, and communication that occur in response to specific physical and social challenges and opportunities” (Keltner & Gross, 1993, p. 468). Current evolutionary and socio-constructivist theories of emotions suggest that they are part of a self-regulatory system, helping people detect, prioritize, and respond to their environment (Barrett & Campos, 1987; Ekman, 1992; Lazarus, 1991).

Intergroup emotions. The key tenets of intergroup emotions theory (Devos, Silver, Mackie, & Smith, 2002; Mackie, Devos, & Smith, 2000; Smith, 1993) can help to further explain the relationship between threats and outgroup derogation. IET integrates research on SIT and self-categorization theory (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) with appraisal theories of emotions (Ellsworth & Scherer, 2003; Frijda, 1986; Lazarus, 1991; Roseman, 1984; Smith & Ellsworth, 1985) to explain how

intergroup emotions arise and how they are dealt with. Specifically, in situations where social identity is salient, group members appraise objects, contexts, and occasions based on their social identity. Consequently, group members perceive themselves as interchangeable members of their ingroup and not as unique individuals. They experience emotions on behalf of their group, and these intergroup emotions, such as the emotions faced at the individual level, are arousing (Rydell, Maitner, Claypool, Ryan, & Smith, 2008) and lead to specific action tendencies (Smith & Mackie, 2008).

Perceptions of ingroup threat are generally related to negative emotions that are expressed outwardly, such as anger (Neuberg & Cottrell, 2002; Parker & Janoff-Bulman, 2013; Stephan & Renfro, 2002). In support of this, threats to ingroup identity have been associated with activation of facial muscles that are correlated with anger (Stephan, Renfro, & Davis, 2008). Moreover, given that anger is related to the tendency or desire to retaliate against the offending outgroup (Cottrell & Neuberg, 2005; Mackie, Devos, & Smith, 2000; Smith, Seger, & Mackie, 2007; Yzerbyt, Dumont, Wigboldus, & Gordijn, 2003), and that it motivates group members to engage in actions to fix perceived wrongs (Maitner, Mackie, & Smith, 2006), feelings of anger might influence behaviours that involve derogation. For example, in a study in which intergroup threat led to sentiments of anger, when participants were informed that ingroup members had successfully retaliated against the outgroup, initial sentiments of anger were related positively to post-retaliation satisfaction and negatively with post-retaliation anger (Maitner et al., 2006). Elsewhere, when participants holding extreme political views (at either side of the spectrum) perceived threats to their ideologies, they experienced fear and derogated the outgroups (Van Proijen, Krouwel, Boiten, & Eedenbak, 2015). Similarly, Yzerbyt and

colleagues categorized French-speaking Belgian participants so that either a common group identity (student) or distinct subgroup identities (French or Flemish) were salient (Yzerbyt et al., 2003). Participants were also informed that the master's program would now be offered in English for Flemish-speaking students. Findings showed that for these French participants when common student identity was induced and attachment to this identity was high, participants were more likely to feel angry and want to engage in offensive action tendencies. Overall, the reviewed literature suggests that perceptions of threat are likely to result in stress and emotional reactions that are typically directed outwards, such as anger.

Social Identity Theory Perspective

Intergroup threats have important identity- and emotions-related consequences because a sense of emotional connectivity to the ingroup is a key component of social identity (Hogg, 2003), while social identity is a key component of one's overall self-identity (Tajfel & Turner, 1979). Given the importance of social identity to overall self-identity, threats to the ingroup are assumed to be stressful (Major & O'Brien, 2005). Research based on SIT suggests that exposure to threat is related to outgroup derogation because people are motivated to have a positive identity and are thereby likely to derogate the outgroup to protect or bolster their ingroup's worth. This finding has been observed in a number of intergroup studies. For example, Branscombe & Wann (1994) showed that when ingroup American identity was threatened, those with higher ingroup identity showed reduced self-esteem, which then predicted engagement in derogation. As SIT had predicted, engaging in derogation was later associated with increases in self-esteem. Similarly, Belgian Flemish participants whose language identity was threatened

(Bourhis, Giles, Leyens, & Tajfel, 1979) and Black Americans who perceived prejudice (Branscombe, Schmitt, & Harvey, 1999) were both more likely to derogate the offending group. In age-related intergroup contexts, elderly people bolstered their self-esteem by reading negative news articles about young people (Knobloch-Westerwick & Hastall, 2010). Similarly, in gender-related contexts, males who had been exposed to a group threat were more likely to harass females, and demonstrated increased ingroup identification (Maass, Cadinu, Guarnieri, & Grasselli, 2003). These findings have also been observed within the minimal group paradigm (Fein & Spencer, 1997; Lemyre & Smith, 1985). Overall, research investigating the different contexts that lead to outgroup derogation has generally shown that perceptions of intergroup threat play a key role (Bettencourt, Dorr, Charlton, & Hume, 2001; Scheepers, Spears, Doosje, & Manstead, 2004; Shapiro, Mistler, & Neuberg, 2010). In particular, perceptions of ingroup threat promote outgroup derogation, which enhances the group, and by extension, the self (Turner, 1982).

Model of Intergroup Anxiety

Not all theories of intergroup interactions would, however, make these predictions. The intergroup anxiety model highlights the importance of context in intergroup relations. It suggests that intergroup contexts can be anxiety inducing, especially when the intergroup nature of contact is made salient (Stephan & Stephan, 1985). Generally, intergroup anxiety stems from the feared negative consequences of intergroup interactions. These consequences can be (1) psychological (e.g., concern that ingroup identity will be threatened), (2) behavioural (e.g., experiencing discrimination), or they can pertain to negative evaluations by (3) ingroup or (4) outgroup members (e.g.,

rejection by the outgroup or disapproval from the ingroup). These sentiments of intergroup anxiety may cause behavioural, cognitive, and emotional consequences. Behavioural consequences include following norms more rigidly, cognitive consequences include biased information processing in favour of the ingroup, and affective consequences include transfer of the arousal from the initial feelings of anxiety to other emotions. Based on previous work showing that when ingroup members experience negative emotions or outcomes, negative evaluative responses of the outgroup are amplified (Blanchard, Adelman, & Cook, 1975), the MIA proposes that intergroup anxiety will amplify emotional responses both during interactions and afterwards during evaluative responses of the outgroup. Similarly, other research with intergroup anxiety demonstrates that it biases social perceptions and leads to negative evaluation of actual events (Wilder & Shapiro, 1989a, 1989b).

The relationships postulated by the MIA provide some key insights into the research question at hand. In the face of threat and the resulting negative emotions, the MIA proposes that a chance at outgroup derogation might amplify these negative emotions. In this way, both SIT and the MIA make contradictory predictions about the consequences of outgroup derogation. Given that previous research has shown how contexts that make identity salient and that are perceived as threatening can result in a physiological stress response (Matheson & Cole, 2004), studying the physiological impact of how one responds to threat will provide insight on the purpose of derogation. Similarly, given the role of negative emotions in the relationship between threat and derogation of the outgroup, it is important to consider how emotions impact this relationship. Overall, this program of research will determine whether engaging in

outgroup derogation is a regulatory mechanism through which one experiences less stress and alleviates negative emotions, or if engaging in derogation makes the intergroup nature of the context more salient, exacerbating levels of stress and negative emotions.

Linguistic Intergroup Bias as a Means of Derogation

Pursuing this conjecture requires attention to characteristics of the modality through which derogation is expressed. Language is a central mechanism through which biased beliefs become shared. It plays an active role in the formation, transmission, and maintenance of beliefs within a group (Bourhis & Maass, 2005; Collins & Clément, 2012). It does so through both explicit, intentional ways, such as the use of slurs, and subtler ways, such as abstraction and word order (Maass, Arcuri, & Suitner, 2014). The linguistic intergroup bias theory (LIB; Maass, Salvi, Arcuri, & Semin, 1989) incorporates perspectives on social identity, language, and derogation in order to explore how language can be used in subtle and implicit ways. It is a valuable paradigm through which we can study the relationships of interest given that more blatant or explicit forms of derogation are against current social norms (Dovidio & Gaertner, 1996; Hogg, 2013; Maass, 1999; Wenneker & Wigboldus, 2008).

The LIB model relies on the linguistic category model (LCM; Semin & Fiedler, 1988; Semin, 2012) to show how the same behaviour can be coded at different levels of linguistic abstraction. Descriptive action verbs are the most concrete terms; they provide a neutral, verifiable, non-interpretable description of an observable behaviour (e.g., A punches B). Interpretive action verbs provide an interpretable description of a behaviour that refers to a general class of behaviours (e.g., A hurts B). State verbs (SVs) do not

make a concrete reference to a specific behaviour, they cannot be verified by observing a behaviour, and they refer to Person A's psychological state with regard to Person B (e.g., A hates B). Adjectives are the most abstract terms and describe enduring dispositions of a person; they are generalizable across situations and behaviours (e.g., A is aggressive). Thus, the various levels of abstraction in language can have very different implications. Generally, moving towards the more abstract end of the continuum results in more information about the actor and less about the situation. Moreover, the information appears more enduring (temporal and cross-situational stability increases) and less verifiable, and it becomes increasingly difficult to consider disconfirming evidence (Semin & Fiedler, 1988). Describing behaviour in abstract terms suggests that a behavioural episode is linked to an actor's disposition or behavioural tendency, while describing behaviour in concrete terms suggests that it is an isolated event that does not necessarily reflect an actor's enduring characteristics.

According to the research conducted on LIB, there are systematic differences in descriptions of the same behaviour depending on the actor's group membership (Maass et al. 1999; Maass et al., 2014). Specifically, research under the LIB paradigm has demonstrated that positively valenced behaviours from the ingroup and negatively valenced behaviours from the outgroup are described abstractly (e.g., "The ingroup member is helpful." and "The outgroup member is aggressive."). Conversely, negatively valenced behaviour performed by the ingroup and positively valenced behaviour performed by the outgroup are described with less abstraction or more concreteness ("The ingroup member punches someone." and "The outgroup member opens the door for someone"). The LIB phenomenon's robustness is evidenced by its presence in both

controlled experimental paradigms and studies looking at naturally occurring language production, as well as in varied linguistic, cultural, and intergroup contexts (Maass, 1999; Wenneker & Wigboldus, 2008).

Research conducted on LIB generally shows that the communicator's motivational state impacts language use (Wenneker & Wigboldus, 2008). For example, in intergroup contexts involving ingroup threat, ingroup protective motives can result in biased language use (Maass, Ceccarelli, & Rudin, 1996). In line with SIT (Tajfel & Turner, 1979), research on LIB has shown that when ingroup identity is threatened, biased language, as a form of outgroup derogation, helps maintain a positive ingroup image. Specifically, Maass, Ceccarelli, and Rudin (1996) varied intergroup competition by either enhancing or attenuating existing antagonism between environmentalists and hunters. Subsequently, participants were asked to respond to both a linguistic abstraction measure and a resource allocation task, one that has often been used as a measure in SIT-related research (Brown, 1978). Previous findings have shown that threatened participants are likely to allocate resources in a manner that benefits the ingroup. As such, Maass and colleagues hypothesized that threatening and co-operative messages would impact resource allocation and LIB in a similar fashion, if the same motivational phenomenon was underlying both cases. Findings showed that threatened participants were more likely to use abstract language to describe negative outgroup and positive ingroup behaviours, while using concrete terms to describe negative ingroup and positive outgroup behaviours. Threatened participants were also more likely to allocate resources that differentially benefited the ingroup. While ingroup protective motives led to outgroup derogation and differential resource allocation, they were nevertheless not

correlated. Participants who showed high LIB also showed greater post-experimental self-esteem. Maass and colleagues (1996) found similar findings in a second experiment. Overall, these studies demonstrated that in the face of a threat-inducing intergroup context, motivational processes might underlie LIB. The above studies, however, used self-report measures of derogation and self-esteem. They may, therefore, have been subject to any number of social desirability and face-saving motives.

Social Neuroscience

Investigating the physiological responses associated with derogation can help assess the diverging predictions SIT and the MIA make, as well as help address some of the key measurement issues in the field. For example, despite social identity threat being a key variable in intergroup relations, one which is assumed to play a motivational role (Branscombe et al., 1999; Ellemers, Spears, & Doosje, 2002), it is rarely measured directly (Scheepers, 2013). This is because self-report measures assessing threat may provoke defensive responding and, consequently, participants may not want to admit to feeling threatened. Scheepers (2013) argues that researchers have tried to bypass this issue by inferring it based on other measures or outcome variables (e.g., attachment to the ingroup). Thus, a key advantage of using a social neuroscience approach is that it enables direct measurement of the variables of interest, without them being subject to controlled processes or concerns relating to self-presentation (Amodio, 2013; Blascovich, Mendes, Hunter, 2001). Given that establishing a link between intergroup threats and self-reports of stress have been inconsistent, some researchers (e.g., Schmader, Johns, & Forbes, 2008) have argued that physiological measures, which circumvent self-presentation concerns, might provide a better evaluation of threat-induced stress.

According to Cacioppo, Berntson, and Decety, “social neuroscience seeks to specify the neural, hormonal, cellular, and genetic mechanisms underlying social behavior, and in so doing to understand the reciprocal associations and influences between social and biological levels of organization” (2010, p. 677). Social neuroscience is an interdisciplinary field with an underlying premise that lawful relationships exist between biological systems and social psychological processes. Given that both social psychology and social neuroscience naturally intersect in their focus on social behaviour, there is potential for both fields to inform each other and further elaborate on theories, methods, and evidence (Abrams & Hogg, 2017; Berntson, Cacioppo, & Sarter, 2002).

The Stress Response. Intergroup threats can induce a stress response. Stress can be defined as a sense of not having sufficient resources to cope with an event (Lazarus & Folkman, 1984). When encountering a potential stressor, individuals appraise the situation to determine whether they have enough resources to adequately deal with it. Psychological factors, such as the perceived unpredictability or uncontrollability of the situation, or expecting negative psychological or physiological consequences from it will determine the extent to which a stressor will generate a physiological response (Kudielka, Hellhammer, & Kirschbaum, 2007). Drawing from stress and coping theory (Folkman, Dunkel-Schetter, DeLongis, & Gruen, 1986), the biopsychosocial model of challenge and threat (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003) suggests a pattern of responses across cardiovascular and hormonal stress systems, referred to as “threat,” occurs when a situation is assessed as exceeding an individual’s resources. This pattern is referred to as “challenge” when the situational demands are not believed to outweigh an individual’s resources. If a context is appraised as threatening, it elicits four types of

actions tendencies (Lazarus & Folkman, 1984), which, in an interpersonal context, researchers have referred to as (a) antagonism, (b) avoidance, (c) freezing, and (d) positive engagement (Trawalter, Richeson, & Shelton, 2009). The studies in this dissertation, by focusing on outgroup derogation, were focused on antagonistic responses to threat.

During challenge responses, only the sympathetic-adrenal-medullary (SAM) axis is activated, while during threat, both the SAM and the hypothalamic-pituitary-adrenal (HPA) axes are activated. These axes, when activated, trigger the secretion of a cascade of stress hormones that result in certain physiological changes (Kirschbaum & Hellhammer, 1999; Schulkin, McEwen, & Gold, 1994). These changes help to maintain homeostasis in response to environmental stressors.

The HPA axis is a complex endocrine system that regulates stress responses via the hormone cortisol (Kirschbaum & Hellhammer, 1989, 2000). It originates in the adrenal gland and circulates in blood before passively diffusing into saliva (Sterling & Eyer, 1988). There is a 15- to 20-minute lag from the onset of HPA axis activity to when there is a salivary change in cortisol. Collecting salivary cortisol has been adopted as the main method of collection due to its non-invasiveness, amenability to serial determinations, and ease of collection with minimal interruption.

Alpha-amylase is being increasingly used as a biomarker of SAM activity. It is produced locally in the oral cavity by salivary glands as part of salivary protein production. Alpha-amylase results from the stimulation of parasympathetic and sympathetic nerves innervating the salivary glands (Baum, 1987), and peaks in

concentration roughly 5 minutes after the onset of SAM activation (Gordis et al., 2006). Given its presence in saliva, quick release, and responsiveness to psychosocial stressors (Rohleder et al., 2004; van Stegeren et al., 2008), it is a useful marker for assessing stress-induced sympathetic activity (Kirschbaum & Hellhammer, 2000; Kivlighan & Granger, 2006).

Among the limited available research studying cortisol in relation to intergroup threat, perceiving a threat resulted in physiological stress responses, suggesting that it is possible to induce physiological stress in an experimental setting (Matheson & Cole, 2004; Page-Gould, Mendoza-Denton & Tropp, 2008; Townsend et al., 2011). This supports the use of biological markers in understanding the relationship between threats and outgroup derogation. To our knowledge, among the studies that examine endocrine-related stress responses to intergroup threats, none have used salivary alpha-amylase to assess SAM activity.

The Present Research Program

The overall goal of the proposed line of research is to contribute to the understanding of why people engage in outgroup derogation and to elaborate on its physiological and emotional consequences. Studies 1 through 3 will focus on the physiological consequences of being exposed to a threat and having an opportunity to derogate. Using the same experimental paradigm, but using a paper and pencil approach, Study 4 will investigate how sentiments of anger and identity relate to levels of outgroup derogation. Together, these studies provide a more holistic understanding and interpretation of the relationship between physiological states and mental processes (Fiske, 2012; Horan & Afifi, 2014).

The first study offers a simple demonstration of the relationship between having an opportunity to derogate and physiological stress, as measured by salivary cortisol, in a threatening context. Generally, studies investigating intergroup threats have not assessed how people react physiologically to their experience and how this might impact their engagement in derogation. In this study, participants were exposed to a text describing either discriminatory (threatening) or favourable (non-threatening) comments expressed by Chinese individuals about Canadians. Half of the participants were given an opportunity to derogate via a bias task, while the remaining half responded to a control task. Salivary cortisol was used as a measure of stress and was collected at baseline, 20 minutes post-threat, and 20 minutes post-derogation. This design allowed us to determine whether cortisol levels increased or decreased following an opportunity to derogate the outgroup, in the face of an intergroup threat.

The second study replicated the first while using alpha-amylase as a marker of stress. The main objectives of this study were to investigate the SAM response to intergroup threat and having an opportunity to derogate, and compare it with findings from the HPA axis.

The third study builds on the first two by including a measure of derogation. To determine how perceptions of an intergroup threat are related to stress and outgroup derogation, we followed the same paradigm as the previous studies, but with a measure of derogation derived from the LIB theory. Participants were exposed to the same threat/non-threat manipulation. Subsequently, participants either completed the LIB measure or a control task. The LIB task consisted of sixteen vignettes with response alternatives that corresponded to different levels of abstraction (Semin & Fiedler, 1988).

Salivary cortisol was used as a measure of stress and was collected at baseline, 20 minutes post-threat, and 20 minutes post-derogation. This design allowed us to determine how people respond physiologically when they engage in different degrees of derogation.

Study four follows the same research paradigm as the first three studies but addresses some of their limitations. Rather than using a physiological indicator of stress, a self-report measure was used. In addition to the implicit measure of derogation, a second derogation variable, resource allocation matrices, was used to assess more explicit forms of derogation. Following exposure to the same threat manipulation involving Canadian identity, participants responded to scales measuring anger directed towards the outgroup, as well as ingroup identification. Participants then responded to either the same control task as in the previous studies or one of the two derogation measures. Participants then completed the same identity and anger scale post-derogation task. This study provides the self-report counterpoint to the previous studies.

In order to study the relationships of interest, a computation of area under the curve with respect to ground (AUC_g) was used in this program of research. This summary measure of change is often used in both endocrinology research and studies using neurosciences methods that involve repeated measurements (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). AUC_g provides information on both the sensitivity (difference from one measurement to the next) and intensity of the response (difference from the measurement to ground) (Fekedulegn et al., 2007). Pruessner and colleagues (2003) argue that AUC_g is ideal for repeated measurements because it increases the power of testing while also maintaining the level of information resulting from multiple measurements.

By adding a social neuroscience perspective to key questions in intergroup relations, the present line of research makes substantial contributions to the literature. Together, the studies will demonstrate (1) how intergroup threats are experienced both physiologically and emotionally, and (2) the physiological and emotional purpose behind responding to threats via outgroup derogation. These findings will confirm whether engaging in derogation serves a regulatory purpose, helping re-establish positive identity and deal with negative emotions, or whether a chance at derogating the outgroup will further induce stress and negative emotions. Given the very negative psychological and physiological consequences of repeated exposure to stress and discrimination, the findings from this study will also have important practical applications.

STUDY 1:
**The Effects of Outgroup Threat and Opportunity to
Derogate on Salivary Cortisol Levels***

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*Sampasivam, S., Collins, K. A., Bielajew, C. & Clément, R. (2016). The Effects of Outgroup Threat and Opportunity to Derogate on Salivary Cortisol Levels. *International Journal of Environmental Research and Public Health*, 13, 616.

Abstract

Perceptions of intergroup threat have been related to both experiences of physiological stress responses and derogation of the outgroup. In this study, a neuroscience perspective was used to investigate the relationship between stress and opportunity to derogate the outgroup, in a threatening intergroup context. Research from a social identity perspective suggests that engaging in outgroup derogation alleviates stress when perceiving an intergroup threat. However, in line with the model of intergroup anxiety, opportunity to derogate could exacerbate the negative connotations of a threatening situation, resulting in more stress. Canadian participants (N = 110) were exposed to text describing either discriminatory or favourable comments expressed by Chinese individuals towards Canadians. Half of the participants were given the opportunity to derogate via a bias task. Salivary cortisol was used as a measure of stress and was collected at baseline, post-threat, and post-derogation. As expected, threatening identity led to more stress as evidenced by increased cortisol concentrations. Furthermore, threatened participants who had an opportunity to derogate showed greater cortisol concentrations than those who did not. These results demonstrate a link between stress and the opportunity to derogate, and highlights the value of using biological markers within the intergroup context.

Keywords: outgroup derogation; threat; stress response; intergroup relations; social neuroscience

1. Introduction

Group membership is used to derive meaning about oneself, and, consequently, motivates identification with positively valued groups and promotes behaviours that advance the group's interest [1]. Intergroup contact makes salient one's group membership and highlights the existence of both an ingroup and an outgroup [2–6]. Such contact can, however, be considered stressful when it is perceived as threatening or when “one group's actions, beliefs, or characteristics challenge the goal attainment or well-being of another group” [7] (p. 336). This study explores the physiological stress response via the hormone, cortisol, to experiencing and dealing with an intergroup threat. How one manages affective experiences may play a role in the relationship between intergroup threats and outgroup attitude [8–10]. In particular, displaying negative attitudes about or derogating the outgroup may be a strategy to help individuals cope with any negative emotions and stress that results from the threatening encounters. However, theories in social psychology make different predictions about the functions and consequences of derogation. In this study, we particularly examine research based on theories holding opposing views: (1) Social Identity Theory (SIT: [1]) and (2) The Model of Intergroup Anxiety (MIA: [3]), in view of clarifying the impact of having the mere opportunity to derogate.

2. Background

2.1. Social Identity Theory Perspective

Social identity, a key component of one's self-concept, is used to both derive meaning about and to evaluate oneself [1]. Identification with groups that are highly valued in society is said to help group members maintain a positive social identity. Thus,

social identity and self-esteem are both influenced by and inextricably tied to the experiences and perceptions of the group to which one belongs [11]. Threats to the ingroup may generate stress and motivate group members to engage in different strategies to alleviate it [12]. Two common intergroup bias strategies that groups use to maintain a positive self-identity are ingroup favoritism and, what is of particular interest here, outgroup derogation [13]. Outgroup derogation refers to discriminating against the outgroup [14]. This may be in the form of treating the outgroup with hostility, making negative evaluations about the outgroup (e.g., [8, 15–17]), and attributing negative traits and responsibility for negative incidents to outgroup members [18].

While outgroup derogation is not as frequent as ingroup favoritism (e.g., [19]), it is more prevalent in contexts involving intergroup threat. SIT suggests that outgroup derogation is often used to bolster and protect social identity in the face of a group-based threat. This finding has been observed in a number of intergroup studies. For example, in age-related intergroup contexts, elderly people bolstered their self-esteem by reading negative news articles about young people [20]. Similarly, in gender-related contexts, males who had been exposed to a group threat were more likely to harass females, and subsequently demonstrated increased ingroup identification [21]. Elsewhere, researchers showed participants boxing matches with outcomes that either threatened or supported the value of being American [22]. Participants who identified strongly as Americans were more likely to have reduced collective self-esteem, which subsequently predicted outgroup derogation. Moreover, the amount of derogation displayed was associated with subsequent increases in self-esteem. Similar findings have also been observed within the minimal group paradigm [23, 24]. Overall, these studies, in line with SIT, suggest that

threatening context elicits engagement in outgroup derogation to bolster self-esteem or identity. Based on this research, we propose that a threatening intergroup experience can evoke feelings of stress, or a sense of having insufficient resources to cope with an event. These feelings can result in a physiological stress response. In order to alleviate these feelings of stress and cope with the situation, threatened people may engage in outgroup derogation. These findings can be further corroborated by looking at studies investigating intergroup relations and physiological stress, where experiencing threats to identity is associated with a physiological stress response [25–32].

Based on SIT, one would expect that experiencing an ingroup threat would lead to physiological arousal and a stress response. Subsequently, an opportunity to engage in outgroup derogation would help reestablish a positive self-identity, thus functioning as a restorative mechanism. This study, rather than studying actual engagement in derogation, the focus was on the impact of having an opportunity to derogate. Previous research has theorized [33] and shown that [34] even an opportunity to derogate or retaliate is considered to be sufficient to deal with perceptions of threat, as it allows participants to deal with a threat if they choose to.

2.2. Model of Intergroup Anxiety (MIA)

Theories focusing on the anxiety-inducing component of intergroup contact could provide key insight into the physiological and behavioural consequences of intergroup threats that may differ sharply from models based on SIT. MIA [3] describes the antecedents and consequences of intergroup contact. According to this model, contexts that make the intergroup nature of a contact salient can be anxiety provoking, resulting in various behavioural, cognitive, and emotional consequences. Behavioural consequences

include amplifying normative behavioural patterns. That is, when anxiety increases, people are more likely to follow norms more rigidly. Cognitive consequences include information-processing biases. For example, contact and anxiety often increase self-esteem-related concerns, leading to positive ingroup biases when evaluating intergroup differences. In terms of affective consequences, intergroup contexts that elicit anxiety amplify emotional reactions, or more specifically, the arousal resulting from experiencing intergroup anxiety transfers to other elicited emotions. This results in heightened emotional responses during, and evaluative responses following, interactions. For example, based on earlier work [35], the model proposes that interactions resulting in negative emotions or outcomes are likely to show augmented negative evaluations. Thus, it is evident that intergroup contact experiences that result in anxiety can have important consequences and are likely to impact subsequent interactions.

Based on MIA, it can be argued that interactions perceived to be threatening will result in anxiety and thus lead to a stress response. Moreover, given that arousal generated from anxiety amplifies all emotions, an opportunity to derogate the outgroup will make the intergroup context salient again, resulting in more negative emotions and further stress, in contrast with expectations derived from SIT.

2.3. Intergroup Threats and Physiological Stress Response

Assessing the divergent predictions of SIT and MIA would be well served by an approach based on the physiological response to derogation. The corresponding framework, social neuroscience, is a growing, interdisciplinary field with an underlying premise that lawful relationships exist between biological systems and social psychological processes [36]. It bridges together biological systems, concepts, and

methods with social psychological processes and behaviours (e.g., [37–39]) to provide a fuller understanding of their relationship [40]. Employing a neuroscience approach, it is possible to directly measure the variables of interest, without it being subject to controlled processes or self-presentation concerns [36,41,42]. This is of particular importance in this study given that a link between intergroup threats and self-reports of stress have not been consistently found, leading some researchers (e.g., [43]) to argue that physiological measures, which circumvent self-presentation concerns, might provide a better evaluation of threat-induced stress.

In studies exploring the physiological underpinnings of intergroup relations, cardiovascular and neuroimaging techniques have most commonly been used (e.g., [41,44,45]). For example, Black adolescents' vigilance for discrimination was correlated with cardiovascular activity [25], while anticipating interacting with a prejudiced White partner was related to psychological and cardiovascular stress for Latina participants [26]. Black participants who experienced a stereotype threat [27] or described racial stressors [28] showed greater increases in blood pressure compared to that of participants who were in non-threatening situations. Interpersonal interactions with members of devalued or stigmatized group members resulted in cardiovascular responses consistent with threat patterns [27,29]. Finally, a meta-analysis based on 134 samples, in which the studies' contribution was weighted by sample size, showed that perceived discrimination led to significantly heightened stress responses, generally measured through cardiovascular indicators [30]. Taken together, these studies have shown how various forms of intergroup threat do indeed result in physiological stress responses.

There is a limited number of studies looking at hypothalamic-pituitary-adrenal

axis (HPA) functioning based on cortisol as a measure of stress. For example, past research has shown how contexts that make identity salient and that are perceived as threatening lead to an increase in cortisol levels [31]. Moreover, using coping strategies that help appraise threatening situations as controllable, along with having a greater sense of optimism, were related to lower cortisol concentrations. Similarly, in a study evaluating threat (sexism) induced stress, women who chronically perceived sexism were more likely to show higher cortisol levels, unless they were placed in a condition in which there was no possibility of sexism [32]. In a study looking at cross-race friendship, participants who found intergroup contact threatening were likely to show increased cortisol reactivity following an interaction with a minority group member; over the course of three cross-race meetings, cortisol reactivity decreased [46]. These studies importantly show that intergroup threats can result in a physiological stress response within an experimental setting and support the use of biological markers in understanding the relationship between threats and outgroup derogation. Even though the evidence bears heavily in favour of the physiological impact of intergroup relations, parallel research on intergroup communication is virtually non-existent (cf. [47]).

2.4. The Stress Response

Stress can be defined as a sense of having insufficient resources to cope with an event [48]. The extent to which a stressor will generate a physiological response depends on several psychological elements of the context, including whether an event is perceived as unpredictable or uncontrollable or whether there are expectations of negative psychological and/or physiological consequences [49]. According to the allostasis model, a stressor, physiological or psychological in nature, can trigger the secretion of a

cascade of stress hormones. This results in a number of physiological changes that help to maintain homeostasis in response to environmental challenges [50,51]. The HPA axis, a major endocrine system, regulates stress responses, principally via the hormone cortisol. Salivary cortisol is typically used to assess HPA functioning and correlates well with serum levels of the hormone [52]. It is a noninvasive method of collecting cortisol that is accomplished readily with minimal interruption and is amenable to serial determinations.

The physiological consequences of chronic stress can result in what has been termed “allostatic load” or “wear and tear” on the body [52]. In a review of the damaging effects of stress, McEwen [53] discussed how allostatic load can increase vulnerability to illness by lowering immune system functioning [54], as well as contributing to the onset and/or progression of diseases such as coronary heart disease [55], hypertension, blood pressure [56], as well as leading to declines in cognitive functioning [57]. Some conditions (Cushing’s syndrome, Alzheimer’s disease, to name a few—see [58]) have been associated with increased HPA activation as measured by cortisol levels while others have been linked to decreased or reduced cortisol secretion—for example, in individuals suffering from post-traumatic stress disorder [59] and in breast cancer survivors [60]. Like other stressors, identity-related stressors have been found to impact health. A number of review articles have found a link between perceived discrimination and negative physical and mental health outcomes (e.g., [31,61,62]). This relationship between discrimination and health may stem from the frequent or chronic activation of the HPA axis.

3. The Present Study

The aim of this study was to further understand the function of outgroup

derogation by studying its associations with physiological states. Given that previous research has shown how contexts that make identity salient and that are perceived as threatening can result in a physiological stress response [31], studying the physiological impact of dealing with a threatening experience through outgroup derogation would be insightful. Moreover, by using a physiological measure of stress, it may be possible to assess the divergent predictions made by SIT and MIA. In this study participants read a threatening or non-threatening composition, and subsequently were given an opportunity to derogate or were placed in a control condition. Participants in the control condition engaged in a task that did not require them to think about the threatening composition nor the outgroup. Consequently, it is not possible to know if any change in cortisol concentrations is a reflection of engaging in bias or merely thinking about the outgroup.

3.1. Specific Hypotheses

(1) Threat. Building on other work (e.g., [31]) and models based on SIT and MIA, we predicted that experiencing a threat to identity would increase salivary cortisol levels while the perception of no threat would not.

(2) Opportunity to derogate. Two different predictions were made about the consequences of having an opportunity to derogate the outgroup. Literature based on SIT and intergroup emotions theory would predict that an opportunity to derogate the outgroup would help participants reestablish a positive identity and deal with the negative emotions, resulting in less stress. On the other hand, MIA theory would predict that the intergroup threat and ensuing anxiety would heighten all emotions. A subsequent opportunity to derogate the outgroup might keep the intergroup nature of the context salient and further augment negative emotions.

3.2. Overview

In this study, participants' cultural identity was the premise for group-based devaluation. An intergroup context was created by describing research on the similarities and differences between Chinese and Canadian cultures. The threatening messages included discriminatory statements that were allegedly made by Chinese individuals against Canadians, and emphasized cultural differences in work habits, family structure, hobbies, and values. Thus, a form of symbolic threat [4, 63, 64] or threat to group value [65] was created against the Canadian participants. This form of intergroup threat is related to the loss of face, undermining self-esteem or ingroup identity [64] and has been associated with negative outgroup attitudes [7].

4. Method

4.1. Participants

It was important that participants both clearly belonged to the Canadian group and were aware of the stereotypes associated with being Canadian. Only participants born in Canada, and whose parents were born in Canada, whose mother tongue was English, and whose most frequently spoken language was English were included in the study. In order to ensure that participants did not identify with Chinese groups and consequently discount the threatening composition, participants who identified as Asian Canadian were not recruited. Mother tongue was explained to participants as the first language learned and still most frequently used. A total of 118 undergraduate students, 102 females and 16 males, enrolled in introductory psychology courses, participated in this study. On average, the participants were 19.8 ($SD = 4.4$) years old. They were recruited through the departmental Integrated System of Participation in Research and received 2% towards

their grade for their involvement in this study. The study was advertised to potential participants as looking at the similarities and differences between cognitive and physiological measures. All participants were randomly assigned to the different conditions. The study was approved by the University of Ottawa’s Social Science and Humanities Research Ethics Board (certificate #H05-15-08). In compliance with ethics regulations, participants gave consent prior to the start of the study and were debriefed about the manipulation at the end of the study.

The design of the experiment as well as the flow of participants through each stage of the experiment appears in Figure 1.

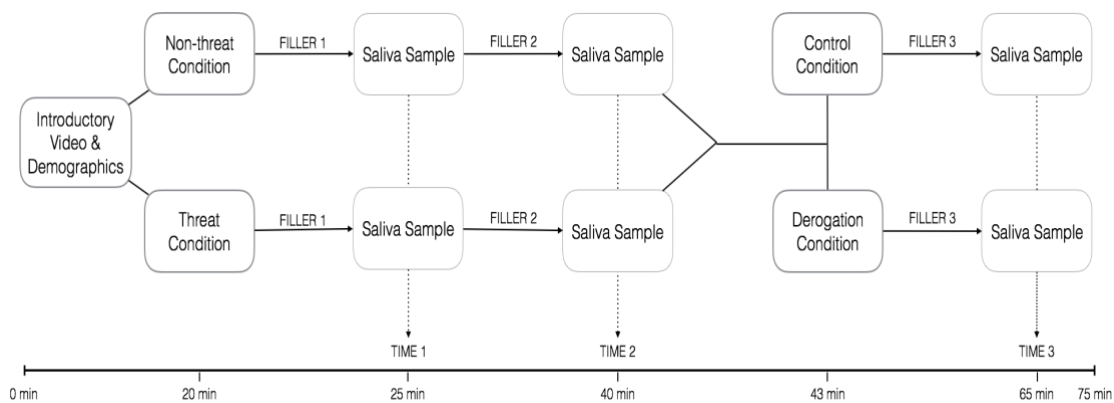


Figure 1. Chart showing flow of participants in the two groups—no threat (top) and threat (bottom) through each stage of the study.

4.2. Measures

4.2.1. Salivary Cortisol

Saliva samples were collected three times by asking participants to place an oral swab underneath the tongue for three minutes. An enzyme-linked immunosorbent assay was used to extract cortisol; commercially available kits and the cortisol protocol from Salimetrics Inc. (State College, PA, USA) were used for this purpose. All samples were

assayed in duplicate and the mean of the two concentration values employed in the data analyses. Intra-assay variability was 11.40% and inter-assay variability, 17.4%.

4.2.2. Outgroup Derogation

Following the threat manipulation, participants were assigned randomly to one of two conditions. In the control condition, they were asked to write a brief paragraph on time management. In the experimental condition, they were asked for their opinion about the outgroup. This was done so as to minimize social desirability effect by avoiding questions blatantly referring to discrimination against the target group. A series of sixteen vignettes—half depicting socially desirable behaviours (e.g., giving a present), four ingroup members (White) and four in outgroup members (Chinese) and half depicting to the participant socially undesirable behaviours (e.g., fighting), four ingroup members (White) and four outgroup members (Chinese) were presented to the participants. The sex of the actors performing the behaviours varied so that there were an equal number of vignettes containing males and females. Participants were asked to read the vignettes and choose the response that, in their opinion, described the behaviour most accurately. The response alternatives underneath each vignette varied randomly in their level of derogation.

4.3. Procedure

Participants meeting the inclusion criteria were tested between 3 PM and 8:30 PM. We selected this time-frame because it corresponds to the time of day when cortisol concentrations are near their lowest value and the diurnal function relating time to cortisol concentration is relatively flat [66]. Participants were asked to attend a lab session during which they were presented with a completely automated online study, with

timers programmed to ask participants to provide saliva samples 20 min after they read the threat manipulation and 20 min after having an opportunity to derogate the outgroup.

After providing consent, participants were asked to rinse their mouth with water in order to remove food residue and increase hydration. To ensure that the sample would not be diluted, saliva samples were collected at least 10 min after rinsing. During this 10-min period, participants viewed a video that demonstrated how saliva samples are collected, completed a demographic questionnaire, and reported on a number of variables that could potentially impact the integrity of the cortisol data. Participants responded to a questionnaire inquiring about consumption of any major meal, fluids, or cigarettes one hour before the start of the study, alcohol, and use of medication 12 h prior to the start of the study, any recent major dental work, and whether their gums bled when they brushed their teeth.

Participants were randomly assigned to either the threat or non-threat condition. In both conditions, participants were provided with information from past psychological and demographic studies investigating the similarities and differences between Canadian and Chinese cultures with respect to work habits, family structure, hobbies, and values. These types of threats to group values, belief systems, or worldview, [4,58–60] are related to negative outgroup attitudes (e.g., [7]). Thus, to evoke perceptions of threat and negative outgroup reactions in this study, participants in the threat condition were told that the research conducted to date showed that Chinese interviewees had no problem admitting the existence of fundamental differences in values and behaviours, among other things, between Canadians and Chinese. These interviews also revealed a number of discriminatory statements against Canadians. For example, participants read about the

interviewees' perceptions of Canadian culture, “. . . There is no Canadian culture—that's why they want to keep the French in—it's the only thing that separates them from the States and makes them interesting. . . . Canadian culture is such a joke”. In the non-threat condition, participants were told that Chinese interviewees felt as though the differences between Canadians and Chinese were insubstantial compared to the similarities between the two cultures, and that the interviewees revealed a number of favourable statements about Canadians. For example, “. . . Like when there are problems, and two countries, or even two groups, like ethnic, religious, or something like that, are fighting, then Canada tries to bring peace. It makes me proud that they do this”. Consequently, those in the non-threat condition read about social identity enhancement. Participants were then presented with some excerpts from the interview transcripts. All participants were given five minutes to summarize their understanding of the information they had just been presented. The timers were automated so that participants provided a baseline saliva sample (labelled “time 1”) exactly five minutes after finishing reading either version of the composition. Although participants provided the saliva sample after experiencing the threat manipulation, given that peak cortisol concentrations occur roughly 15–20 min following an acute stressor [50], we did not expect there to be an impact of threat on the first sample. We did expect an impact on the second saliva sample (labelled “time 2”), which was collected 20 min following the threat. In between saliva sample collection, participants engaged in a filler task that kept the threat manipulation salient. This task consisted of responding to questions about the composition they read. Participants then either had the opportunity to engage in outgroup derogation or complete the control task. They next engaged in a final filler task which consisted of viewing short videos that kept

the intergroup nature of the study salient. They provided a final saliva samples 20 min (labelled “time 3”) after this task. Participants were then debriefed.

5. Results

A pilot test was conducted using an independent sample similar to that used in the main study to confirm that the compositions were perceived as expected. Twenty-two participants were assigned to reading either the threatening or the non-threatening composition. They were then asked to rate the composition on 10 items using a 5-point scale labelled at one end as “not at all” (1) and at the other as “completely”. Four items (threatening, offensive, ignorant, disagreeable) constituted the threat scale ($\alpha = 0.88$) whereas six items (congenial, inoffensive, soothing, pleasant, agreeable, positive) comprised the inoffensive scale ($\alpha = 0.96$). An independent-sample *t*-test was conducted to compare answers to the threat scale in the threat in threat and non-threat conditions. As expected, those in the threat condition were significantly more likely to perceive the text as threatening ($M = 2.98$, $SD = 1.044$) compared to those in the non-threat condition, ($M = 1.63$, $SD = 0.780$), $t(20) = -3.473$, $p = 0.002$. Similarly, an independent-sample *t*-test was conducted to compare perceptions of inoffensiveness in the threat and non-threat conditions. Those in the non-threat condition were significantly more likely to perceive the text as non-threatening ($M = 3.68$, $SD = 0.702$) compared to those in the threat condition ($M = 1.67$, $SD = 1.091$), $t(20) = 5.236$, $p < 0.001$.

We also considered several factors that could influence cortisol secretion such as time since awakening on the saliva collection day, medication use such as birth control, and days since the last menstrual cycle. Across groups, time since awakening averaged from 7.5 to 8.9 h with no group difference ($F(1,117) = 0.81$, $p = 0.493$); of the female

participants, only six were using birth control pills, a few in each group, and there was no significant group difference in the number of days since the last menstrual period ($F(1,101) = 0.32, p = 0.81$).

Subsequent analyses were conducted using area under the curve (AUC) as the summary measure of change based on trapezoidal rule from ground [67]. After checking for outliers, 9.7% of the data was removed.

Effect of threat on AUCg . A one-way ANOVA was conducted with threat (present or absent) on the AUC of saliva samples 1 and 2 (see Figure 2). The analysis revealed a significant effect of threat $F(1,122) = 4.34, p = 0.039, \eta^2 = 0.034$. Participants who were threatened ($M = 0.116, SE = 0.006$) had a greater AUC compared to those who did not receive a threat ($M = 0.097, SE = 0.007$).

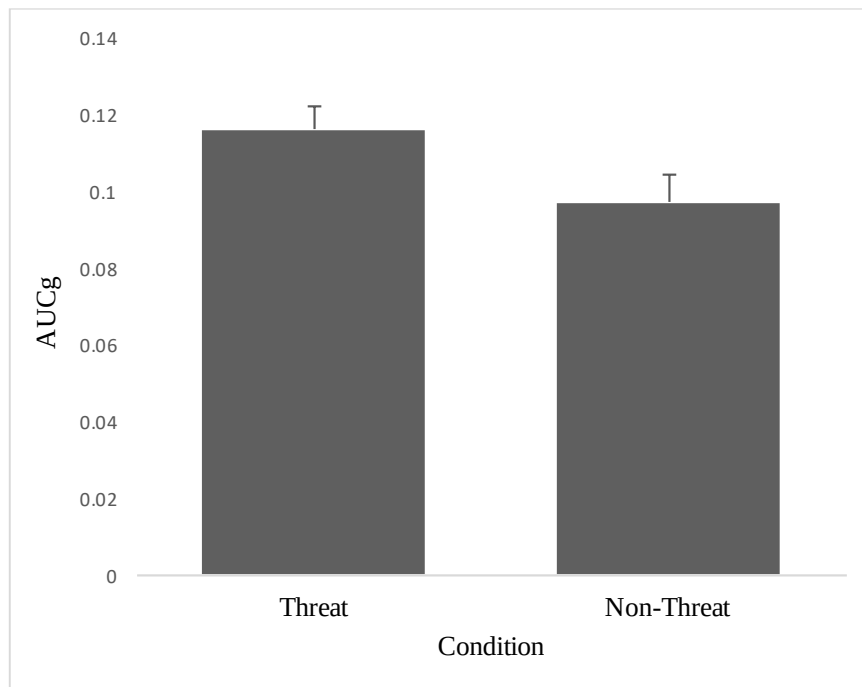


Figure 2. The figure shows the mean AUCg ($\pm$ SEM) of cortisol concentrations collected at times 1 and 2 as a function of condition—either threat or non-threat.

Effect of threat and opportunity to derogate on AUC. A two-way randomized group ANOVA was conducted with both threat (present or absent) and opportunity to derogate (yes or no) on the AUC of saliva samples collected at times 2 and 3 (see Figure 3). The analysis revealed significant main effects of threat ($F(1,114) = 9.441, p = 0.003, \eta^2 = 0.076$.) and opportunity to derogate ($F(1,114) = 10.53, p = 0.002, \eta^2 = 0.085$.) The interaction between threat and opportunity to derogate was not significant, $F(1,114) = 2.22, p = 0.139$. However, planned comparisons revealed a significant difference in the AUC of those who had an opportunity to derogate ($M = 0.119, SE = 0.097$) and did not have an opportunity to derogate ($M = 0.083, SE = 0.007$) in the threat condition, ($F(1,63) = 10.16, p = 0.002, \eta^2 = 0.139$).

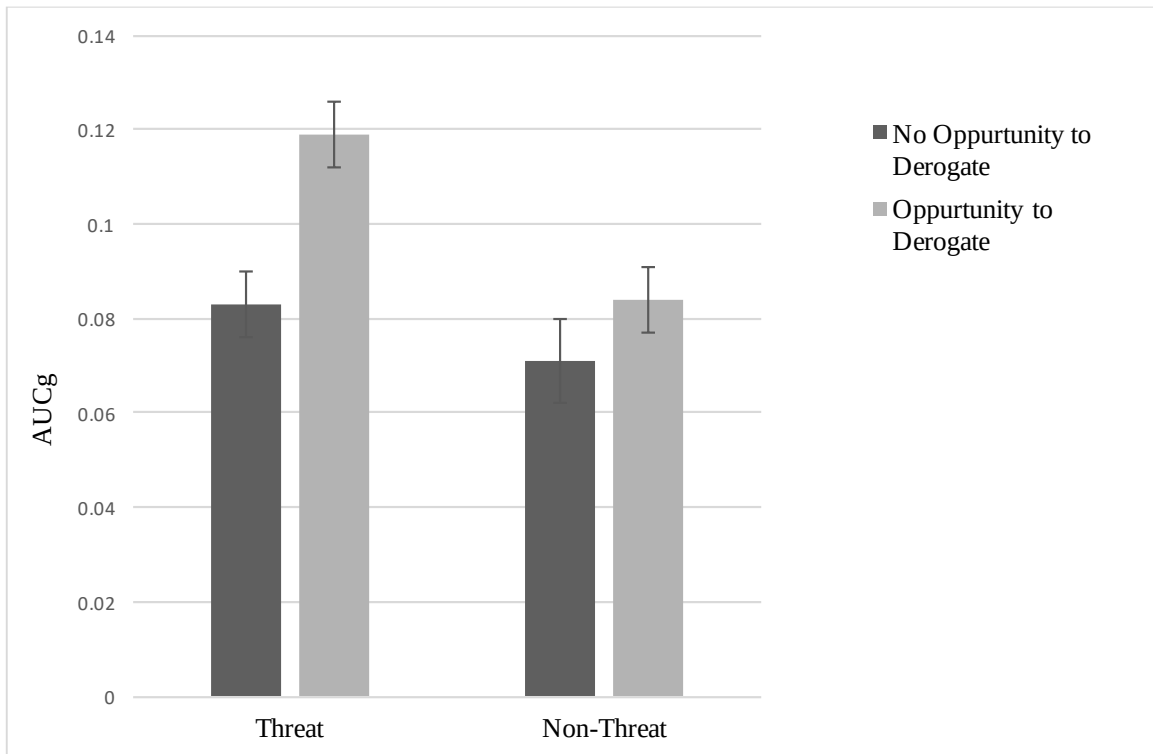


Figure 3. The figure shows the AUC of cortisol samples collected at times 2 and 3 as a function of threat- with the two conditions, threat and nonthreat, on the left and right sides respectively as a function of derogation. Dark grey bars represent no opportunity to

derogate and light grey bars represent opportunity to derogate.

6. Discussion

The aim of this study was to investigate the relationship between intergroup threats and outgroup derogation in the context of a physiological stress response; the stress hormone cortisol was used as a biomarker to study this relationship. We predicted that experiencing an intergroup threat would result in an increase in cortisol levels. In line with this hypothesis and consistent with other work (e.g., [31–32 ,46]), participants who were exposed to the threat showed a consistent increase in cortisol levels, indicative of a stress response, compared to those who did not receive a threat. Thus, these findings suggest that group-based threats do indeed incur a stress-related physiological response.

Two different predictions were made about the consequences of having an opportunity to derogate the outgroup. The results indicated that participants who were both threatened and had an opportunity to derogate the outgroup showed an increase in stress levels compared to that of individuals who were threatened but without an option to respond by derogation. In the non-threat condition, there was no difference between participants who had a chance to derogate the outgroup and those who did not. Thus engaging in outgroup derogation increases physiological stress, supporting expectations derived from MIA. This is incongruent with SIT that would posit a decrease in cortisol levels as the opportunity to engage in outgroup derogation would help to reestablish identity and reduce stress.

There are several ways to interpret our findings. First, in line with MIA, it is possible that intergroup contexts elicit emotions like anxiety, resulting in an increase in cortisol levels. An opportunity to derogate the outgroup, which makes the intergroup

context even more salient, might amplify other emotions and result in further stress. This would imply that derogation is an inadequate strategy or coping mechanism, given its physiological consequences. Second, an opportunity to derogate the outgroup might have resulted in an increase in cortisol because participants were aware that they were derogating the outgroup. Given that this study is taking place within a Canadian cultural context, which has strong norms about acceptable intergroup behaviour, a chance to derogate the outgroup might increase stress levels. Studies set in cultural contexts with less aversive consequences for outgroup derogation would provide insight on whether an opportunity is sufficient to cause a stress response.

While this study is the first to look at the physiological consequences of outgroup derogation and provides insight into its biological underpinnings, there are some important limitations. Notably, participants did not respond to an actual emotions inventory nor were levels of ingroup identity or outgroup derogation measured. It would be important to document which emotions, including anxiety, are experienced, and how they change with an opportunity to derogate. Given that actual levels of outgroup derogation were not measured, it is unclear whether there were different emotional consequences, and related stress responses, for participants who, when given an opportunity to derogate in response to threat, did and did not engage in derogation. Moreover, the control condition did not require participants to think about the outgroup; it is therefore unclear whether the effects in the outgroup derogation condition resulted because participants were thinking about the outgroup, engaging in outgroup derogation, or engaging in ingroup favouritism. Future research should include a measure of outgroup derogation that makes it possible to delineate these effects.

Despite these limitations, our findings make some key contributions. In addition to replicating the results of previous research showing that a perceived intergroup threat is associated with a stress response as indexed by cortisol concentrations (e.g., [31–32, 46]), our data demonstrate the link between outgroup derogation and stress reactivity. While stress responses are often adaptive in the short term, frequent exposure to stressors can result in allostatic load and long-term, negative health outcomes. This can occur through various pathways, for example, when the chronic activation of the HPA axis compromises the feedback mechanism that normally extinguishes the stress response [53].

A growing literature [30, 61, 62, 68–70] suggests that perceived discrimination is harmful to both physical and mental health, and contributes to some of the existing health disparities between stigmatized and non-stigmatized groups. Research reviewing the literature on perceived threat and health, has found that perceptions of threat were not only associated with both physiological and psychological stress responses, but also led to unhealthier (e.g., smoking) and fewer healthy behaviours [30]. It is possible that experiences of discrimination might impact participation in health behaviours which may then contribute to adverse health outcomes. Literature reviewing the effects of perceived racial discrimination on health shows that the negative consequences of perceiving discrimination still exist after socioeconomic status is controlled for [62]. Moreover, the life expectancy disparity between White and Black Americans has only changed from 7 years to 5.1 years between 1960 and 2005 [71], while disparities on other health outcomes (e.g., heart disease) have grown worse. These findings suggest that intergroup experiences such as anticipating and perceiving discrimination contribute to this adverse

impact of discrimination on health.

7. Conclusions

Our findings provide evidence that outgroup derogation may be a maladaptive response and that frequent exposure to intergroup stressors may have negative and serious consequences. They further pioneer an extension of the field of social neuroscience to intergroup communication [[47](#)].

Author Contributions

Sinthujaa Sampasivam drafted the manuscript. Katherine Anne Collins and Richard Clément conceived and designed the study. Katherine Anne Collins and Sinthujaa Sampasivam performed the statistical analyses. Catherine Bielajew and Richard Clément revised the manuscript. Catherine Bielajew acted as a consultant for the cortisol assays and statistical analyses.

Conflicts of Interest

The authors declare no conflict of interest.

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STUDY 2:
**The Impact of Perceptions of Outgroup Threat and
Opportunity to Derogate on Alpha-Amylase Levels***

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*Sampasivam, S., Collins, K. A., Bielajew, C. & Clément, R. (2018). The Impact of Perceptions of Outgroup Threat and Opportunity to Derogate on Alpha-Amylase Levels. Manuscript submitted for publication.

Abstract

Recent research has documented the relevance of a neuroscientific perspective to intergroup phenomena. One approach has been to examine the effects of intergroup threat on hormonal indicators of stress. In an earlier study, we demonstrated that intergroup threat and having an opportunity to derogate the outgroup resulted in heightened levels of one indicator of stress, cortisol. Based on these previous findings, we hypothesized that perceptions of threat would result in an increase in another indicator, alpha-amylase, and that an opportunity to derogate against the outgroup would exacerbate the situation, resulting in more stress. Canadian university students ($N = 66$), the same students who participated in the previous study, read either about discriminatory or favourable comments that Chinese individuals had made towards Canadians. Subsequently, they were either placed in a control condition or were given the opportunity to derogate the outgroup. Salivary alpha-amylase was collected at baseline, twice following the threat, and twice after the opportunity to derogate. Findings showed that participants showed a delayed alpha-amylase response to threat. Contrary to our previous findings with cortisol, however, threatened participants who had an opportunity to derogate did not show higher alpha-amylase concentrations. These findings illustrate the importance of using multiple biomarkers in order to obtain a more nuanced picture of the relationship between stress and psychosocial threats.

Keywords: outgroup derogation, threat, stress response, intergroup relations, social neuroscience

Erik Erikson (1968) wrote, “In the social jungle of human existence, there is no feeling of being alive without a sense of identity” (p. 38). Past research on intergroup relations has relied heavily on the concept of group identification (e.g., Brewer, 2001; Tajfel & Turner, 1979, 1986). Currently, there are diverging predictions on the outcome of having an opportunity to respond to identity threats: whether this opportunity increases stress levels, based on the model of intergroup anxiety (MIA; Stephan & Stephan, 1985), or lowers stress levels, based on social identity theory (SIT; Tajfel & Turner, 1979). Recent work from our laboratory investigating this relationship between the two models using salivary cortisol as a stress biomarker suggests that perceptions of intergroup threat increase cortisol levels and a chance to respond to the threat further augments these levels, in line with the MIA (Sampasivam, Collins, Bielajew, & Clément, 2016). In the present study, using the same subjects and protocol reported in Sampasivam et al. (2016), we evaluated the effects of intergroup threat on another stress biomarker, alpha-amylase.

Social Identity Theory (SIT; Tajfel & Turner, 1979)

Group identity is based on multiple individuals having a common underlying feature tying them together to form a group, an “us.” People who do not belong to this “us” are part of the “them,” and belong to the outgroup (Brewer, 2001). According to SIT, individuals are motivated to feel positive about the social group they belong to as a way to maintain a positive self-image. A perceived threat to the ingroup, typically the result of threatening intergroup comparisons or competition, is dealt with by either bolstering the ingroup or derogating the outgroup (Tajfel & Turner, 1986). Ingroup bias or favouritism occurs when the same benefits or favours are not extended to others as to

other group members, whereas outgroup derogation occurs when members of the outgroup are treated with negativity or hostility (Brewer, 2001; Tajfel, 1982).

While ingroup favouritism often occurs more frequently and often independently of outgroup derogation (Brewer, 2001), the latter has been found to occur more often in contexts involving threat. Past research suggests that group members who are subjected to a self-esteem-lowering threat are more likely to derogate as a way of defending themselves (e.g., Finchilescu, 1986; Meindl & Lerner, 1984). These results have been corroborated in studies in which ingroup members feel better after derogating outgroup members in various contexts relating to ethnic groups (Branscombe & Wann, 1994), age groups (Knobloch-Westerwick & Hastall, 2010), and gender groups (Maass, Cadinu, Guarnieri, & Grasselli, 2003). Thus, research based on SIT suggests that a perceived threat to identity leads to feelings of stress, and derogation is, therefore, a means to relieve this stress and reaffirm positive identity. These findings are further supported by studies measuring physiological stress, in that experiencing threats to identity is associated with a physiological stress response (Blascovich, Spencer, & Quinn, 2001; Clark, Benkert, & Flack, 2006; Lepore et al., 2006; Matheson & Cole, 2004; Mendes, Blascovich, Lickel, & Hunter, 2002; Pascoe & Richman, 2009; Sawyer, Major, Casad, Townsend, & Mendes, 2012; Townsend, Major, Gagni, & Mendes, 2011).

Model of Intergroup Anxiety (MIA; Stephan & Stephan, 1985)

The MIA highlights the importance of context in intergroup relations and suggests that intergroup anxiety arises from feared negative consequences. These consequences can be psychological, for example, embarrassment, loss of self-esteem, awkwardness of the interaction; behavioural, such as being exploited as a low-status group member; or

they can pertain to negative evaluations by ingroup or outgroup members, as in rejection by the outgroup or disapproval from the ingroup. The context surrounding the interaction can elevate some of these fears, resulting in increased levels of arousal during the interaction, which can affect later interactions as well. Thus, in a threatening intergroup context, an opportunity to derogate the outgroup highlights the intergroup nature of the interaction, leading to increased levels of stress. The two models, therefore, make conflicting predictions, and their implications for stress levels call into play a methodological approach that would be directly relevant to the assessment of that phenomenon.

Social Neuroscience and Intergroup Research

Social neuroscience methods are being increasingly exploited in social psychology paradigms, including ones related to intergroup research. This approach offers a number of benefits. For example, intergroup research often involves sensitive topics (e.g., prejudice), resulting in reactions that are influenced by social desirability and self-presentation motives. Social neuroscience or more objective methods of measurement might better tap into beliefs that participants would be unwilling to report or be unaware of (Gardner et al., 2000), by directly measuring the variables of interest (Amodio, 2013; Cacioppo, Berntson, & Decety, 2010). Past research investigating the relationship between threat and self-reported stress has not consistently found them to be linked. Given that physiological measures circumvent the impact of self-presentation concerns, they may be a better indicator of threat-induced stress.

The majority of intergroup studies that incorporate social neuroscience methods use cardiovascular and neuroimaging techniques (e.g., Amodio, 2009, 2013, 2014). A

meta-analysis based on 134 samples demonstrated that perceptions of discrimination, a form of threat, were associated with a physiological stress response, most often based on cardiovascular indices (Pascoe & Richman, 2009). Only a limited number of studies have looked at endocrine-related stress responses (e.g., Matheson & Cole, 2004; Sampasivam et al., 2016; Townsend et al., 2011).

Stress and Its Indicators

Stress can be defined as a threat to homeostasis by a real or perceived challenge (Goldstein, 2010; Goldstein & McEwen, 2002; McEwen, 2000; McEwen & Stellar, 1993). A stressor, whether physiological or psychological, and whether positive or negative, is a stimulus that leads to a physiological imbalance. When an event is perceived as stressful, a physiological reaction occurs that involves multiple systems (cardiovascular, musculoskeletal, respiratory, etc.) and impacts several homeostasis mechanisms (Sapolsky, 2002). The two major neuroendocrine systems that are activated in response to a stressor are the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic-adrenal-medullary (SAM) axis (Chrousos & Gold, 1992).

Cortisol is a well-established indicator of stress-induced HPA axis activation (Kirschbaum & Helhammer, 1989, 2000). It has been the object of a significant body of research, resulting in an understanding of the correlates and consequences of HPA activity (Granger et al., 2007). Cortisol is produced by the adrenal gland, one of a class of endocrine glands, and circulates in blood before passively diffusing into saliva (Sterling & Eyer, 1988), resulting in a roughly 15- to 20-minute lag between, for example, stress-induced HPA axis activation and a change in the salivary concentration of cortisol.

Among the limited number of intergroup studies that examine endocrine-related stress responses, the majority make inferences about HPA functioning. A few investigators have demonstrated that the perception of an intergroup threat is associated with increases in cortisol levels (e.g., Matheson & Cole, 2004; Townsend et al., 2011). For example, the use of coping strategies that allow threatening situations to be appraised as controllable, along with having a greater sense of optimism, have been related to lower cortisol concentrations (Matheson & Cole, 2004). In a study that examined sexism and stress, women who chronically perceived sexism tended to have higher cortisol levels, unless they were placed in an experimental condition that provided no possibility of experiencing sexism (Townsend et al., 2011). Another report that investigated stress in the formation of cross-race friendships found that those who perceived the friendships as threatening tended to show increased cortisol reactivity following an interaction with different race friends (Page-Gould et al., 2008). Over multiple cross-race interactions, stress reactivity decreased.

In our previous study (Sampasivam et al., 2016), participants had an opportunity to respond to intergroup threats while salivary cortisol levels were simultaneously assessed. In the threat condition, participants read discriminatory statements about Canadian values, family structure, work habits, etc., allegedly made by the outgroup. Subsequently, participants were given an opportunity to derogate the outgroup. Based on previous research, an opportunity to derogate the outgroup was expected to result in one of two outcomes. Following predictions made by SIT, we predicted that engaging in derogation would lower stress, and thus cortisol concentrations. Extrapolating from the MIA, we predicted that an opportunity to derogate would exacerbate the situation and

result in more stress. Our findings indicated that threatened participants who had an opportunity to derogate showed higher cortisol concentrations compared to those in the non-threat group. These studies importantly suggest that the stress response, as indexed by cortisol levels, can be manipulated within an experimental laboratory setting using an intergroup threat. Even though there is evidence showing the usefulness of physiological indicators of threat, these studies have largely focused on only one of the two major stress response systems. The present research extends the intergroup relations literature and physiological indicators to include the SAM axis.

Alpha-amylase has been used increasingly as a biomarker of SAM activity after Chatterton and colleagues reported increases in salivary alpha-amylase (sAA) and plasma norepinephrine levels, as well as a positive relationship between the two, following both physical exercise and a written exam (Chatterton, Vogelsong, Lu, Ellman, & Hudgens, 1996). Subsequent research has shown that sAA levels increase in response to psychosocial stress (Rohleder, Nater, Wolf, Ehler, & Kirschbaum, 2004; van Stegeren, Wolf, & Kindt, 2008). Gordis et al. (2006) recorded peak sAA values immediately (about 5 minutes) following stressor exposure. Its presence in saliva and its rapid response to stressor induction make it a useful marker for assessing stress-induced sympathetic activity (Kirschbaum & Hellhammer, 2000; Kivlighan & Granger, 2006). Moreover, unlike cortisol, it is not passively transported into saliva and is instead part of salivary protein production, stimulated by parasympathetic and sympathetic nerves innervating the salivary glands (Baum, 1987). Thus, it is locally produced in the oral cavity by salivary glands.

The Present Study

Lovallo and Thomas (2000) stated that stress is a multi-dimensional construct and, therefore, multiple measures of stress are required to accurately represent stress physiology. There is growing interest in the coordination of both the HPA and SAM axes in the context of stress, and measuring their activity via cortisol and sAA indices together may provide information on how the behaviour of one axis influences the other (Bauer et al., 2002). The specific aim of this study was, therefore, to investigate if the same threat as that used by Sampasivam et al. (2016) activated a stress-induced sympathetic response, as indexed by sAA. To better understand the neurobiology of stress and biomarker interactions, and the cascade of neuroendocrine and nervous system reactions that occur in response to stress, we extracted sAA from serial saliva samples collected in the same individuals as those in our previous study; this design allowed us to compare HPA and SAM hormonal responses to stress. We predicted the following outcomes:

a) **Threat.** Participants who are threatened would show increased levels of sAA compared to those in the control group, as we and others have previously reported based on cortisol levels (Sampasivam et al., 2016; Blascovich et al., 2001; Clark et al., 2006; Lepore et al., 2006; Matheson & Cole, 2004; Mendes et al., 2002; Pascoe & Richman, 2009; Sawyer et al., 2012; Townsend et al., 2011).

b) **Opportunity to derogate.** Participants who are threatened and given the opportunity to derogate would show increased levels of sAA, in line with the theory proposed by the MIA and our recent findings showing that an opportunity to derogate was associated with an increase in cortisol levels (Sampasivam et al., 2016).

Method

Participants

A total of 66 female undergraduate students participated in this study; their average age was 19.80 ($SD = 4.66$) years old. They were recruited through the Integrated System of Participation in Research program at the University of Ottawa and received 2% towards their grade in an introductory psychology course for their participation. In this study, it was important for the participants to both belong to the same ingroup and be aware of the same stereotypes towards both the ingroup and the outgroup. Consequently, only participants who identified as Caucasian Canadian with their mother tongue being English were deemed eligible for the study. Informed and written consent was obtained from all participants following a description of the procedures and risks, and participants had the opportunity to ask questions. This study was approved by the Ethics Review Board of the University of Ottawa.

Experimental Procedure

The diurnal rhythm of sAA suggests that sAA levels decrease within 30 minutes of awakening and then increase slowly throughout the day (Nater et al., 2007; Rohleder et al., 2004). Consequently, participants were tested between the hours of 3 p.m. and 8:30 p.m., when concentrations are most stable. Participants attended a laboratory session in which they complete the testing online; the study was completely automated and equipped with timers programmed to ask participants to provide saliva samples at baseline, 5 minutes and 20 minutes after they read the threat manipulation, and 5 and 20 minutes after having an opportunity to derogate the outgroup.

Figure 1 shows the stages of the experiment. After providing consent, participants were given a glass of water and asked to rinse their mouths to ensure that the saliva samples were not contaminated by food. Participants then watched an instructional video illustrating how to provide saliva samples and filled out a questionnaire on general demographic information. The questions included queries on the consumption or use of items that impact stress hormones (i.e., cigarettes, alcohol, birth control, and other medications), and about any recent dental work. Anyone who reported bleeding gums the morning of the study was excluded from further participation due to potential contamination of the saliva samples (Page-Gould & Akinola, 2015).

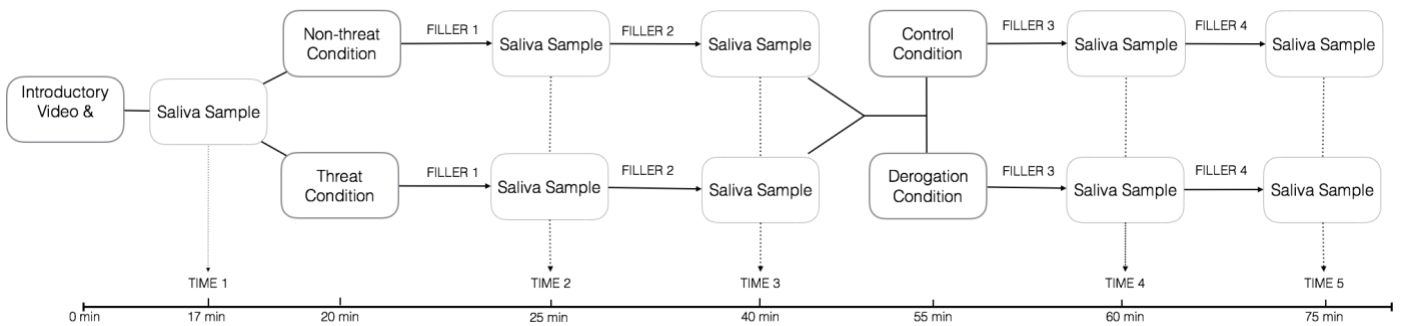


Figure 1. Flow chart showing the steps of the experimental procedure for both the no threat (top) and threat (bottom) groups.

Each participant provided five saliva samples collected from oral swabs placed underneath the tongue for three minutes. The samples were obtained through the sequence that follows. An initial baseline saliva sample (time 1) was collected immediately before participants were randomly assigned to read either a threatening or non-threatening composition. Both compositions provided information on previous psychological studies regarding relations between Canadian and Chinese cultures on the

topics of work habits, family structure, hobbies, and values. The non-threatening composition contained positive statements about Canadians, highlighting the similarities between the two cultures. For example, it included the following interview insert: “It was easy to make friends with the people I worked with though. I think Canadians are so friendly! Even though my English was bad, we became friends...like really fast, and we work well together.” The threatening composition contained negative statements about Canadians and highlighted the differences between the cultures. For example, it stated, “Why do Canadians always think their country is so great? You can always hear them talking about how great Canada is - how they are so multicultural and diverse. But really, China is much more multicultural and diverse - in China, there are, uh, 56 different minority groups and yeah, there are a few problems - but Canada has what? Like, 2 - the French people and native people... *[laughing]*... That’s it! And they can barely hold it together.” Thus, the threatening composition was meant to induce a mild stress response through a perceived threat to the participants’ ingroup identity.

A second saliva sample was collected (time 2) five minutes following the threat. During the five-minute wait period, participants responded to a filler task that asked them to summarize the information they read. Participants then provided a third saliva sample (time 3) 20 minutes after the threat. Participants responded to additional filler questions about the compositions while waiting to give the third sample.

Following the collection of the third saliva sample, participants were again randomly assigned to one of two conditions. In one condition, they were asked to read 16 short descriptions of specific positive or negative intergroup behaviours through which they were given the opportunity to derogate by assigning explanations for the behaviours.

In the other condition, the participants were engaged in a control task. Five minutes after the task, the participants provided a saliva sample (time 4); another sample (time 5) 20 minutes post-derogation was then collected. Participants watched filler videos that aimed to help them keep the themes of the study salient between the task and time 4, as well as between time 4 and time 5. Both videos were related to challenging intergroup experiences. For example, the first video was derived from the television show *What Would You Do?*, in which hidden cameras are used to observe how bystanders react to social dilemmas. Unbeknownst to the bystanders, those involved in the dilemmas are all actors. In the specific episode that the participants viewed, Caucasians actors treated visible minorities in a discriminatory fashion in front of bystanders, and some of the bystanders were silent or even joined in on the discrimination, whereas others defended those subjected to the discrimination. In the second video, participants watched a short film called “New Boy,” a story depicting the experiences of a boy who moves to Ireland from an unidentified country in Africa. Finally, participants were debriefed.

The swabs were deposited in a sterile container and kept in a -80°C freezer until assayed for sAA. Commercially available kinetic reaction assay kits and protocols designed by Salimetrics, State College, PA, USA, were used. All samples were assayed in duplicate and the mean of each pair of concentration values was employed in the data analyses.

Results

Manipulation Check

A pilot study was conducted with an independent sample to confirm that the threatening and non-threatening compositions were perceived as intended. Participants (n

= 22) read one of the two compositions and responded to two scales indicating the extent to which the compositions were threatening ($\alpha = .88$) or inoffensive ($\alpha = .96$). The items in the threat scale were threatening, offensive, ignorant, and disagreeable. The items in the inoffensive scale were congenial, inoffensive, soothing, pleasant, agreeable, and positive. Independent-samples t-tests comparing responses to the threat scale in the threat and non-threat conditions showed that those in the threat condition were significantly more likely to perceive the text as threatening ($M = 2.98$, $SD = 1.044$) compared to those in the non-threat condition, ($M = 1.63$, $SD = 0.780$), $t(20) = 3.473$, $p = .002$, while those in the non-threat condition were significantly more likely to perceive the text as inoffensive or non-threatening ($M = 3.68$, $SD = 0.702$) compared to those in the threat condition, ($M = 1.67$, $SD = 1.091$), $t(20) = 5.236$, $p < .001$.

Main Analysis

In this study, we predicted that participants who were threatened would show increased levels of sAA compared to those in the control group. Planned comparisons were carried out between those who were in the threat and non-threat groups at each of the five time points when sAA was collected. As depicted in Figure 2, planned comparisons between threat and non-threat groups indicated significant differences at time 5 only, $t(48) = 2.085$, $p = .042$).

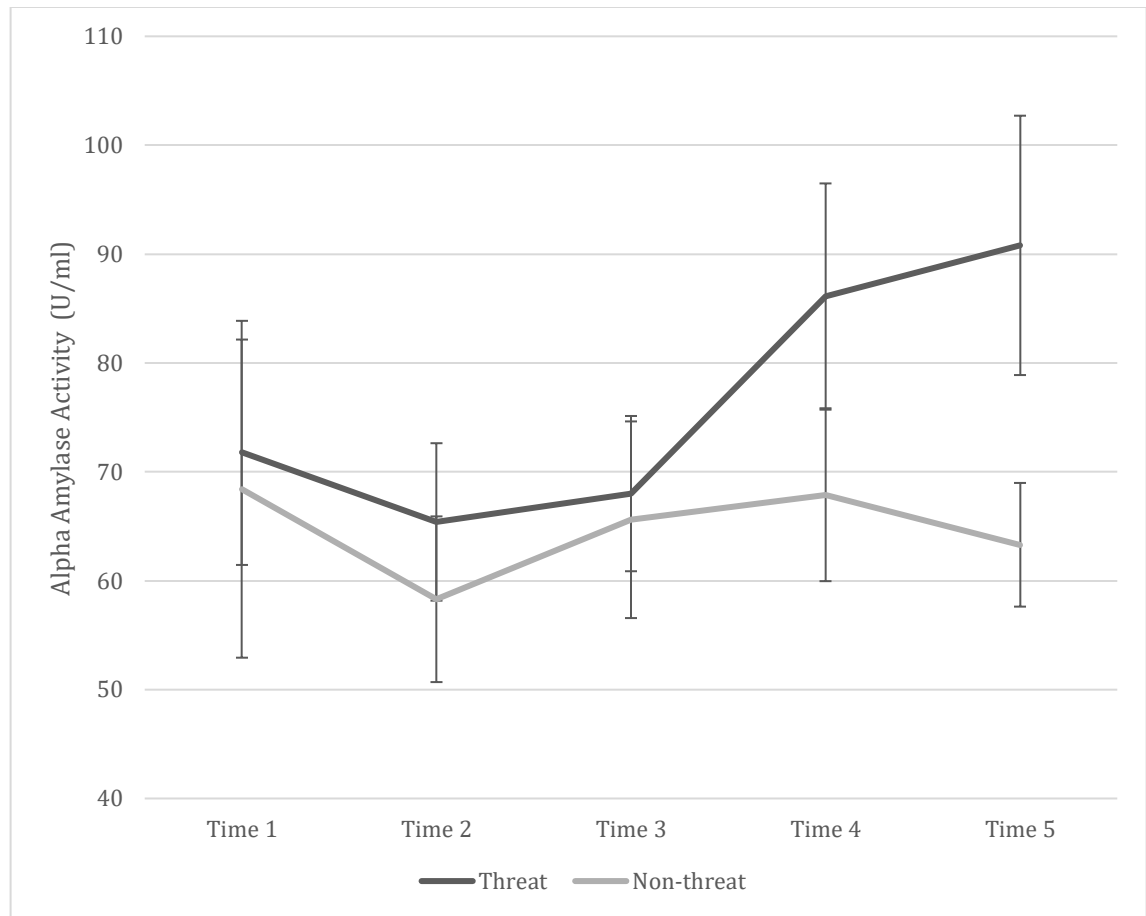


Figure 2. sAA concentrations at each time point as a function of group (threat vs non-threat).

We also predicted that participants who are threatened and given the opportunity to derogate would show increased levels of sAA. Planned comparisons applied to groups based on derogation or non-derogation assignment at time 5 revealed no group differences whether under the threat condition ($t(33) = .499, p = .621$) or the non-threat condition ($t(27) = .264, p = .794$).

Discussion

This study evaluated sAA responses, as biomarkers of SAM functioning, to

intergroup threats and derogation. Our earlier study investigated salivary cortisol concentrations in the same individuals and following the same protocol described here (Sampasivam et al., 2016). Based on these findings and that of others (e.g., Matheson & Cole, 2004; Townsend et al., 2011), we hypothesized that participants who were threatened would show increased sAA activity from baseline. The results obtained in this study, however, differ from our previous findings, which showed a typical HPA axis (cortisol) response to stress, roughly 20 minutes after the threat, corresponding to time 3. In particular, our present findings only partially supported our hypothesis, in that participants who were threatened showed an increase in sAA concentrations compared to those who were not threatened, but not as expected. Peak sAA concentrations have been shown to occur immediately (roughly five minutes) following a stressor (Nater et al., 2007). In contrast, our participants in the threat group began diverging from those who were not threatened approximately 35 minutes after the threat, and displayed significantly higher levels of sAA about 55 minutes after experiencing the threat, thus only after viewing both videos (see Figure 1 for procedure). Although pilot testing indicated that the threat and non-threat manipulation compositions were perceived as intended, it is possible that these manipulations were not arousing enough to result in an immediate stress response via the SAM pathway. Moreover, given the time point at which participants began to show an increase in sAA, it is likely that the videos that were intended to keep the participants thinking about intergroup conflicts led to stress above and beyond any stress resulting from the threat. Thus, experiencing an ingroup threat paired with watching a stimulating intergroup video might have worked in combination to produce the delayed SAM response.

In our earlier work (Sampasivam et al., 2016), we also showed that participants in the threat condition who had an opportunity to derogate secreted more cortisol than participants in the threat condition who had no opportunity to derogate. Based on these findings, we hypothesized that a similar sAA distinction would occur in these groups. However, we found no such differences in this phase of the study.

The SAM and HPA axes may, therefore, respond differently to psychosocial threats. Indeed, some studies have found a dissociation between the systems. For example, a recent study comparing HPA and SAM reactivity to indirect ethnic discrimination revealed that it elicited cortisol reactivity but no cardiovascular responses (Huynh, Huynh, & Stein, 2017). Rohleder, Chen, Wolf, and Miller (2008) also compared SAM and HPA reactivity to experiencing a psychosocial threat and having chronic feelings of shame. There was a significant association between experiencing shame and SAM activity, but not HPA activity. Given this disassociation, it is possible that the nature of the outgroup derogation task more readily activated the HPA axis (Sampasivam et al., 2016) than the SAM axis.

Research comparing SAM and HPA activity with physical stressors has also found a divergence between both systems (Messina et al., 2016). For example, in a study examining the physical and emotional stress related to first-time parachute jumping, there were increases in both cortisol and sAA 90s after the jump. However, when assessed again at 90 minutes' post-jump, sAA and other SAM indicators did not return to basal levels, while cortisol had. Thus, the HPA and SAM axes may be stimulated by different types of stressors and over time may respond differently to stress (Messina et al., 2016).

While this study is one of the first, to our knowledge, to include sAA as an

indicator of SAM activity in intergroup research, our findings should be interpreted in light of its limitations. While pilot testing indicated that the threat manipulation were understood as intended, it appears as though it might not have been salient enough to elicit SAM activity at the expected times. Moreover, outgroup derogation was not explicitly measured in this study, and therefore, it is unclear whether participants who were threatened and had an opportunity to derogate actually did or did not engage in derogation.

Conclusion

Our study investigated when cortisol and sAA have parallel and divergent stress response patterns in the face of an intergroup threat and when there is an opportunity to respond to the threat. This is especially important considering the growing interest in employing multiple indicators of physiological stress to understand how they interact with each other (Bauer et al., 2002). Our findings are consistent with previous research that demonstrates the existence of independent activation and response patterns of the SAM and HPA axes. However, additional research is needed to predict more precisely which type of stressor would activate one or both systems. Our results suggest that perceiving a threat can make one susceptible to physiological stress in the face of additional stimulating experiences. Hence, it is possible that our findings result from a threshold effect in which an initial exposure to an intergroup threat is not sufficient to elicit a SAM response, but increases vulnerability to a SAM stress response when exposed to additional threatening information.

This has important implications given that threats such as anticipating and perceiving discrimination contribute to a number of the physical and mental health

disparities found between stigmatized and non-stigmatized groups (e.g., Carter, 2007; Clark et al., 2009; Hahm et al., 2010; Harrell, 2000; Pascoe & Richman, 2009; Stephan & Renfro, 2002). Given the significant consequences of being exposed to intergroup threats, further research delineating how different types of stressors activate stress response systems, and the accumulative impact of stress on these systems, is key.

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STUDY 3

Intergroup Threat and the Linguistic Intergroup Bias: A Stress Biomarker Study*

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*Sampasivam, S., Collins, K. A., Bielajew, C. & Clément, R. (2017). Intergroup Threat and the Linguistic Intergroup Bias: A stress Biomarker Study. Manuscript submitted for publication. *Journal of Language and Social Psychology*.

This research was funded in part by a grant from the Social Sciences and Humanities Research Council of Canada to the last author.

Abstract

The present research investigates the physiological consequences of showing linguistic bias as a form of derogation. Past research has demonstrated how ingroup threat and having an opportunity to derogate the outgroup results in increased salivary cortisol levels, a biomarker of physiological stress. These findings align with research supporting the intergroup anxiety model (Stephan & Stephan, 1985), which suggests that following an anxiety-inducing threatening experience, making evaluations about the outgroup would result in even more stress. In this study, we investigated whether threatened participants who derogated on a linguistic bias task would show higher cortisol levels. In the study, Canadian undergraduate students ($N = 169$) read either a discriminatory (threatening) or favourable passage about Canadians. Subsequently, participants either engaged in a linguistic intergroup bias (LIB) task (based on the linguistic intergroup paradigm) or in a control task. Salivary samples were collected pre-threat, twenty minutes post-threat, and twenty minutes post-derogation. As expected, the results suggested that reading a threatening passage was associated with an increase in cortisol levels. The results also indicated that participants exposed to the ingroup threat and displaying linguistic bias showed higher cortisol levels than those who were threatened and did not show LIB or were in the control condition. These findings support the intergroup anxiety model and illustrate the importance of incorporating a neuroscience approach in intergroup communication.

Keywords: prejudice, outgroup derogation, intergroup threat, stress biomarker, cortisol, social identity theory, intergroup anxiety model, social neuroscience

Within social psychology, there has long been an interest in the study of social identity and intergroup relations (e.g., Allport, 1954; Hewstone, Rubin, & Willis, 2002; Tajfel & Turner, 1979). Typically, research in this area incorporates empirical work on attitudes, cognitions, and behaviours in intergroup settings, and uses a mix of observational, behavioural, and self-report measures. More recently, neuroscience methods have been applied to this area of inquiry. Social neuroscience is an interdisciplinary field that integrates theories and methods in social psychology and biology to inform, refine, and elaborate on theories on intergroup behaviour and processes (Cacioppo & Cacioppo, 2013; Cikara & van Bavel, 2014).

One area of intergroup research that lends itself directly to such an approach pertains specifically to reactions to intergroup threats (Scheepers, 2013). Perceptions of threat are associated with stress (Cheon & Hong, 2016; Stephan & Renfro, 2002) and will typically result in actions meant to restore comfort and security. One such action is the verbal expression of outgroup biases (e.g., Bourhis & Maass, 2005; Collins & Clément, 2012; Fiedler & Schmid, 2001; Wigboldus, Spears, & Semin, 2005). It is not, however, entirely clear whether verbal derogation will have restorative functions. Sampasivam, Collins, Bielajew, & Clément (2016) found that the opportunity to verbally retaliate enhanced physiological stress. This study aims to further our understanding by assessing physiological reactions associated with the actual use of derogation via subtle lexical choices.

Social Identity Theory (SIT) Perspective

Social identity comprises an important component of one's self-concept, used to both derive meaning about and to evaluate oneself (Tajfel & Turner, 1979). Social

identity can be based on sexual orientation, ethnicity, a common hobby, etc. It represents more than mere group membership resulting from categorization and indicates actual motivation to define oneself based on group membership (Brewer, 2001). The more one identifies with the ingroup the more central that identity becomes to the self, and the more the group's welfare impacts the member's welfare (see Brewer, 2007 for a review). Identification with groups that are highly valued in society helps group members maintain a positive self-identity. Consequently, group membership promotes behaviours that advance that group's interests and goals.

Some researchers have focused on contexts in which social identity is undermined, that is, in contexts that are threatening (Branscombe, Ellemers, Spears, & Doosje, 1999). Threat is defined as the actions or beliefs of an outgroup that challenge the group's goal attainment or well-being (Riek et al., 2006). The nature of these threatening contexts can vary; it can range from circumstances in which one belongs to a stigmatized group (e.g., being denied a promotion based on race or size), to situations in which preferred sports teams or political parties lose. Threat is considered to be a key motivational variable in social identity research (Branscombe et al., 1999; Ellemers, Spears, & Doosje, 2002).

Various theories and taxonomies on intergroup threat explore how different forms of threats interact with ingroup identification to impact attitudes and behaviours towards the outgroup (e.g., Branscombe et al., 1999; Riek et al., 2006). Integrated threat theory (ITT; Stephan & Renfro, 2002; Stephan & Stephan, 2000; Stephan, Ybarra, & Morrison, 2009) proposes that threats can be categorized into realistic and symbolic threats. The former relates to threats to the political and economic power of the group, the group's

physical welfare, and its very existence, while the latter relates to threats to the group's value and belief systems, world view, etc. ITT argues that threats lead to negative psychological reactions (e.g., prejudice) and behavioural reactions (e.g., aggression) against the outgroup, as well as other consequences such as negative emotions and stress. Stephan and Renfro (2002) report evidence supporting a relationship between threat and prejudice from both correlational and experimental studies with a wide range of target groups. Similarly, a meta-analysis studying the impact of intergroup threats on outgroup attitudes showed that threats are indeed negatively related to outgroup attitudes (Riek et al., 2006). Perceptions of intergroup threat may relate to negative outgroup attitudes, given that experiencing an intergroup threat is a stressful and anxiety-provoking experience (see Stephan et al., 2009). Thus, it may motivate group members to engage in different strategies to alleviate it (Hogg & Abrams, 1990; Yzerbyt & Demoulin, 2010). One such strategy is outgroup derogation (Tajfel & Turner, 1986), described as treating or viewing the outgroup with negativity or hostility. Outgroup derogation may take both implicit and explicit forms.

Intergroup theories help explain why people might experience stress when perceiving a threat to their identity, and what purpose engaging in outgroup derogation would serve. According to SIT and research under its paradigm (e.g., Maass, Cadinu, Guarnieri, & Grasselli, 2003), outgroup derogation is one strategy used in the face of a group-based threat to bolster and protect social identity. This finding has been observed in a number of intergroup contexts. For example, when ingroup American identity was threatened, those with higher ingroup identification showed reduced self-esteem, which then predicted engagement in derogation (Branscombe & Wann, 1994). As expected,

engaging in derogation was later associated with increases in self-esteem. Similar results have been found in diverse intergroup contexts (Bourhis, Giles, Leyens, & Tajfel, 1979; Branscombe, Schmitt, & Harvey, 1999; Knobloch-Westerwick & Hastall, 2010; Maass, et al., 2003). Overall, past research suggests that perceptions of threat that negatively impact self-esteem or identity can be bolstered by engaging in outgroup derogation. Hence, according to SIT, outgroup derogation functions as a restoration mechanism.

Model of Intergroup Anxiety Perspective

Not all theories of intergroup interactions would, however, make these predictions. Research based on the model of intergroup anxiety (MIA; Stephan & Stephan, 1985) suggests that intergroup contexts can be anxiety inducing, especially when the intergroup nature of the contact is made salient. The MIA proposes that majority group members feel anxious, stressed, or uncomfortable in intergroup contexts from worry relating to psychological and behavioural consequences for the self, from being negatively evaluated by both ingroup and outgroup members, from appearing prejudiced, etc. Behavioural, cognitive, and emotional consequences result from these feelings of anxiety. Behavioural consequences include following norms more rigidly, cognitive consequences include biased information processing in favour of the ingroup, and affective consequences include transfer of the arousal from the initial feelings of anxiety to other emotions. Based on previous work showing that when ingroup members experience negative emotions or outcomes, negative evaluative responses of the outgroup are amplified (Blanchard, Adelman, & Cook, 1975), the MIA proposes that intergroup anxiety amplifies emotional responses both during interactions and afterwards during evaluations of the outgroup. In support of this model, there is evidence that anxiety

triggers negative cognitions, which results in people relying on expectations and stereotypes when stressed, as well as being more likely to make unfavourable evaluations (Wilder & Shapiro, 1989a, 1989b). More recent research exploring anticipated intergroup contact showed that participants who were told they would be interacting with a Black partner were more likely to report anxiety and were subsequently more likely to make negative evaluations of the outgroup (Amodio & Hamilton, 2012). Negative intergroup contact has also been found to increase the saliency of the contact partner's group membership, partially as a result of a lack of positive emotions associated with the contact partner (Paolini, Harwood, & Rubin, 2010). Taken together, these studies would suggest that the stress induced by intergroup threat would make group membership salient and would exacerbate negative evaluations of the outgroup and amplify negative emotions.

SIT and the MIA in this study are framed as making diverging predictions on why people engage in outgroup derogation. According to SIT, outgroup derogation is a regulatory mechanism through which positive regard is re-established and stress diminished. Conversely, the MIA suggests that derogation makes the intergroup nature of the context more salient, causing negative emotions to be amplified and stress levels to increase. Thus, while both theories suggest that derogation is brought on by threat, the MIA would predict that derogation would not diminish stress levels.

Linguistic Intergroup Bias as a Means of Derogation

The mode by which derogation is performed may have an impact on its eventual outcome. Language is considered to play a key role in the formation, transmission, and maintenance of beliefs within a group, and allows for biased beliefs to be shared (Bourhis

& Maass, 2005; Collins & Clément, 2012). Biased language can be presented in very obvious and intentional ways, for example through the use of slurs or metaphors, and also in subtle, spontaneous, or even unconscious ways, for example through word order, pronoun use, and language abstraction (Maass, Arcuri, & Suitner, 2014). The linguistic intergroup bias model (LIB; Maass, Salvi, Arcuri, & Semin, 1989) incorporates perspectives on social identity, language, and derogation to theorize when people are likely to demonstrate biased views in a subtle manner. LIB proposes subtle and implicit forms of linguistic bias that nevertheless contribute to the pervasiveness and ubiquitous nature of biased beliefs within society, thus providing a valuable paradigm through which we can study the relationships of interest. Moreover, given that more blatant or explicit forms of derogation are against current social norms, it is fruitful to consider subtle forms of derogation (Dovidio & Gaertner, 1996; Hogg, 2013; Maass, 1999; Wenneker & Wigboldus, 2008).

The LIB model relies on the linguistic category model (Semin & Fiedler, 1988) to show how the same behaviour can be coded at four different levels of linguistic abstraction. Descriptive action verbs are the most concrete; they provide a neutral, verifiable, non-interpretable description of an observable behaviour (e.g., A punches B.). Interpretive action verbs provide an interpretable description of a behaviour that refers to a general class of behaviours (e.g., A hurts B.). State verbs do not make a concrete reference to a specific behaviour. Rather, they refer to Person A's psychological state with regard to Person B (e.g., A hates B.). Adjectives are the most abstract, and describe enduring dispositions of a person; they are generalizable across situations and behaviours (e.g., A is aggressive.). Language varying in levels of abstraction has very different

implications. Generally, describing behaviour in more abstract terms suggests that a behavioural episode is linked to an actor's disposition or behavioural tendency, while describing behaviour in concrete terms suggests that it is an isolated event that does not necessarily reflect an actor's enduring characteristics (Semin & Fiedler, 1988). More recently, researchers have argued that nouns should be included as a fifth level of abstraction (see Maass et al., 2014) and, compared to adjectives, have been found to provide more information about the person and describe more enduring and central characteristics of the individual, as well as make more predictions about future behaviours (Carnaghi, Maass, Gresta, Bianchi, Cadinu, & Arcuri, 2008).

According to the research conducted on LIB, there are systematic differences in descriptions of the same behaviour depending on the actor's group membership (Maass et al., 1989). Specifically, research under the LIB paradigm has demonstrated that positively valenced behaviours from the ingroup and negatively valenced behaviours from the outgroup are described abstractly (e.g., "The ingroup member is helpful." and "The outgroup member is aggressive."). Conversely, negatively valenced behaviours performed by the ingroup and positively valenced behaviours performed by the outgroup are described with less abstraction or more concreteness ("The ingroup member punches someone." and "The outgroup member opens the door for someone.") (Maass et al., 1999). Thus, positive features of the ingroup are emphasized through the use of higher levels of abstraction to describe them compared to negative features, while the opposite is true for the outgroup (Moscatelli & Rubini, 2011; Rubini, Menegatti, & Moscatelli, 2014). The LIB phenomenon's robustness is evidenced by its presence in both controlled experimental paradigms and studies looking at naturally occurring language production,

as well as in varied linguistic, cultural, and intergroup contexts (Maass, 1999; Wenneker & Wigboldus, 2008).

Of particular interest to this study is research showing that the motivational state of communicators impacts language use (Wenneker & Wigboldus, 2008), even when speakers are unaware of the biases present in their language use (e.g., Franco & Maass, 1996; Maass, 1999). For example, in intergroup contexts involving ingroup threat, ingroup protective motives can result in biased language use (Maass, Ceccarelli, & Rudin, 1996). In line with SIT (Tajfel & Turner, 1979), research on LIB has shown that when the ingroup identity is threatened, biased language, as a form of outgroup derogation, helps maintain a positive ingroup image (Maass et al., 1996). Research utilizing LIB has also demonstrated the effectiveness of using an implicit instrument to assess bias in contexts in which norms against explicit forms of bias exist (Franco & Maass, 1999). Implicit and explicit bias measures were found to correspond for groups that do not have normative protection against discrimination (e.g., Islamic fundamentalists), but not for groups that do (e.g., Jewish people). These findings suggest that participants provided their true feelings for the implicit measure, but gave socially acceptable ones for the explicit measures when there was a normative pressure not to discriminate. Overall, these studies demonstrate that in the face of a threat-inducing intergroup context, people can implicitly, and unintentionally, derogate to achieve certain goals (Maass, 1999). Moreover, they reveal the advantages of using implicit measures of bias (Hogg, 2013; Maass, 1999; Wenneker & Wigboldus, 2008) to gain insight into a speaker's attitudes and attributes. Employing physiological measures of stress can further elucidate the relationship between these variables.

The Stress Response

Stress can be defined as the feeling of not having sufficient resources to deal with an event (Lazarus & Folkman, 1984). In particular, psychological factors, such as the perceived unpredictability or uncontrollability of an event, as well as factors such as expecting negative psychological or physiological consequences, will together determine whether a stress response will be activated (Kudielka, Hellhammer, & Kirschbaum, 2007).

According to the allostasis model, a stressor may trigger the secretion of various hormones through the hypothalamic-pituitary-adrenal (HPA) axis, a major endocrine system, which principally regulates the stress response via the hormone cortisol. These sequential secretions allow blood sugar levels to remain steady in order to cope with the stressor, while also ensuring that the body is able to function and meet the need for increased attention, energy, etc., and eventually return to homeostasis (Schulkin, McEwen, & Gold, 1994). Salivary cortisol is typically used to assess HPA functioning; it is a non-invasive method of collecting cortisol and correlates well with blood levels of the hormone (Vining, McGinley, & Symons, 1983).

Intergroup Threats and Physiological Stress Response

Recent work by Clément, Bielajew, and Sampasivam (2015) draws attention to the advantages of applying social neuroscience methodology in intergroup research. Scheepers (2013) notes how threat has seldom been directly measured in the extensive literature on threat and identity and has rather been inferred on the basis of, for example, lowered self-esteem or other outcome variables. With social neuroscience methodology, it is also possible to directly measure the variables of interest, without them being subject

to controlled processes or self-presentation concerns (Blascovich, 2000; Blascovich, Mendes, Hunter, Lickel, & Kowai-Bell, 2001; Cacioppo, Tassinary, & Bernston, 2000; Scheepers, Ellemers, & Derks, 2013; Scheepers, Ellemers, & Sintemaartensdijk, 2009). The link between intergroup threats and self-reports of stress has been inconsistent, resulting in some researchers (e.g., Schmader, Johns, & Forbes, 2008) arguing that physiological measures might provide a better evaluation of threat-induced stress and are necessary to move this area of research forward (Scheepers et al., 2013). Moreover, the use of a multimethod approach, in which both self-report and physiological data are used to inform each other, would enhance interpretation (Mendes, Major, McCoy, & Blascovich, 2008; Mendoza-Denton & Page-Gould, 2013) and make it possible to compare competing theories, which could not occur with the use of only observational data or self-report measures (Ochsner & Lieberman, 2001).

Within this area of research, cardiovascular and neuroimaging techniques have most frequently been used (e.g., Amodio, 2009, 2013, 2014). A meta-analysis based on a sample of 134 studies that largely measured stress through cardiovascular indicators showed that perceived discrimination is associated with significantly heightened stress responses (Pascoe & Richman, 2009). Generally, experimental research with various groups and studying different forms of intergroup threat support this relationship (e.g., Blascovich et al., 2001; Blascovich, Spencer, Quinn, & Steele, 2001; Clark, Benkert, & Flack, 2006; Lepore et al., 2006; Mendes, Blascovich, Lickel, & Hunter, 2002). Cheon and Hong (2016) argue that this is because perceptions of threat, a subjective experience characterized by sentiments of anxiety, fear, and uncertainty stemming from basic

psychological needs being thwarted, induces adaptive responses at social, psychological, and neurobiological levels.

In the limited intergroup research incorporating hypothalamic-pituitary-adrenal axis measures, cortisol has been used as an indicator of stress. For example, these studies have demonstrated that experiencing a threat to identity results in increased cortisol levels (Matheson & Cole, 2004; Townsend, Major, Gangi, & Mendes, 2011). In a study examining the association between threat due to anticipated interactions with outgroup members, prejudice, and HPA reactivity, the findings demonstrated that participants who showed an increase in cortisol after anticipating contact with outgroup members were more likely to show subtle and blatant prejudice (Bijleveld, Scheepers, & Ellemers, 2012). The authors suggest that increases in cortisol levels and expressions of prejudice have similar features; they are both proposed to have restorative functions.

Sampasivam, Collins, Bielajew, and Clément (2016, 2018) examined the interaction between perceiving a threat to the ingroup, an opportunity to derogate the outgroup, and physiological stress response. In their studies, Euro-Canadian students were asked to read either discriminatory (threat condition) comments Chinese people had made about Canadians. Subsequently, participants were placed in a condition in which they either had an opportunity to derogate against Chinese people or had no such opportunity. Salivary cortisol and alpha-amylase, both indicators of physiological stress, were measured at baseline, following the threat, and following the opportunity to derogate. In the case of cortisol, an ingroup threat was associated with an increase in salivary cortisol concentrations (Sampasivam et al., 2016). Moreover, for those who were threatened, having an opportunity to retaliate against the outgroup was associated with

more stress. In the case of alpha-amylase, participants only showed a delayed response to stress, and having an opportunity to derogate did not impact alpha-amylase levels (Sampasivam et al., 2018). What is clear from these results is that intergroup threats can result in a physiological stress response in an experimental setting, which supports the use of biological markers in understanding the relationship between threats and outgroup derogation.

The Present Study

The studies described above did not consider whether threatened participants actually engaged in derogation when given the opportunity to do so, and thus it is unclear what exactly led to the stress response. Hence, the present study expands on previous work by including a LIB task as a means of derogation. With the use of this implicit measure, it is possible to compare participants who did and did not engage in derogation given the opportunity, and those who were in the control condition and had no such opportunity.

Specific Hypotheses

1. Based on previous research (e.g., Matheson & Cole, 2004; Sampasivam et al., 2016), we predicted that exposure to an intergroup threat would increase salivary cortisol levels, while exposure to non-threatening intergroup text would result in no changes to salivary cortisol.
2. Based on our previous findings (Sampasivam et al., 2016), we hypothesized that participants who were exposed to an ingroup threat and had an opportunity to derogate the outgroup would show higher cortisol levels compared to those who were threatened and had no such opportunity.

3. Given our earlier findings (e.g., Sampasivam et al., 2016) and following an MIA perspective, we expected an interaction between threat and LIB such that threatened participants who display LIB would show higher cortisol levels than threatened participants who did not show LIB or were in the control condition.
4. We also hypothesized that threat and LIB would interact so that among participants showing LIB, threatened participants would show significantly higher cortisol levels compared to those who were not threatened.

Method

Overview

In this study, social identity was used to create a group-based symbolic threat (Stephan & Renfro, 2002; Stephan & Stephan, 2000; Stephan, Ybarra, & Morrison, 2009) or threat to group value (Branscombe et al., 1999). This form of threat questions the integrity of the group's meaning system and is related to loss of face, undermining self-esteem or ingroup identity (Stephan et al., 2009). To establish an intergroup context with symbolic threats, participants read about research on the similarities and differences between Chinese and Canadian cultures. The research focusing on the differences provided a symbolic threat and questioned Canadian work habits, family structure, hobbies, and values.

Participants

The experimental protocol called for creating a situation in which participants would feel threatened. To that extent, the materials had to target a very specific group, in this case, Canadians. It was, therefore, important that participants were clearly affiliated with the Canadian group and were also well aware of the stereotypes associated with

being Canadian. Thus, only participants who met the following criteria were recruited: (1) born in Canada, (2) parents were born in Canada, (3) mother tongue was English, and (4) exclusively self-identify as a Caucasian Canadian. Participants were told that mother tongue referred to the first language learned and still most frequently used. A total of 169 undergraduate students (26 males and 143 females) who were enrolled in introductory psychology courses participated in exchange for course credit. This discrepancy between the number of male and female participants will be addressed in the Discussion section. The average age of participants was 19.07 ($SD = 2.81$) years old. This study received ethical approval from University of Ottawa's Social Science and Humanities Research Ethics Board. Informed consent was obtained from all participants.

Measures

Salivary Cortisol. Saliva samples were collected three times. Participants placed an oral swab underneath their tongues for three minutes. To extract cortisol, enzyme-linked immunosorbent assay kits commercially available from Salimetrics Inc. were used. The samples were assayed in duplicate, and the average concentration was used for data analyses. Intra-assay variability was 13.91%, and inter-assay variability was 8.06%.

Outgroup Derogation. Participants were randomized into conditions in which they either had the opportunity to engage in a linguistic task that would allow outgroup derogation or to complete the control task. Participants in the condition in which they could respond to the LIB task were in the opportunity to derogate condition, while those in the control task were in the no opportunity to derogate condition. 34.8% of participants were in the control condition, while 65.2% of participants were in the LIB condition. Given that not all participants in the LIB condition would engage in derogation, more

participants were randomized into the LIB condition.

In the control condition, participants were given 10 minutes to write a paragraph on time management. In the opportunity to derogate condition, participants responded to a linguistic task that consisted of sixteen vignettes. The vignettes were pilot tested prior to the study so that participants rated the extent to which the scenarios were typical of North Americans and Asians, and whether they really did describe positive and negative behaviours. Scenarios that were rated as being above at least 85% socially desirable or socially undesirable and were judged as significantly more typical of either Asians or North Americans were included in the study.

Eight of the vignettes depicted socially desirable behaviours (e.g., giving a present) and eight depicted socially undesirable behaviours (e.g., fighting). Eight of the vignettes (four desirable and four undesirable) described ingroup members (Caucasian) and the remaining eight described outgroup members (Chinese). The sex of the actors performing the behaviour varied so that eight of the vignettes contained males and eight contained females. The sixteen vignettes were balanced across conditions, and the order of their presentation varied systematically. Participants were asked to read the vignettes and choose the response alternative that, in their opinion, described the behaviour most accurately. The response alternatives for each vignette were randomized and corresponded to a level of abstraction in the LCM (Semin & Fiedler, 1988). Participants received higher scores for choosing more abstract descriptions (DAV=1, IAV=2, SV=3, ADJ=4) (Semin & Fiedler, 1988).

Procedure

Participants who met the inclusion criteria were invited to attend a lab session at either 3 p.m., 5 p.m., or 7 p.m., when cortisol concentrations are near their lowest values and the diurnal function relating time to cortisol concentration is relatively flat (Kirschbaum & Hellhammer, 2000). The study lasted approximately 90 minutes. Only participants who woke up at or before 9 a.m. were included in the study. Participants were randomly assigned to the different threat conditions. The design of the experiment, including the flow of participants through each stage of the experiment and assignment into different conditions appears in Figure 1. A customized survey was used to ensure that saliva samples were collected at baseline, 20 minutes after participants read the threat manipulation, and 20 minutes after engaging in the LIB or control task.

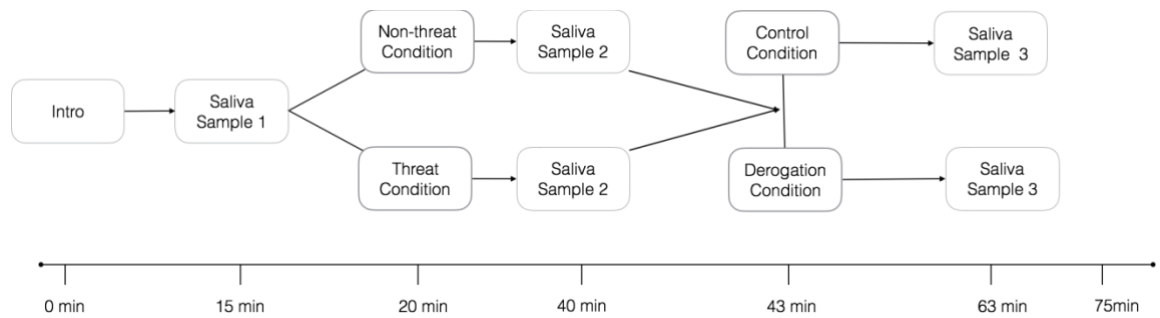


Figure 1. Flowchart demonstrating participants in the two groups—no threat (top) and threat (bottom) moving through the different stages of the study.

Before starting the experiment, participants were asked to rinse their mouths with water to help remove food residue and increase hydration. They subsequently watched a video demonstrating how to provide saliva samples, and completed a demographic questionnaire as well as questions about engaging in behaviours that could potentially impact cortisol concentrations. This included questions about having any major meals,

fluids, or cigarettes one hour before the start of the study, alcohol and medication 12 hours prior to the start of the study, any recent major dental work, and whether their gums bled when they brushed their teeth that morning. These tasks took at least 15 minutes.

Participants then provided a baseline saliva sample (labelled “time 1”). Subsequently, they were randomized either into the threat or non-threat condition. Participants in both conditions were presented with information from past psychological studies investigating the similarities and differences in work habits, family structure, hobbies, and values between Canadians and Chinese individuals. Those in the threat condition received a symbolic threat or threat to group values and belief systems (Branscombe et al., 1999; Stephan & Renfro, 2002; Stephan & Stephan, 2000; Stephan et al., 2009). These participants were told that Chinese interviewees admitted to the existence of fundamental differences in values and behaviours, among other things, between Canadians and Chinese, and had made a number of discriminatory statements about Canadians. Participants were then presented with some excerpts from the interview transcripts. An example of an excerpt from the threat condition was “There is no “Canadian” culture – that’s why they want to keep the French in – it’s the only thing that separates them from the States and makes them interesting. ... “Canadian culture” is such a joke.” In the non-threat condition, participants were told that Chinese interviewees focused on the similarities between both cultures and made a number of favourable statements about Canadians. For example, participants in the non-threat condition read, “.... I heard Canada was supposed to be one of the most, uh, multicul... yeah, multicultural places in the world. It is so true. People were so nice to me and helped me out so much. They didn’t care that I wasn’t from here.”

Participants then provided a second saliva sample (labelled “time 2”), which was collected 20 minutes following the threat. In between saliva sample collections, participants engaged in a filler task that kept the threat manipulation salient. The filler task involved summarizing their understanding of the research on Canadian and Chinese individuals, as well as responding to questions about the research they had just read, for example, if Chinese interviewees perceived similarities or differences between Canadians and Chinese. Participants were randomized into conditions in which they either had the opportunity to engage in a linguistic task that would give them the possibility to derogate against the outgroup or to complete the control task. Twenty minutes following this task, participants provided saliva sample 3 (labelled “time 3”). During this twenty-minute period, all participants engaged in another filler task in which they watched a short film called “New Boy” and a clip of the show *What Would You Do*, which both involved more stressful intergroup contact at first and then more positive intergroup contact. In compliance with ethics regulations, participants were debriefed about the manipulation involved in the study. Saliva samples were centrifuged and stored in a -80°C freezer until they were assayed.

Results

Manipulation Check

To determine whether the threat manipulation was perceived as expected, a pilot study with an independent sample of 22 participants (20 females and 2 males) was carried out. The participants’ average age was 20.59 ($SD = 5.62$) years old. They were asked to read either the threatening or the non-threatening composition and then respond to a scale with 10 items. The scale included four items (threatening, offensive, ignorant, and

disagreeable) that measured perceptions of threat ($\alpha = .88$), and six items (congenial, inoffensive, soothing, pleasant, agreeable, and positive) that measured inoffensiveness ($\alpha = .96$). Participants responded on a 5-point scale that ranged from “not at all” (1) to “completely” (5). An independent-samples t-test was carried out to compare the effect of reading either the threatening or non-threatening composition on feeling threatened. Results showed that those who read the threatening text were significantly more likely to perceive the text as threatening ($M = 2.98$, $SD = 1.044$) compared to those in the non-threat condition ($M = 1.63$, $SD = 0.780$), $t(20) = 3.473$, $p = .002$. An independent-samples t-test also compared the effect of reading either the threatening or non-threatening composition on perceiving the composition as inoffensive. Compared to those in the threat condition ($M = 1.67$, $SD = 1.091$), participants in the non-threat condition were significantly more likely to perceive the text as non-threatening ($M = 3.68$, $SD = 0.702$), $t(20) = 5.236$, $p < .001$.

Confounding Variables

The effects on cortisol secretion of wake-up time on saliva collection day, use of birth control in 12 hours prior to testing, number of days since the last menstrual cycle, and time of participation were considered. Across groups, wake-up time ranged from 5 a.m. to 9 a.m. with no group difference, $F(1,168) = 0.178$, $p = .674$; 12 participants took birth control pills 12 hours prior to testing, a few in each group, and there was no significant group difference in the number of days since their last menstrual period, $F(1,141) = <.001$, $p = .997$. We also considered whether the time at start of participation (3 p.m., 5 p.m., or 7 p.m.) would impact baseline cortisol levels. No group differences

were found, $F(1,165) = 1.030$, $p = .462$. Of our participants, 95 reported having close Chinese friendships, while 73 reported having none. There was no impact of close friendships on cortisol secretions, $F(1,168) = 0.570$, $p = .451$).

Main Analyses

To test our main hypotheses, AUC_g was used as the summary measure of change based on trapezoidal rule from ground (Pruessner, Kirschbaum, Meinlschmid, & Helhammer, 2003).

Effect of threat on AUC_g . A one-way ANOVA was conducted with threat (present or absent) on the AUC of saliva samples 1 and 2 (see Figure 2). There was a significant effect of threat, $F(1,169) = 3.686$, $p = .050$, $\eta^2 = .022$). Supporting the first hypothesis, participants who were threatened ($M = 0.120$, $SE = .007$) had a greater AUC compared to those who were in the no-threat condition ($M = 0.098$, $SE = .009$).

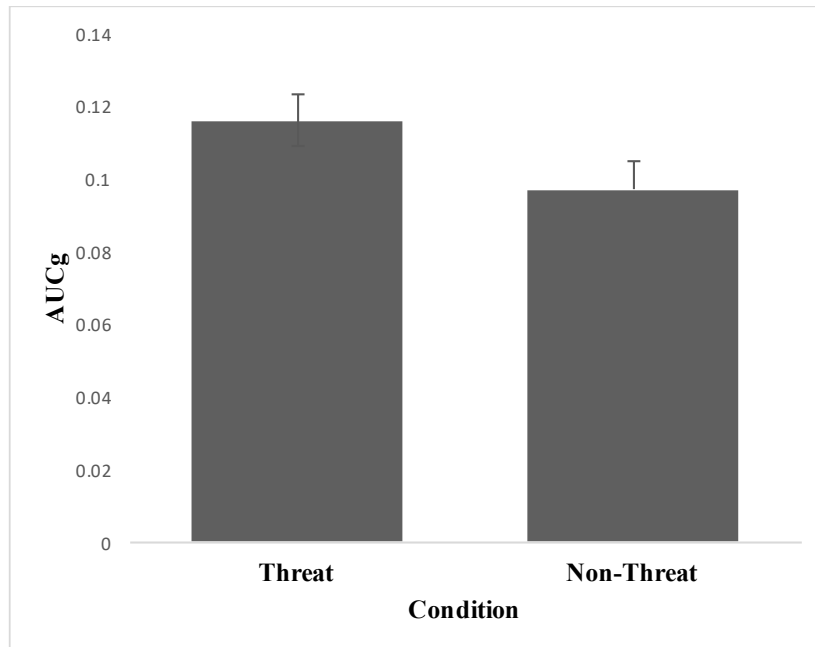


Figure 2. The figure depicts the mean AUCg ($\pm$ SEM) of cortisol concentrations collected at times 1 and 2 as a function of condition—threat or non-threat on the left and right sides respectively.

Linguistic bias. In order to differentiate participants who showed linguistic bias from those who did not, an index of linguistic bias was calculated (Maass et al., 1996). For vignettes pertaining to ingroup members, the mean of ingroup negative behaviours was subtracted from the mean of ingroup positive behaviours. In the case of participants reading about situations involving the outgroup, the mean of outgroup positive behaviours was subtracted from the mean of outgroup negative behaviours. Next, these differences were summed to create an overall LIB Index, which ranged from -2 to 2.50 ($M = -.186$, $SD = .815$). Higher scores were indicative of greater linguistic bias.

In order to differentiate participants who tended to show derogation (LIB group) from those who did not (no LIB group), we first removed 16 participants who had a LIB score of zero. Participants whose LIB Index scores were above zero were grouped together (LIB group, $n = 27$), while those whose scores were below zero were grouped together (no LIB group, $n = 46$). There were 39 participants in the control condition, resulting in a final sample of 112. Thus, our categorical independent variable had three groups: control group, LIB group, and no LIB group.

Relationship between categorical IVs. The chi-square test for independence was used to study the relationship between the threat groups and whether participants were in the LIB group or no LIB group. The relationship between these variables was not significant, $X^2(1, N = 73) = .04$, $p = .847$. Hence, while participants were randomized into the threat and non-threat conditions, participants were placed in the LIB or no LIB

condition as a result of their responses to the linguistic task. The results of this chi-square analysis suggest that showing either high or no LIB was not an artifact of exposure to either the threatening or non-threatening text.

Effect of threat and opportunity to derogate on AUC. To create the opportunity to derogate variable, participants who completed the LIB task, regardless of score, were placed in one group, while those in the control condition were placed in a second group. To assess the impact of threat (present or absent) and opportunity to derogate (completion of the LIB task or control task) on the AUC of saliva samples collected at times 2 and 3, we conducted a two-way randomized group ANOVA. Contrary to hypothesis 2, findings revealed no effects of threat, $F(1, 111) = .002, p = .968, \eta^2 = .000$, and opportunity to derogate, $F(1, 111) = .332, p = .571, \eta^2 = .003$, or the interaction between the two, $F(1, 111) = .372, p = .544, \eta^2 = .003$.

Effect of threat and derogation on AUC. A two-way randomized group ANOVA was conducted with both threat (present or absent) and derogation (LIB group, no LIB group, or control) on the AUC of saliva samples collected at times 2 and 3 (see Figure 3). The analysis revealed no significant main effect of threat, $F(1, 112) = .465, p = .497$, nor derogation, $F(1, 112) = .194, p = .824$. The interaction between threat and derogation was significant, $F(1, 112) = 3.132, p = .048, \eta^2 = .056$, indicating that threatened participants with the tendency to use LIB showed higher cortisol levels. After applying a Bonferroni adjustment to the significance level, simple main effect analyses revealed significant differences in the AUC of threatened participants who showed LIB ($M = 0.1, SE = .010$) compared to those who showed no LIB ($M = 0.069, SE = .008$) ($p = .050$), but not when compared to those in the control condition ($p = .114$). In the non-

threat condition, there was no significant difference between the AUC of participants who showed high LIB, who showed no LIB, and who were in the control condition. Simple main effect analyses also revealed that in the LIB condition, participants who were threatened ($M = 0.1$, $SE = .010$) were significantly more likely to have higher levels of cortisol compared to those who were not threatened ($M = 0.056$, $SE = .017$), $F(1, 106) = 4.834$, $p = .030$, $\eta^2 = .044$. There was no such difference in the no LIB condition, $F(1, 106) = 1.248$, $p = .267$ or in the control condition $F(1, 106) = .190$, $p = .664$. These results support hypotheses 3 and 4, respectively.

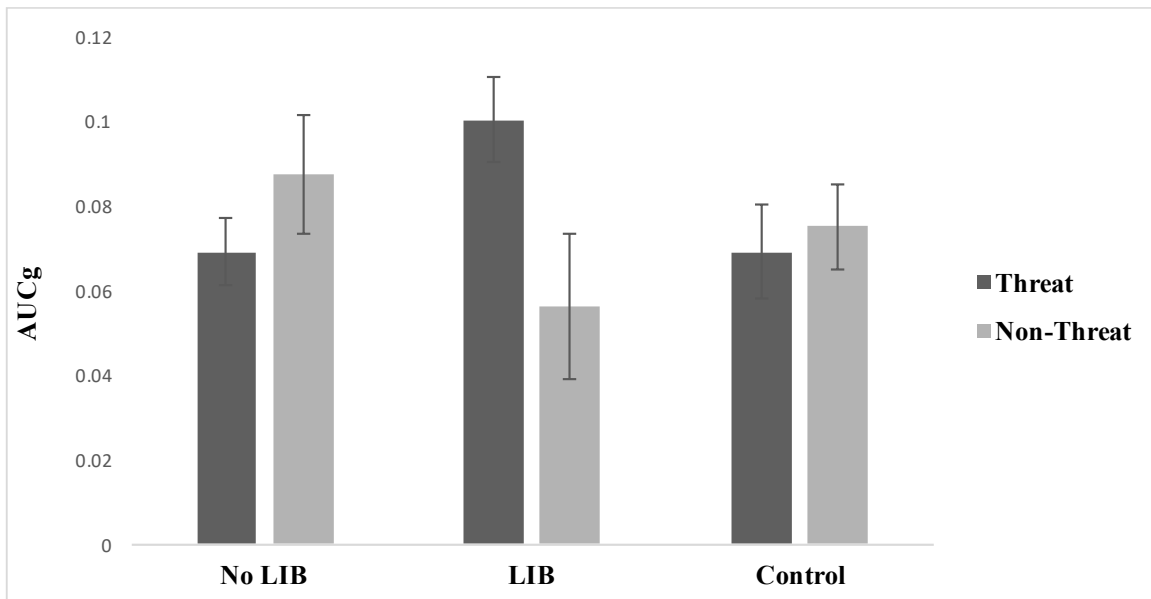


Figure 3. The figure shows the AUCg of cortisol samples collected at times 2 and 3 as a function of threat—with the two conditions, dark grey bars represent threat, and light grey bars represent non-threat, as a function of derogation—with the No Lib on the left, LIB in the middle, and Control on the far right.

Discussion

This research merges several areas of study to provide further understanding of the physiological underpinnings behind perceiving and responding to an intergroup threat. Based on previous work in our laboratory and that of others (e.g., Matheson & Cole, 2004; Sampasivam et al., 2016) we predicted that (1) only participants who were threatened would show an increase in salivary cortisol levels and (2) that being threatened combined with an opportunity to derogate would result in more stress than being threatened and having no such opportunity. While the first hypothesis was confirmed, the second one was not; that is, we observed no differences in cortisol levels between those who were threatened and had an opportunity to derogate and those in the control condition.

We also predicted (3) that threatened participants displaying LIB would show higher cortisol levels than those who were threatened and did not show LIB or were in the control condition. In particular, we wanted to contrast SIT and the MIA to see whether engaging in bias would decrease or increase cortisol levels, respectively. Our findings indicated that threatened participants who engaged in LIB showed greater cortisol reactivity compared to threatened participants who did not engage in LIB and, as expected, participants who were not exposed to the threat. While our findings did not support our predictions derived from SIT, they supported our expectations based on the MIA. In particular, participants who were threatened and, consequently, aroused continued to be so after engaging in LIB. Lastly, (4) in line with our hypothesis, we found that among participants showing LIB, threatened participants showed significantly higher cortisol levels compared to those who were not threatened.

The present findings suggest that threatened participants who chose biased descriptors favouring the ingroup and derogating the outgroup showed greater physiological stress compared to those who were threatened and chose not to engage in bias. Previous studies have demonstrated that engaging in derogation in the face of ingroup threat can help bolster identity and self-esteem (e.g., Branscombe & Wann, 1994; Fein & Spencer, 1997; Knobloch-Westerwick & Hastall, 2010; Lemyre & Smith, 1985). While there may be identity- and self-esteem-related benefits to engaging in derogation, our findings suggest that physiological consequences should also be taken into consideration.

One such consequence of responding in a biased manner is that it increases physiological stress. Frequent activation of the stress response system has been associated with a number of negative health consequences, including interfering with disease course and increasing vulnerability to disease incidence (Munck, Guyre, & Holbrook, 1984), as well as declines in cognitive functioning (Seeman et al., 1997). Previous research with African Americans on stereotype threat and blood pressure has documented how African Americans under such threat showed greater mean arterial blood pressure during an academic test and performed worse on more difficult questions (Blascovich et al., 2001). In a review of social psychological research on the relationship between intergroup relations and health disparities, the authors argue that both advantaged and disadvantaged group members' "expectations, assumptions, interpretations, actions, and reactions" add to the disparities in health outcomes and quality of treatment experienced (Major, Mendes, & Dovidio, 2013, p. 14). This indicates that there are severe consequences to experiencing and dealing with an ingroup threat.

SIT and the MIA are framed in this study as making diverging predictions. However, it is possible that both theories can work in conjunction to predict the consequences of derogation. In a threatening context, it is possible that engaging in outgroup derogation can elevate ingroup identity, while also increasing physiological stress. In particular, a task that permits outgroup derogation might help restore ingroup identity, while at the same time making salient the intergroup nature of the task, resulting in stress. This protocol did not permit the simultaneous assessment of identity strength and cortisol because of the potentially confounding effect of asking about identity on physiological stress. However, a correlational study by Shulman, Collins, and Clément (2011) suggests that for a subgroup characterized by low second language confidence, resorting to the LIB is related to lower ingroup identity strength (p. 324, figure 3). Furthermore, a more recent study following a protocol similar to the present study, but that included a measure of ingroup identity, found conflicting evidence (Sampasivam & Clément, 2018). Identity was measured using Cameron's three-factor identity scale, which incorporates the three components of identity as stated in SIT: awareness of group membership, group evaluation, and group attachment. The findings indicated that participants who were threatened and did not engage in bias showed an increase in ingroup identification compared to threatened participants who did engage in bias. Thus, for threatened participants, engaging in derogation was not a restorative mechanism. Taken together with the results from the current study, these findings suggest that not only is engaging in bias associated with increased stress, but it also does not have any identity-related benefits. Future research including both physiological indicators of stress

while also assessing identity is necessary to further flesh out how SIT and the MIA align and differ.

This biomarker study featured the incorporation of the LIB paradigm. Linguistic bias is considered to be an implicit expression of bias, operating without one's conscious control, and thus is not subject to normative concerns (e.g., Franco & Maass, 1996; von Hippel, Sekaquaptewa, & Vargas, 1997). It has been argued that when using LIB, people may be aware that they are choosing more positive or negative alternatives to describe a group, but might not be aware of or notice the subtle differences in response alternatives that are at higher levels of abstraction (Franco & Maass, 1996, 1999; Schmid & Fiedler, 1996; von Hippel, Sekaquaptewa, & Vargas, 1995, 1997). Given that threatened participants who showed higher levels of linguistic bias also showed more HPA axis reactivity, the findings suggest that even if participants are implicitly engaging in bias, it nonetheless results in physiological stress. More research with other implicit instruments of bias is needed to elucidate if engaging in unconscious forms of bias can still have a physiological impact.

Previous work by Maass and colleagues (Maass et al., 1996; Maass et al., 2003) has documented how responding to threats by engaging in derogation helps bolster identity and self-esteem. Moreover, given that exposure to biased language results in the formation of corresponding beliefs (Collins, 2015), frequently responding to perceptions of threat via biased language use can have long-term societal implications. Specifically, biased language is a mechanism through which cultural beliefs are formed, shared, and maintained. The use of biased language as a means of dealing with the stress resulting

from perceptions of threat not only further increases stress levels and, as a result, impacts health, but also helps perpetuate those biased beliefs within a group.

In a recent review, Clément and colleagues argue that despite a strong rationale for studying intergroup communication from a social neuroscience perspective, there is only a limited amount of research in this area (Clément et al., 2015). In particular, research on intergroup communication has traditionally studied the link between psychological processes and communicative behaviours. However, given that language is a key biological component of human interactions and is found across cultures (Cappella, 1991), and given that current methodologies (e.g., self-report measures) in intergroup communications are not always able to distinguish between competing theories, it would be fruitful to employ a social neuroscience approach to better tie together this relationship and help extend the scope of the current research being conducted.

Several limitations in this study should be noted. First, in this study, we only included a physiological indicator of stress. It would be fruitful to include a self-report measure of stress to learn how it corresponds with cortisol levels. Second, the LIB task consisted of participants choosing a response alternative that they believed best represented the vignettes they read. Thus, participants' preferences were experimentally elicited, and it would be worthwhile to analyze the content of actual open responses, which may contain more complex biased communication. Third, the study sample consisted largely of young female university students and is not representative of the general population. Given that gender differences in LIB use have never been hypothesized or examined in the literature, we did not investigate any specific gender effects. It would be worthwhile to determine if there are gender-related differences in LIB

use, considering there are gender differences generally in language use.

In summary, this study demonstrates how both perceiving a threat and engaging in bias in the face of threat is associated with physiological stress. Although there is extensive research suggesting that perceptions of threat are a key contributing factor to prejudice (Essess, Haddock, & Zanna, 1993; Riek et al., 2006) and a growing literature suggesting that psychosocial threats can elicit physiological stress responses, this is the first study to investigate the physiological consequences of engaging in derogation.

Although research suggests derogating or retaliating against an outgroup can have restorative effects on identity and self-esteem (e.g., Branscombe & Wann, 1994), there is a physiological toll associated with it. Chronic exposure to intergroup threats might not only have long-term health consequences, but it will also heighten anticipatory vigilance and sensitivity to intergroup experiences. This may result in attempts to regulate future experiences of threat and, ultimately, may shape attitudes and behaviours towards the outgroup (Cheon & Hong, 2016).

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STUDY 4

Outgroup Threat and the Linguistic Intergroup Bias: Their Impact on Anger and Identity

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Abstract

This study explored the anger- and identity-related consequences of engaging in implicit and explicit forms of outgroup derogation. Past research suggests that threatened participants who engage in derogation are likely to show increased levels of cortisol, an indicator of physiological stress (Sampasivam, Collins, Clément, & Bielajew, 2017). This study investigated whether the stress-related consequences of displaying derogation would replicate in a self-report study. Canadian undergraduate students (N = 322) read either a discriminatory (threatening) or favourable passage about Canadians, and subsequently reported on feelings of anger and identification with the ingroup. Subsequently, participants were randomized into either an implicit derogation condition in which they responded to a linguistic task, an explicit derogation condition in which they completed a resource allocation task, or the control condition. Participants were asked to respond to the same measures of anger and identity. Findings showed that threatened participants showed an increase in anger and decrease in identification with the ingroup compared to non-threatened participants. Findings also revealed that threatened participants who displayed linguistic derogation showed no decrease in anger or increase in identification with a Canadian identity, while those in the explicit derogation condition showed an increase in anger and no increase in identification with the ingroup. These findings suggest that outgroup derogation is not a useful approach to deal with experiences of intergroup threat.

Preferential treatment of one's ingroup has received much attention in social psychology (e.g., Brewer, 1979; Messick & Mackie, 1989; Mullen, Brown, & Smith, 1992; Tajfel, 1982). Only more recently, however, has research on intergroup relations focused on emotions elicited on behalf of the ingroup. Given that different emotions are associated with specific action tendencies (Frijda, Kuipers, & ter Schure, 1989; Neuberg & Cottrell, 2002; Roseman, Wiest, & Swartz, 1994), the emotions experienced during interactions with the outgroup might significantly impact attitudes and behaviours. The goal of this study is to investigate the relationship between perceiving an intergroup threat and feelings of anger and identity and how these feelings change when emotion-related action tendencies are carried out.

Threat and Identity

A substantial body of research points to a relationship between perceptions of intergroup threat and intergroup bias or negative attitudes towards the outgroup (Riek, Mania, & Gaertner, 2006). Intergroup threats can be described as challenges to the ingroup's goal attainment or well-being resulting from the behaviours and actions of an outgroup. According to integrated threat theory (ITT; Stephan & Stephan, 2000; Stephan & Renfro, 2002), there are two types of threats: realistic threats (threats to the political/economic power of the group, material well-being of the group, or its very existence) and symbolic threats (threats to the group's worldview, morals, values, religion, etc.). ITT argues that these threats lead to negative psychological reactions such as prejudice and behavioural reactions such as aggression against the outgroup.

Threat from an outgroup elicits strong reactions, according to social identity theory (SIT; Tajfel & Turner, 1979), because social identity comprises a key component

of one's self-concept, used to both derive meaning about and to evaluate oneself (Tajfel & Turner, 1979). Moreover, group identification helps meet several needs, including maintaining a positive self-identity, providing a sense of acceptance and social support, as well as providing a system of beliefs, norms, and values to guide behaviour (Crocker & Luhtanen, 1990). Consequently, threats to the ingroup generate stress and motivate group members to engage in different strategies to alleviate it (Branscombe, Ellemers, Spears, & Doosje, 1999; Ellemers, Spears, & Doosje, 2002; Tajfel & Turner, 1986; Yzerbyt & Demoulin, 2010).

Ingroup favouritism and outgroup derogation are two common intergroup strategies that groups use to maintain a positive social identity (Tajfel & Turner, 1986). Ingroup favouritism refers to preferentially treating ingroup members and has been found to occur frequently in experimental research (e.g., Brewer, 1999, 2012; Mummendey & Otten, 1998; Otten & Mummendey, 2000). Outgroup derogation refers to discriminating against an outgroup (Moscatelli, Hewstone, & Rubini, 2016). This could be in the form of treating the outgroup with hostility, making negative evaluations of the outgroup (Brewer, 2001; Bettencourt, Charlton, Dorr, & Hume, 2001; Hewstone, Rubin, & Willis, 2002; Moscatelli et al., 2016), and attributing negative traits and responsibility for negative incidents to outgroup members (Tajfel, 1982). This willingness to benefit the ingroup and have more positive sentiments towards the ingroup is a subtle form of prejudice, in comparison to blatant forms that involve derogation and outgroup hostility, which aim to harm the outgroup (Pettigrew & Meertens, 1995). Thus, according to the SIT perspective, outgroup derogation is used to harm the outgroup in the face of threat.

Research based on SIT would suggest that exposure to threat is related to outgroup derogation because people are motivated to have a positive identity and are thereby likely to derogate the outgroup to protect or bolster their ingroup's worth. This pattern of findings has been observed in a number of intergroup studies. For example, in studies involving threat to racial identity (Branscombe & Wann, 1994; Branscombe, Schmitt, & Harvey, 1999), linguistic identity (Bourhis, Giles, Leyens, & Tajfel, 1979), age-related identity (Knobloch-Westerwick & Hastall, 2010), and gender identity (Maass, Cadinu, Guarnieri, & Grasselli, 2003), results generally suggest that perceptions of threat that negatively impact self-esteem or identity can be restored or bolstered by engaging in outgroup derogation. Given the association between threats and outgroup attitudes (Riek et al., 2006), showing hostile outgroup attitudes might be a process through which ingroup members deal with threatening intergroup experiences. Threatening experiences are emotionally charged events, and given that emotions are related to specific action tendencies, determining which emotions are elicited might help explain why only some people engage in derogation.

Intergroup Emotions

Emotions can be defined as “episodic, relatively short-term, biologically based patterns of perception, experience, physiology, action, and communication that occur in response to specific physical and social challenges and opportunities” (Keltner & Gross, 1999, p. 468). Currently, trends in emotions research follow evolutionary and socio-constructivist perspectives and state that emotions serve an important function in helping people detect, prioritize, and respond to their environment (e.g., Barrett & Campos, 1987; Ekman, 1992; Lazarus, 1991).

Emotions help people respond to the environment by giving rise to specific action tendencies (Frijda et al., 1989). In the case of negative emotions, successfully engaging in emotion-related actions results in their dissipation, and through a feedback loop suggests that the environment is once again benign. These behavioural responses are emotionally reinforced and result in feelings of satisfaction (Leary, 2004). Responses that are impeded or are deemed unsuccessful remain active and continue to motivate behaviour. For example, research suggests that engaging in aggressive behaviour against an irrelevant target does not dissipate anger (Bushman, 2002). Thus, people engage in emotion-related action tendencies in order to deal with their emotions.

The key tenets of intergroup emotions theory (IET; Devos, Silver, Mackie, & Smith, 2002; Mackie, Devos, & Smith, 2000; Smith, 1993) can help to further clarify the relationship between threat and engaging in outgroup derogation. IET integrates research on SIT and self-categorization (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) with appraisal theories of emotions (Ellsworth & Scherer, 2003; Frijda, 1986; Lazarus, 1991; Roseman, 1984; Smith & Ellsworth, 1985) to explore how intergroup emotions arise and how they are dealt with. Appraisal theories, when applied to an intergroup context, make similar predictions. Specifically, situations that make group identity salient cause group members to appraise contexts, occasions, and objects in terms of group identity. Consequently, group members perceive themselves as interchangeable members of their ingroup and not as unique individuals. Hence, they experience emotions on behalf of their group, and these intergroup emotions, such as the emotions faced at the individual level, are arousing (Rydell, Maitner, Claypool, Ryan, & Smith, 2008) and are associated with various action tendencies (Smith & Mackie, 2008).

Perceptions of ingroup threat are related to emotions that are expressed outwardly, such as anger (Neuberg & Cottrell, 2002; Stephan & Renfro, 2002). In support of this, studies have shown that threats to group identity are associated with activation of facial muscles that are correlated with anger (Stephan, Renfro, & Davis, 2008). Research further suggests that anger is related to the tendency or desire to retaliate against the offending outgroup (Cottrell & Neuberg, 2005; Mackie, Devos, & Smith, 2000; Smith, Seger, & Mackie, 2007; Yzerbyt et al., 2003), while also motivating group members to engage in actions to fix the perceived wrongs (Maitner, Mackie, & Smith, 2006). In one study, an intergroup threat led to participants feeling angry when they were informed that ingroup members had successfully retaliated against the outgroup; initial sentiments of anger were related positively to post-retaliation satisfaction, and negatively with post-retaliation anger (Maitner et al., 2006). Hence, emotions play a self-regulatory role, helping individuals detect and respond to situations involving threat. Moreover, when the response is deemed successful, the emotion dissipates (Frijda et al., 1989). Emotions are, however, considered to be active if the behavioural responses are impeded, for example, when there is only the option of aggressing against an irrelevant target (Bushman, 2002).

Model of Intergroup Anxiety Perspective

Not all theories of intergroup interactions would, however, make these predictions. For example, research based on the model of intergroup anxiety (MIA; Stephan & Stephan, 1985) suggests that intergroup contexts can be anxiety inducing, especially when the intergroup nature of the contact is made salient. Behavioural, cognitive, and emotional consequences result from these feelings of anxiety. Behavioural consequences include following norms more rigidly, cognitive consequences include biased information

processing in favour of the ingroup, and affective consequences include transfer of the arousal from the initial feelings of anxiety to other emotions. Based on previous work showing that when ingroup members experience negative emotions or outcomes, negative evaluative responses of the outgroup are amplified (Blanchard, Adelman, & Cook, 1975), MIA proposes that intergroup anxiety will amplify emotional responses both during interactions and afterwards, during evaluative responses of the outgroup. Thus, negative interactions will not only result in negative emotions, but also negative evaluations of the outgroup.

This is in line with work suggesting that ruminating, or focusing one's attention inwards (Lyubomirsky & Nolen-Hoeksema, 1995), can exacerbate negative emotions like anger (Bushman, 2002). For example, Rusting and Nolen-Hoeksema (1998) induced anger in participants before randomizing them into a rumination condition, where participants wrote about self- and emotion-focused topics, or in a distraction condition where they wrote about irrelevant topics. Then, participants completed a task that assessed emotions. Findings showed that participants who ruminated when angry showed increased anger during the final task, while distraction did not increase anger (Rusting & Nolen-Hoeksema, 1998). Similarly, Bushman (2002) examined the effects of angering participants and then placing them in conditions that were distracting or made them ruminate about the angering situation. Participants then reported how they felt and were given the chance to aggress against the initial anger-invoking target. Participants who were in the rumination condition showed more anger than those in the distraction condition, and aggressed more. Thus, in line with the MIA, an opportunity to retaliate or aggress after an anger-inducing experience can result in further exacerbated feelings.

Overall, the relationships postulated by the MIA provide some key insights into the research question at hand. In the face of threat and the resulting negative emotions, the MIA proposes that a chance at outgroup derogation might amplify negative emotions. In this way, both IET and the MIA make contradictory predictions about the consequences of outgroup derogation.

Outgroup Derogation

Both IET and the MIA may be applied to situations of intergroup discrimination. It is a common phenomenon and tends to have similar features regardless of the constituents of the ingroups and outgroups (Tajfel, 1970). For example, the characteristics that underlie race-, age-, and gender-related discrimination are similar. Outgroup derogation generally refers to discriminating against an outgroup (Moscatelli, Hewstone, & Rubini, 2016). This may be via different methods, for example attributing negative traits to outgroup members or assigning responsibility for negative incidents to outgroup members. People can also engage in derogation with and without explicit awareness. It is possible to show bias in an explicit way, such as giving more resources to other ingroup members (Tajfel, 1982). However, it is also possible to use language implicitly and strategically in order to derogate (Maass, Salvi, Arcuri, & Semin, 1989). Given that engaging in implicit or explicit outgroup derogation may have different effects on emotions, it is fruitful to consider these differing forms of derogation.

Resource allocation task as a means of derogation. There is substantial literature on the minimal group paradigm and what conditions elicit intergroup bias. Typically, findings show that mere categorization into groups based on minimal or trivial criteria are sufficient to evoke discrimination in favour of the ingroup (Tajfel, Flament,

Billig, & Bunay, 1971; Tajfel, 1982). Over multiple decades and numerous studies, there has been strong support for these findings (Brewer, 1979; Tajfel, 1981).

Research under the minimal group paradigm has typically investigated intergroup behaviour by using matrix allocation tasks as a dependent measure (Bourhis, Sachdev, & Gagnon, 1994). For example, in some of the earliest work by Tajfel and colleagues (1971), participants were categorized into groups based on overestimating or underestimating the numbers of dots in clusters. Participants later had to attribute points to two other participants in either the ingroup or the outgroup. The points were distributed using matrices, which allowed the researchers to compare the relative importance of the different distribution strategies participants were using (Tajfel, 1982). Findings revealed that participants showed ingroup bias, and that this stemmed from a desire to achieve positive ingroup distinctiveness on whichever dimensions of comparison were available, which led to members wanting to protect, maintain, bolster, or achieve a positive social identity for the group (Tajfel 1974, 1981; Turner 1975). While matrix allocation tasks were initially used within minimal group studies, Bourhis and colleagues (1994) have argued that they are also a useful measure for monitoring discriminatory behaviour in both laboratory and field studies, and that they provide information in a valid, reliable, and sensitive way (Bourhis & Sachdev, 1986; Brewer, 1979; Brown, Tajfel, & Turner, 1980; Turner,). Consequently, in the present study, we will be using a matrix allocation task as an explicit form of outgroup derogation.

Linguistic intergroup bias as a means of derogation. Current societal norms generally suggest that it is not appropriate to explicitly derogate the outgroup. Assessing subtler forms of derogation may therefore also be advantageous (Hogg, 2013; Maass,

1999; Wenneker & Wigboldus, 2008). LIB (Maass et al., 1989) captures the subtle ways language can be used to express biased beliefs. Drawing from the linguistic category model (Semin & Fiedler, 1988), LIB shows how the same behaviour can be described using one of four different levels of linguistic abstraction, increasing in abstraction from descriptive action verbs to interpretive action verbs, state verbs, and adjectives. The use of more abstract language provides less information about a situation and more about the actor, and the information also appears less verifiable, more stable across situations and time, and harder to reconcile with disconfirming evidence (Semin & Fiedler, 1988). Specifically, descriptive action verbs provide information about concrete, neutral, verifiable, and observable behaviour: an interpretation of the behaviour is not necessary (e.g., A punches B.). Interpretive action verbs provide an interpretable description of a concrete behaviour, rather than just a classification of a behaviour: it refers to a general class of behaviours (e.g., A hurts B.). State verbs refer to the psychological state of one person towards another, and do not make a concrete reference to a specific behaviour, nor can they be verified by observing a behaviour (e.g., A hates B.). Adjectives are the least concrete and most abstract, and describe enduring dispositions of a person: they are generalizable across situations and behaviours (e.g., A is aggressive.).

Research conducted under the LIB paradigm, using both controlled experimental settings and looking at naturally occurring language production, has shown how the same behaviour is described differently depending on the group membership of the actor performing the behaviour (Maass, 1999; Wenneker & Wigboldus, 2008). Positively valenced behaviours from the ingroup and negatively valenced behaviours from the outgroup have been found to be described more abstractly, while negatively valenced

behaviours from the ingroup and positively valenced behaviours from the outgroup are described more concretely. By differentially describing positively and negatively valenced behaviours from ingroup and outgroup members, it is possible to use language subtly to express bias. Limiting negative behaviours from the ingroup and positive behaviours from the outgroup to concrete descriptions helps inhibit the generalization of negative information about the ingroup and positive information about the outgroup. Similarly, by abstracting positive information about ingroup behaviour and negative information about outgroup behaviour, it helps facilitate the generalization of positive ingroup information and negative outgroup information (Menegatti & Rubini, 2012, 2013, 2014; Semin & Fiedler, 1988).

The described form of language use has been found to occur in situations that involve intergroup threat. Past research has shown that in intergroup contexts involving ingroup threat, a motive or desire to protect the ingroup can result in biased language use (Maass, Ceccarelli, & Rudin, 1996). For example, in a study where intergroup competition between environmentalists and hunters was either enhanced (threat group) or attenuated (no threat group), results indicated that participants used descriptions in line with LIB theory. Thus, threatened participants more often used abstract language to describe negative outgroup and positive ingroup behaviours, while using concrete terms to describe negative ingroup and positive outgroup behaviours. Participants who expressed more LIB also showed greater post-experimental self-esteem. In a second experiment, Maass and colleagues (1996) had similar findings. Thus, in accordance with SIT (Tajfel & Turner, 1979), research investigating the LIB paradigm has shown that in

the face of a threat to ingroup identity, outgroup derogation in the form of biased language use helps maintain a positive view of the ingroup.

More recent research has started to incorporate affective processes with LIB. A recent study by Albarello and Rubini (2017) found that Italian students who perceived a threat from the outgroup (Roma) were more likely to discriminate linguistically as well as demonstrate affective prejudice towards Roma. Recent studies have also investigated the relationship between threat, LIB, and physiological stress (Sampasivam, Collins, Bielajew, & Clément, 2016). Sampasivam et al.'s (2016) study documented how experiencing a threat to group identity resulted in an increase in cortisol levels, and having an opportunity to derogate was also associated with heightened cortisol levels. A second study found that experiencing a threat and showing more derogation, via the linguistic intergroup bias task, was associated with increased cortisol levels (Sampasivam, Collins, Bielajew, & Clément, 2017). Taken together, these studies suggest that both experiencing an ingroup threat, as well as dealing with derogation post-threat, can induce stress.

These findings, however, contradict what some researchers have theorized to be the association between threat and cortisol. For example, Bijleveld, Scheepers, Ellemers (2012) argue that there are interesting similarities between the functions of both cortisol and prejudice. Cortisol, in the face of a stressor, allows individuals to adapt to and regain control over a situation, via a number of cognitive and metabolic processes (Oitzl, Champagne, van der Veen, de Kloet, 2010; Putman & Roelofs, 2011; Romero & Butler, 2007). While earlier research suggested that stress and the resulting cortisol are associated with negative shifts in moods (e.g., Buchanan, al'Absi, & Lovallo, 1999),

more recent studies have shown the stress-buffering effect of cortisol pretreatment on mood. For example, research suggests that cortisol administration delivered before a stressor can improve mood after a mood decreasing stressor (Het & Wolf, 2007). Similarly, cortisol administration before exposure to a stress-inducing film found to ameliorate emotional states (including lower levels of anger compared to the placebo group) (Reuter, 2002). Reuter's research suggests that while cortisol may directly induce specific moods, it may also have adaptive functions that help cope with situations that elicit emotions. Overall, these findings suggest that cortisol and outgroup derogation serve some overlapping functions that broadly revolve around regaining control/restoring well-being in the face of a threat. Investigating anger and identity changes under a paradigm that has been repeatedly found to increase cortisol levels might help further our understanding of the restorative effects associated with cortisol.

The Present Study

The aim of the present study was to further understand the purposes behind outgroup derogation by studying its relationship with emotions. Specifically, this study investigated how emotions and two forms of derogation are related.

Research Questions

- 1) How does engaging in LIB, showing no LIB, or being in the control condition impact anger?
- 2) How does engaging in LIB, showing no LIB, or being in the control condition impact ingroup identity?

- 3) How does derogating on the resource allocation task, not derogating, or being in the control condition impact anger?
- 4) How does derogating on the resource allocation task, not derogating, or being in the control impact condition impact ingroup identity?

Method

Overview

Cultural identity was used to create a group-based symbolic threat (Stephan & Renfro, 2002; Stephan & Stephan, 2000; Stephan, Ybarra, & Morrison, 2009) or threat to group value (Branscombe, Ellemers, Spears, & Doosje, 1999). This form of threat questions the integrity of the group's meaning system and is related to loss of face, undermining self-esteem or ingroup identity (Stephan et al., 2009). To establish an intergroup context with symbolic threats, participants were provided with passages describing research on the similarities and differences between Chinese and Canadian cultures. The passages focusing on the differences provided a symbolic threat, where Chinese participants allegedly made discriminatory statements about Canadians and their work habits, family structure, hobbies, and values.

In order to assess outgroup derogation, participants responded to either a linguistic bias task, our main dependent variable, or a resource allocation task. Researchers investigating the linguistic intergroup bias paradigm suggest that it is a form of implicit bias, where participants may be unaware they are engaging in bias (Franco & Maass, 1999). Consequently, it is unclear whether negative emotions will dissipate after engaging in this form of derogation. Hence, in this study, resource allocation matrices,

typically used to measure derogation in intergroup research (Brown, 1978), were used to assess an explicit form of derogation. This second dependent variable allowed implicit and explicit forms of bias to be compared.

Participants

It was important that the study participants clearly belonged to the Canadian group and were also well aware of the stereotypes associated with being a Canadian, given that cultural identity provided the basis for group-based threat. It was also important that participants did not identify with or were not overly familiar with the Chinese culture. Hence, only participants who met the following criteria were recruited: (1) born in Canada, (2) parents were born in Canada, (3) mother tongue was English, and (4) exclusively identify as a Caucasian Canadian. Participants were told that mother tongue referred to the first language learned and still most frequently used. A total of 322 undergraduate students (70 males and 252 females) who were enrolled in introductory psychology and communications courses participated in exchange for course credit. The average age of participants was 19.58 ($SD = 3.94$) years old, with three students not reporting their age. Ethical approval was obtained from University of Ottawa's Social Science and Humanities Research Ethics Board. Informed consent was obtained from all participants.

Measures

Attention check. Participants responded to one question that assessed whether they were paying attention to the questions they were being asked or if they were careless responders. Out of 343 participants, twenty participants were deemed careless responders. This left a total of 323 participants in the study.

Outgroup derogation: Linguistic task. Participants were randomized into either the control condition, an implicit derogation condition, or an explicit derogation condition. In the control condition, participants were asked to spend ten minutes writing a paragraph on time management. In the experimental condition with the main dependent variable, linguistic abstraction, participants responded to a linguistic task, which consisted of sixteen vignettes. Eight of the vignettes depicted socially desirable behaviours (e.g., giving a present), and eight depicted socially undesirable behaviours (e.g., fighting). Eight of the vignettes (four desirable and four undesirable) described ingroup members (Caucasians), and the remaining eight described outgroup members (Chinese). The sex of the actors performing the behaviour varied so that eight of the vignettes contained males and eight contained females. The sixteen vignettes were balanced across conditions, and the order of their presentation varied systematically. Participants were asked to read the vignettes and choose the response alternative that, in their opinion, described the behaviour most accurately. The response alternatives underneath each vignette were randomized and corresponded to a level of abstraction in the LCM (Semin & Fiedler, 1988). In terms of scoring, participants received higher scores for choosing more abstract descriptions (DAV=1, IAV=2, SV=3, ADJ=4) (Semin & Fiedler, 1988). A score representing linguistic intergroup bias was calculated for each participant.

Outgroup derogation: Resource allocation task. In the experimental condition with the second dependent variable, participants responded to a resource allocation task used to measure derogation. Participants were presented with a hypothetical task in which they had to distribute funds (a positive stimulus) between Chinese and Canadian student

associations on behalf of the University of Ottawa. They were told, “This laboratory has been contracted by the University of Ottawa to determine how to distribute funds between associations for different cultural groups. You have been assigned to report your opinion on how resources should be divided between Canadian and Chinese student associations.” Participants were given three types of matrices presented twice, once with the ingroup association and once with the outgroup association on the top row (Brown, 1978). The order of the matrices was randomized. Participants had to choose one of thirteen options on how funds could be divided (see Tajfel, 1970). By comparing the responses for each group, it is possible to gain an estimate for the relative strength or pull of each allocation strategy (Brown, 1978). With these six matrices, it was possible to identify six different differentiation strategies. In this study we were interested in the combination of matrices measuring discrimination.

Emotions. As in Maitner et al. (2006), we measured emotions by asking participants to indicate to what extent they felt anger (angry, irritated, furious) by choosing a number from 1 (*not at all*) to 7 (*completely*). A higher number indicated that the emotion was felt more strongly. These emotions were presented in a random order. Cronbach’s alpha for the four items was .907 (time 1) and .909 (time 2).

Identity. Cameron’s (2004) multidimensional measure of social identity was used to assess identification with Canadian identity. This scale is theoretically grounded in social identity theory and therefore includes components relating to awareness of group membership, group evaluation, and group attachment. It consists of twelve items, six of which were reverse coded. The items were presented in random order. Examples of items include “I feel strong ties to other Canadians” and “I have a lot in common with other

Canadians.” Participants responded to the items by choosing a number between 1 and 7, with a high score across items indicating a stronger identification as Canadian. Reliability (Cronbach’s alpha) for the 12 items was .824 at time 1 and .863 at time 2.

Procedure

Participants meeting the inclusion criteria were given access to a secure online study, which they completed at their convenience. Participants were randomly assigned to the different conditions. The design of the experiment, as well as the flow of participants through each stage of the experiment appears in Figure 1.

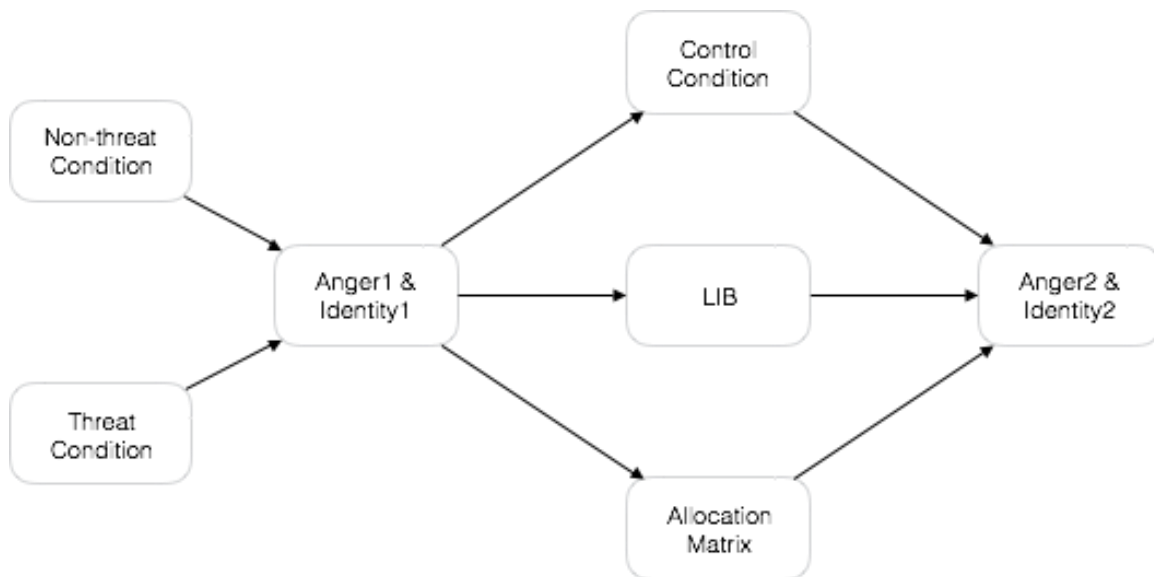


Figure 1. Chart showing flow of participants in the two groups—no threat (top) and threat (bottom) through each stage of the study.

Subsequently, participants from both conditions were asked to respond to a scale measuring anger and identity. The order of these scales was counterbalanced. Participants

were then randomized into one of three conditions: control condition, implicit derogation measure, or explicit derogation measure. Participants then responded to the same emotions and identity scales whose order was once again counterbalanced. Lastly, in compliance with ethics regulations, participants were debriefed about the manipulation used in this study.

Results

Deriving Bias Indices From the Derogation Tasks

Linguistic bias. An index of linguistic bias was calculated to distinguish between participants who showed linguistic bias and those who did not (Maass et al., 1996). In order to calculate an overall LIB Index, the difference of the mean of ingroup negative behaviours and ingroup positive behaviours was summed together with the difference in the mean of outgroup positive behaviours and outgroup negative behaviours. The values of the index ranged from -2.25 to 2.00 ($M = -.319$, $SD = .857$). Higher scores were indicative of greater linguistic bias.

In order to distinguish participants who engaged in derogation (LIB group) from those who did not (no LIB group), participants whose LIB Index scores were above zero were grouped together (LIB group, $n = 31$), while those whose scores were below zero were grouped together (no LIB group, $n = 69$). There were 93 participants in the control condition. In sum, there were three levels of the categorical independent LIB variable: control group, LIB group, and no LIB group.

Resource allocation task. Participants' responses on two resource allocation matrices were used. These matrices measured the pull of maximum differentiation (MD)

against a combination of maximum ingroup profit (MIP) and maximum joint profit (MJP). MD refers to when resources are allocated between two groups in a manner that favours the ingroup. MIP is used in an attempt to maximize absolute profit for the ingroup. MJP is used to maximize profit for both groups. Participants were asked to allocate resources between the two groups. In Figure 2, MD and MIP + MJP are on opposing ends of the top matrix, while both MD and MIP + MJP are together on the bottom matrix. Being more pulled by MD in favour of MIP + MJP is considered to be a discrimination strategy, in which the participant is choosing a less economically rational strategy in favour of a more rational combination (Bourhis et al., 1994). For the purpose of simplicity, this strategy will be hereafter be referred to as the pull of MD on MIP + MJP.

In order to calculate the pull of MD on MIP + MJP, we followed the guidelines presented by Bourhis, Sachdev, & Gagnon (1994). In the matrix on the top, the opposite matrix, the 7/1 represents the maximum differentiation strategy (in which there is a positive difference of 6 between the groups). The 19/25 refers to both MJP ($19+25 = 44$) as well as MIP (19). For the bottom matrix, the together matrix, MD and MIP + MJP all coincide at 25/9. In order to calculate the pull, we need to also identify the stationary variable, that is the score that is pulling the participants' choice from the 7/1. On the top matrix, 7/1 is the stationary point from which participants move as they are tempted by MIP + MJP (19/25). On the bottom matrix, the contrary is true. Based on past recommendations suggesting the use of participants as their own controls against response biases (Bourhis & Sachdev, 1986; Brown et al., 1980), the difference between the scores for the opposite and together strategies was used (Bourhis et al., 1994). These

difference scores are referred to as the pull scores. The higher the pull score, the higher the inclination to maximize differentiation and, thus, derogation. High- and low-derogation groups were formed by ranking participants based on being above or below the median value. Participants higher than the median (median = 0) were put in the high-derogation group, while those below or at the median were put in the low-derogation group.

Canadian	19	18	17	16	15	14	13	12	11	10	9	8	7
Chinese	25	23	21	19	17	15	13	11	9	7	5	3	1

Canadian	1	3	5	7	9	11	13	15	17	19	21	23	25
Chinese	7	8	9	10	11	12	13	14	15	16	17	18	19

Figure 2. Allocation matrices used to investigate explicit derogation.

Area under the curve (AUC) was used as the summary measure of change in anger to test our main hypotheses. It was based on trapezoidal rule from ground (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003).

Manipulation Check

A pilot study with an independent sample ($n = 22$) was conducted to ascertain if participants understood the threat manipulation as expected. Following exposure to either the threatening or non-threatening text, participants responded to a scale assessing the threatening ($\alpha = .88$) and inoffensive ($\alpha = .96$) nature of the text. Two independent-samples t-tests were conducted on the impact of text (threatening or non-threatening) as the independent variable and perception of threateningness or inoffensiveness as the dependent variable. As expected, participants who read the threatening text perceived it to be significantly more threatening ($M = 2.98$, $SD = 1.044$) than participants who read the non-threatening text ($M = 1.63$, $SD = 0.780$), $t(20) = 3.473$, $p = .002$. Similarly,

participants who read the non-threatening text ($M = 3.68$, $SD = 0.702$) were significantly more likely to perceive it as inoffensive compared to participants who read the threatening text ($M = 1.67$, $SD = 1.091$), $t(20) = 5.236$, $p < .001$.

Preliminary Analyses

Relationship between categorical IVs. To investigate the relationship between the threat groups (threat or no threat) and LIB groups (LIB or no LIB), a chi-square test was conducted. The relationship between threat and LIB groups was not significant, $X^2(1) = .004$, $p = .947$. These findings suggest that the threat groups and LIB groups are independent of each other. Participants who showed high and low LIB did not do so as a result of whether they were in the threat or non-threat conditions. Similarly, to investigate the relationship between the threat groups (threat or no threat) and derogation groups (high or low), a chi-square test was conducted. The relationship between threat and derogation groups was not significant, $X^2(1, N = 106) = .038$, $p = .696$. These results suggest that participants who showed high and low derogation did so independently of being in the threat or non-threat conditions.

Effect of threat on anger and identity. Preliminary analyses were conducted to study the impact of threat and derogation on feelings of anger and identity. A one-way ANOVA was conducted on the impact of threat (present or absent) on anger at time 1. The analysis revealed a significant main effect, $F(1, 321) = 20.319$, $p = .001$, $\eta^2 = .060$, such that threatened participants ($M = 2.80$, $SD = 1.49$) were significantly more likely to be angry compared to non-threatened participants ($M = 2.00$, $SD = 1.10$). A one-way ANOVA was also conducted on the impact of threat (present or absent) on identity at time 1. The analysis revealed a significant main effect, $F(1, 321) = 4.644$, $p = .032$, $\eta^2 =$

.014, such that threatened participants ($M = 5.37$, $SD = .047$) had significantly lower ingroup identity compared to non-threatened participants ($M = 5.56$, $SD = .075$).

Main Analyses

Effect of threat and derogation via the linguistic task on AUC of anger. In order to answer the first research question, planned comparisons were computed on the means pertaining to the AUC of anger as a function of threat (present or absent) and derogation (LIB group, no LIB group, or control) (see Figure 3). They revealed that among participants who showed no LIB, those who were threatened ($M = 2.267$, $SE = .144$) were more likely to report feeling angrier compared to those who were not threatened ($M = 1.633$, $SE = .263$), $F(1,187) = 4.989$, $p = .027$. Planned comparisons also revealed that there was no such difference in the change in anger between those in the threat and non-threat conditions for participants who showed LIB, $F(1,187) = .397$, $p = .530$, and those in the control condition, $F(1,187) = 1.264$, $p = .262$.

In the threat condition, there was also no difference between participants who showed no LIB and those who showed LIB, $F(1,187) = .054$, $p = .816$, as well as between these two groups and the control group, $F(1,187) = 2.096$, $p = .149$ and $F(1,187) = 1.519$, $p = .219$, respectively. In the no-threat condition, there was also no difference between the no LIB and the LIB groups, $F(1,187) = 1.519$, $p = .170$ as well as between these two groups and the control condition $F(1,187) = .753$, $p = .387$ and $F(1,187) = .020$, $p = .889$, respectively.

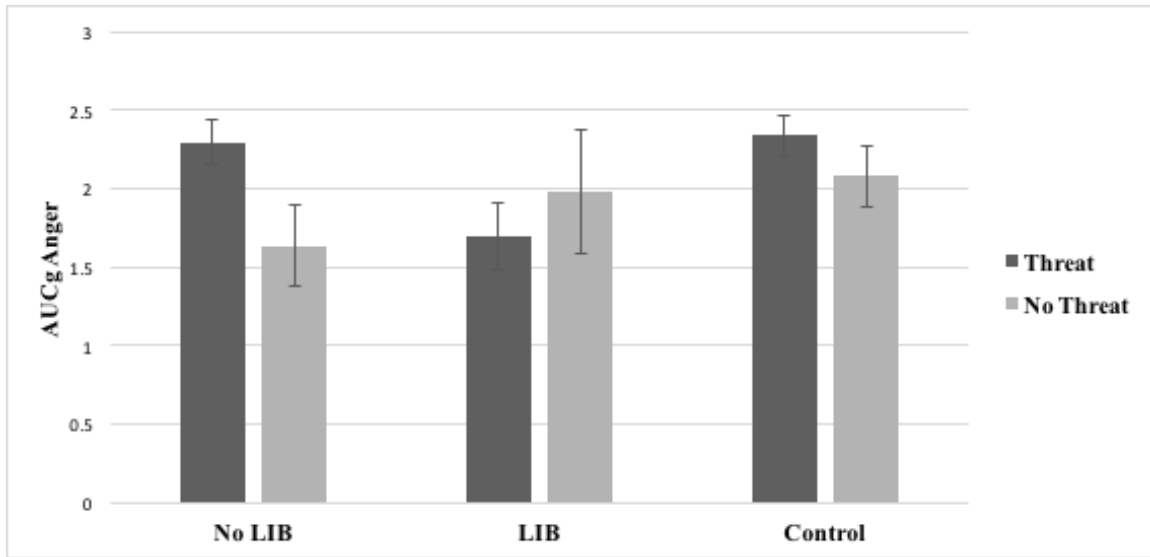


Figure 3. The figure shows the AUC of anger measured at times 1 and 2 as a function of threat—with the two conditions, dark grey bars represent threat, and light grey bars represent non-threat, and as a function of derogation—with no LIB on the left, LIB in the middle, and control on the far right.

Effect of threat and derogation via the linguistic task on AUC of identity. In order to answer the second research question, planned comparisons were computed on the means pertaining to the AUC of strength of Canadian identity as a function of threat (present or absent) and derogation (LIB group, no LIB group, or control) (see Figure 4). Planned comparisons revealed that among participants who showed no LIB, those who were not threatened ($M = 5.881$, $SE = .173$) were more likely to report a greater increase in identification compared to those who were threatened ($M = 5.365$, $SE = .095$), $F(1, 187) = 6.824$, $p = .010$. Planned comparisons also revealed that there was no such difference in identity between those in the threat and non-threat conditions for participants who showed LIB, $F(1, 187) = 2.794$, $p = .096$, and those in the control

condition, $F(1, 187) = 0.010, p = .922$.

Threatened participants who displayed no LIB ($M = 5.365, SE = .095$) showed a significantly higher positive change in ingroup identification compared to those who engaged in LIB ($M = 4.795, SE = .141$), $F(1,187) = 11.224, p = .001$. Still, among threatened participants, those who showed LIB ($M = 4.795, SE = .141$) had a significantly lower increase in identification $F(1,187) = 14.796, p < 0.001$ than those in the control condition ($M = 5.447, SE = .129$). Planned comparisons also revealed no difference in identification between threatened participants who showed no LIB and those in the control condition, $F(1,187) = .270, p = .604$. Among participants who were not threatened, those who did not engage in LIB ($M = 5.881, SE = .173$) showed a marginally higher change in identification compared to those who engaged in LIB ($M = 5.292, SE = .262$), $F(1,187) = 3.530, p = .062$. Non-threatened participants who showed no LIB ($M = 5.881, SE = .173$) had a significantly higher increase in identification compared to those in the control condition ($M = 5.447, SE = .129$), $F(1,187) = 4.049, p = .046$. There was no difference between the control and the LIB condition among non-threatened participants, $F(1,187) = .285, p = .594$.

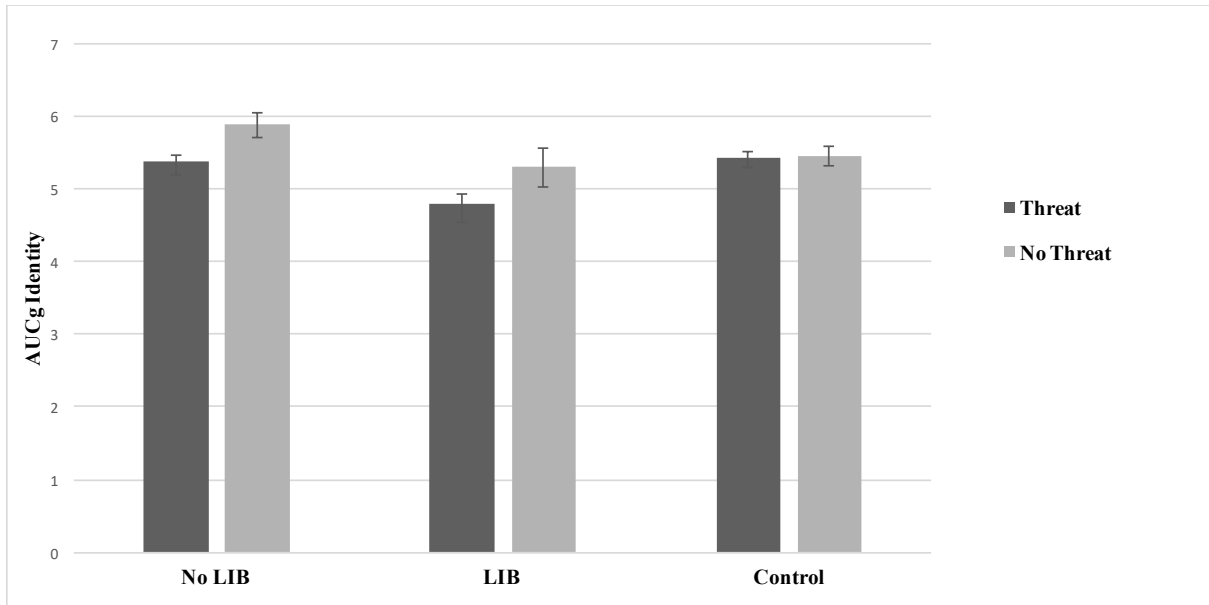


Figure 4. The figure shows the AUC of identity measured at times 1 and 2 as a function of threat—with the two conditions, dark grey bars represent threat, and light grey bars represent non-threat, and as a function of derogation—with no LIB on the left, LIB in the middle, and control on the far right.

Effect of threat and derogation via the resource allocation task on AUC of anger. To investigate the third research question, planned comparisons were computed on the means pertaining to the AUC of anger as a function of threat (present or absent) and derogation (high, low, or control) (see Figure 5). Planned comparisons revealed that there was a greater increase in anger for participants who derogated when they were threatened ($M = 2.990$, $SE = .210$) compared to those who derogated when they were not threatened ($M = 1.875$, $SE = .363$), $F(1, 193) = 7.052$, $p = .009$. There were no differences in anger between those in the threat and non-threat groups in the low-derogation, $F(1, 193) = .285$, $p = .594$, and control conditions, $F(1, 193) = 1.481$, $p = .225$. Planned comparisons also revealed that in the threat condition, participants in the

high-derogation group ($M = 2.990$, $SE = .210$) showed a significantly higher increase in anger compared to those in the low-derogation group ($M = 2.074$, $SE = .153$), $F(1, 193) = 12.445$, $p = .001$, and those in the control condition ($M = 2.346$, $SE = .137$), $F(1, 193) = 6.582$, $p = .011$. There was no difference between threatened participants in the low-derogation group and those in the control condition, $F(1, 193) = 1.759$, $p = .186$. In the no-threat condition, there was also no difference between the low- and high-derogation groups, $F(1,193) = 0.012$, $p = .913$, as well as between these two groups and the control condition, $F(1,193) = .150$, $p = .699$ and $F(1,193) = .165$, $p = .656$, respectively.

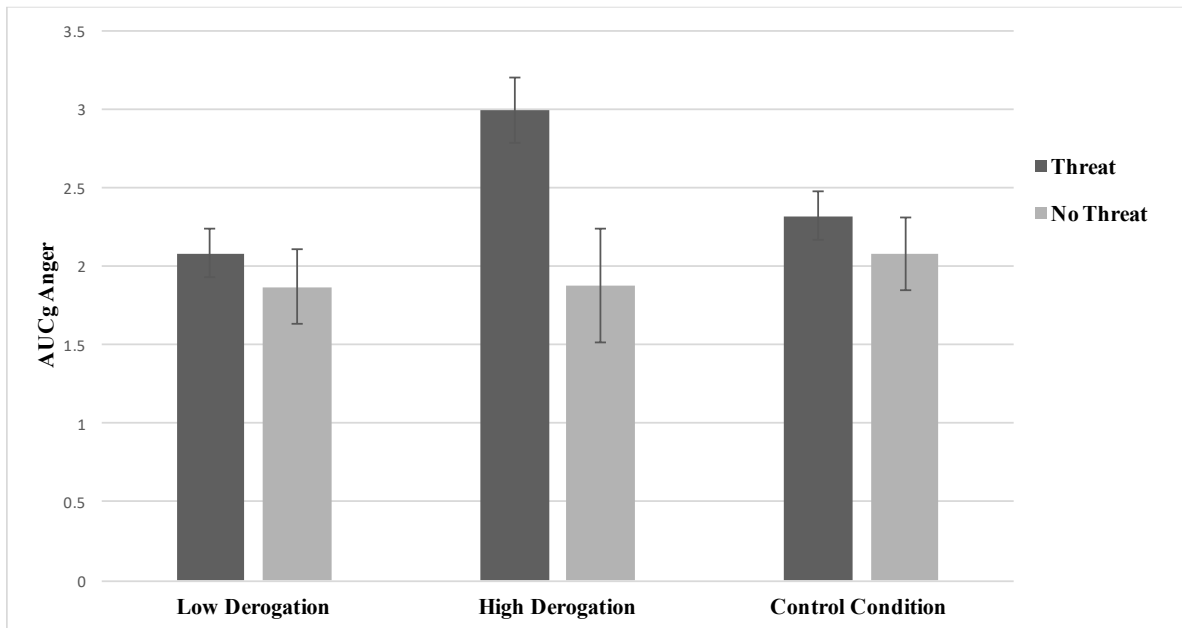


Figure 5. The figure shows the AUC of anger measured at times 1 and 2 as a function of threat—with the two conditions, dark grey bars represent threat, and light grey bars represent non-threat, and as a function of derogation—with the low derogation on the left, high derogation in the middle, and control on the far right.

Effect of threat and derogation via the resource allocation task on AUC of identity. To investigate the fourth research question, planned comparisons were

computed on the means pertaining to the AUC of strength of Canadian identity as a function of threat (present or absent) and derogation (high, low, or control) (see Figure 6). Planned comparisons revealed that there were no differences in identification with the ingroup among participants who showed low derogation in the threat and non-threat conditions, $F(1,193) = .011, p = .917$. Similarly, there was no significant change in ingroup identification between those in the threat and non-threat conditions for participants who showed derogation, $F(1,193) = 1.314, p = .253$. There was also no such change in identification for those in the control condition, $F(1,193) = .004, p = .952$.

There was no significant difference in ingroup identification for both threatened participants in the low- and high-derogation conditions, $F(1,193) = .661, p = .417$, and non-threatened participants in the low- and high-derogation conditions, $F(1,193) = .306, p = .581$. Planned comparisons also revealed no difference in identification between threatened participants who showed low derogation and those who were in the control condition, $F(1,193) = .169, p = .681$, as well non-threatened participants who showed low derogation and those in the control condition, $F(1,187) = .016, p = .899$. Similarly, among threatened participants, there was no difference in identification between those in the high-derogation group and the control group, $F(1,193) = 1.389, p = .240$. Likewise, among non-threatened participants, there was no difference in identification between those in the high-derogation group and the control group, $F(1,193) = .230, p = .632$.

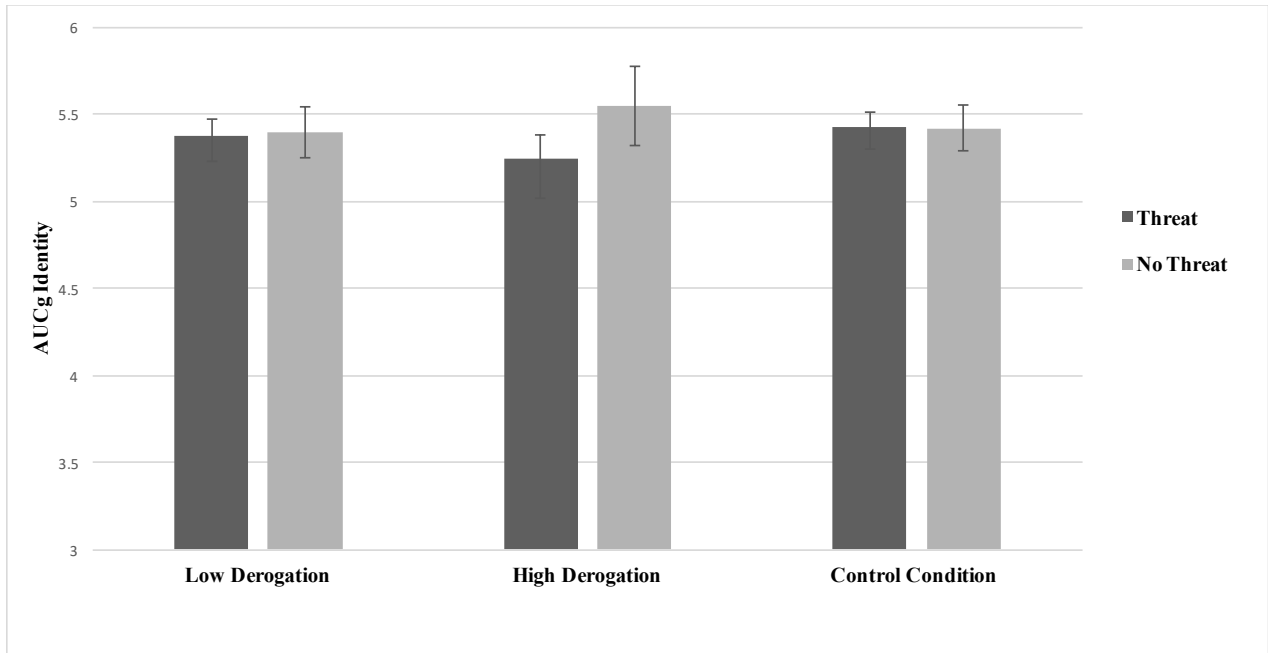


Figure 6. The figure shows the AUC of identity measured at times 1 and 2 as a function of threat—with the two conditions, dark grey bars represent threat, and light grey bars represent non-threat, and as a function of derogation—with the low derogation on the left, high derogation in the middle, and control on the far right.

Discussion

In this study, we aimed to build on research investigating the outcome of intergroup threat and derogation. Based on past research, we expected that threatened participants would express more anger (Maitner et al., 2006; Stephan et al., 2008). In line with our expectations, our findings revealed that being exposed to an ingroup threat is associated with higher feelings of anger compared to not being exposed to a threat. Consistent with past research, the study also showed that experiencing an ingroup threat results in lower ingroup identification.

Our findings with regard to LIB suggest that for those who are subjected to an ingroup threat, there is no difference in anger between those who showed LIB, those

showed no LIB, and those in the control condition. Moreover, the findings revealed that threatened participants who showed no LIB expressed more anger than those who were not threatened. The tendency to not show LIB has been coined as “reverse LIB” (Shulman, Collins, & Clément, 2011). Participants classified here as showing no LIB were essentially using linguistic abstraction in a manner that favours the outgroup. In the present context, this would imply that threatened participants who showed outgroup favouritism were more likely to report being angry compared to those who had not been threatened.

The justification-suppression model of the expression of prejudice may provide an explanation for these results. It suggests that genuine prejudice is often suppressed by both personal values and beliefs, and by group norms (Crandall & Eshleman, 2003). Similarly, Dasgupta’s (2004) review of ingroup and outgroup favouritism suggests that outgroup favouritism results from impression management concerns, as well as from contexts in which there are large differences in status between groups (Rudman et al., 2002; Sachdev & Bourhis, 1994) or when group members are aware of the ingroup’s cultural standing in wider society (Livingston, 2002). Given that Canadians, as a group, are generally seen positively in society and have relatively high group status, it is possible that there was a normative pressure to suppress outgroup bias. In fact, research assessing the social value of using LIB has found that people are perceived to be better group members if they use LIB in a manner that is consistent with group expectations (Assilaméhou & Testé, 2013). The authors argue that this may be because majority group members may be less worried about how the values and beliefs of minority groups can significantly change their beliefs. Based on these findings, it is possible that when there is

a normative pressure to not engage in LIB, threatened participants who engage in reverse LIB are more likely to report being angrier because the threat is perceived as unfair and not justified.

In this study, we also aimed to replicate findings from previous research on threat, LIB, and identity. Based on past research that suggests that outgroup derogation is a strategy used to maintain a positive self-image (e.g., identity, self-esteem) (e.g., Maass et al., 1996), we expected that threatened participants who derogated would exhibit an increase in ingroup identification. Findings showed that among participants who were exposed to the threat, those who showed no LIB as well as those in the control condition displayed a greater increase in ingroup identification compared to those who showed LIB. Our results also showed that only participants who did not experience a threat and showed no LIB reported an increase in ingroup identification compared to those who were threatened. Together, these findings suggest that not engaging in LIB is associated with greater identification with the ingroup, irrespective of whether one is or is not exposed to a threat. These findings are contrary to what we would expect based on past research with LIB and SIT (Maass et al., 1996), in that biased communication is associated with ingroup protective motives. We would, therefore, have expected that threatened participants would have shown the greatest increase in ingroup identification. Our findings, however, suggest the contrary: engaging in bias might be the worst strategy to bolster ingroup identity, as would be predicted by MIA.

Higher explicit discrimination via resource allocation is also associated with increased anger for threatened participants. Here again, the results differ from past research suggesting that engaging in derogation is associated with a decrease in anger.

For example, previous work has shown that for threatened participants who are angry, learning that the ingroup had successfully retaliated resulted in a negative relationship with post-retaliation anger (Maitner et al., 2006). Similarly, dealing with an ingroup threat by instigating action against the outgroup results in less anger (Scheepers, Spears, Doosje, & Manstead, 2003). Given these findings, it is surprising that in the present study engaging in derogation is nevertheless also associated with an increase in self-reported anger. The present results do, however, align with the results of our previous study wherein physiological stress was measured and an implicit measure of derogation was utilized (Sampasivam et al., 2017). The findings showed that exposure to an intergroup threat and engagement in derogation were associated with an increase in cortisol. Similarly, our current findings with LIB also suggest that there is no benefit to engaging in bias. In particular, it does not lead to a reduction in anger, as assessed via the LIB task, nor does it have any identity-bolstering effects. In fact, the participants who did not engage in bias were the ones who showed increases in ingroup identification. Moreover, the findings with the resource allocation task also suggest that engaging in bias actually results in more anger. Taken together, these findings suggest that in the face of intergroup threat, engaging in bias has no identity-related or stress-related benefits. Thus, contrary to previous research and to our expectations, the findings from our study suggest that engaging in bias in the face of threat is not an effective approach to dealing with it.

Our study also raises the issue of the contrast between the results obtained with the two derogation instruments. Previous findings from studies investigating implicit and explicit instruments of derogation have also obtained mixed results. While some studies have found that the different instruments lead to varying results (e.g., Franco & Maass,

1999), others have found the instruments lead to corresponding results (Albareello & Rubini, 2017). The difference between the findings for the implicit and explicit measures in this study might have partly resulted from the nature of the derogation tasks that were used. The process of allocating resources directly between groups might make the intergroup context of the study even more salient, making participants aware of their feelings. The LIB task does not involve direct comparison between groups, and consequently, it is possible that participants' feelings towards the outgroup were not as salient. Given that participants who did not show LIB and participants who derogated on the resource allocation task were both more likely to report feeling angry, variables such as motivation to control derogation should be included in future studies.

This study also aimed to elaborate on research suggesting that cortisol can ameliorate emotional states (Het & Wolf, 2007; Reuter, 2002). Major conclusions cannot be drawn from the present study given that cortisol was not measured. Nevertheless, considering that the same cortisol inducing manipulation was used as in our other studies, the findings suggest that, unsurprisingly, contexts that do not reduce cortisol (i.e., engaging in derogation), also do not lower feelings of anger.

We also aimed to replicate research on threat and identity findings from previous research on threat, explicit derogation, and identity. The findings showed that for participants engaging in the explicit outgroup derogation task, there were no differences in identity. This is in contrast with past research with resource allocation tasks, wherein there is an increase in identification with the ingroup after showing derogation (e.g., Branscombe & Wann, 1994; Knobloch-Westerwick, & Hastall, 2010; Maass et al., 2004). The ingroup identity measure utilized in this study incorporated multiple facets of

identity, including self-esteem. Evidence from a recent study investigating the moderating effect of group norms on the relationship between ingroup favouritism and self-esteem might help explain the current findings (Lacoviello, Berent, Frederic, & Pereira, 2017). Self-esteem, like identification with the ingroup, has been found to decrease under threat and increase following outgroup derogation. Over three studies, the authors showed how ingroup favouritism was associated with increased self-esteem when group norms were manipulated to be pro-discrimination. When group norms were anti-discrimination, a lack of ingroup favouritism was associated with heightened self-esteem. Thus, self-esteem was largely impacted by whether participants' actions were congruent with group norms. Similarly, in a study in which ingroup threat was perceived as low, anti-discrimination norms were associated with reduced discrimination (Falomir-Pichastor, Muñoz-Rojas, Invernizzi, & Mugny, 2004). Given that Canadian norms generally oppose outgroup derogation, it is possible that group norms would have played a role in our study, and thus diminished the identity-bolstering effects of derogation. While our results conflict with previous research, future research incorporating the impact of group norms might clarify our findings.

Conclusion

This study aimed to extend the existing research on why people engage in derogation in the face of threat. In order to do so, we investigated the relationship between threat, anger, and identity, with both implicit and explicit forms of derogation. The findings showed that engaging in derogation had neither an identity-bolstering effect or an anger-reducing effect for the implicit measure, and in fact, had an anger-inducing impact for the explicit measure. Taken together, regardless of the instrument used, there

are no identity- or emotion-related advantages of engaging in derogation, thus questioning previous theorizing that has proposed the reverse.

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General Discussion

Group membership provides us with a sense of meaning, guides us on how to behave and feel in response to different situations, and determines who “us” is and who “them” is. Intergroup threats, especially symbolic threats, impact intergroup relationships by further enhancing this categorical distinction. Symbolic threats are those that jeopardize our values, belief systems, and moral systems (Stephan et al., 2009). Threats to identity can, therefore, have important negative consequences; they can elicit various affective, physiological, and evaluative responses.

Past research has shown how outgroup derogation is a common response to ingroup threat (e.g., Branscombe & Wann, 1994). The purpose of this program of research was to further understand the physiological and emotional corollaries of derogation. To do so, we drew from SIT and MIA theories to understand the context in which people engage in derogation, as well as the consequences of such behaviours. To address issues regarding impression management and self-presentation concerns involved with experiencing and dealing with threat, we used a mix of physiological and self-report indicators of stress, as well as implicit and explicit indices of derogation. To this end, we conducted four studies. All four studies followed the same format but with different stress indicators (i.e., salivary cortisol, salivary alpha-amylase, anger, and identity).

Summary of Results

Study 1. In study one, we assessed the effects of ingroup threat and opportunity to derogate on physiological stress assessed via salivary cortisol. Findings revealed that participants who were threatened showed an increase in cortisol levels, and that for

threatened participants, an opportunity to derogate the outgroup led to even more stress. These findings confirmed previous results that suggest that perceiving a threat to the ingroup is associated with physiological stress and supported MIA, in that an opportunity to derogate exacerbated the negative consequences of experiencing threat. Dealing with threatening experiences by derogating the outgroup also had certain negative physiological consequences.

Study 2. The second study replicated the first but with salivary alpha-amylase as the stress biomarker. The findings for this study were inconsistent with that of the first; participants only reacted to the threat manipulation at a later time point than expected, and there was no difference in alpha-amylase levels between participants who were threatened and who did and did not have an opportunity to derogate. These findings point to the importance of using multiple indicators of stress. Moreover, as reported in other works (e.g., Messina et al., 2016; Rohleder, Chen, Wolf, & Miller, 2008), more research is needed to ascertain which types of psychosocial threats activate both or just one of the two stress response systems.

Study 3. This study incorporated a measure of derogation derived from the LIB paradigm, and otherwise replicated the first study. LIB is a subtle pattern of biased language use that favours the ingroup over the outgroup. Findings confirmed that threatened participants had higher cortisol levels. Moreover, participants who were threatened and showed LIB had higher post-derogation cortisol levels. In line with Study 1, the findings suggest that in cases in which people perceive a threat, engaging in derogation results in more physiological stress. Moreover, given that LIB is considered to be an implicit measure of derogation, the findings suggest that even though participants

might not be aware that they are aggressing, they can nevertheless elicit physiological stress.

Study 4. The final study attempted to address some of the limitations present in our other experiments and contrast them with the more usual approach by including self-report indicators of stress and identity, and also incorporating a more explicit measure of outgroup derogation. Thus, this study included both LIB and a resource allocation matrix task as measures of derogation, and assessed anger, instead of physiological stress. A measure of ingroup identity encompassing the three key features of identity as described by SIT was also included. The findings in this study were inconsistent with those we had expected. For the LIB task, the findings suggested that engaging in bias had no identity restorative benefits nor did it change feelings of anger in experiences of threat and no threat. Moreover, only participants who did not show LIB under threat showed an increase in anger. Findings also revealed that compared to participants who engaged in LIB, those who did not showed an increase in identity, under both threat and no threat. Finally, the results also showed how engaging in explicit outgroup derogation is associated with an increase in anger. There was no relationship, however, between identity and explicit outgroup derogation.

Discussion

This study focused on two key theories in social psychology, SIT and MIA, to frame the consequences associated with outgroup derogation. Generally, the results obtained with our physiological measures were more in line with the MIA, in that in threatening situations, derogating the outgroup can further elicit stress. Although it is a common belief that aggressing, while feeling threatened, can lower feelings of anger, our

physiological and self-report findings suggest that it does not. In fact, our findings suggest that engaging in biased allocation of resources is associated with more anger, which is especially surprising given that previous literature involving SIT and the minimal group paradigm has shown that engaging in derogation against the outgroup can bolster identity and self-esteem. Overall, our results suggest that engaging in derogation has no identity or stress-related benefits. Past research has also suggesting that cortisol and derogation serve similar purposes (Bijleveld, Scheepers, & Ellemers, 2012), and that cortisol can ameliorate emotional states (Het & Wolf, 2007; Reuter, 2002). The findings from this program of research suggest that derogation and cortisol do not have restorative effects, as cortisol levels did not decrease following derogation, nor did anger or identity improve. In other words, the studies suggest that engaging in derogation that does not reduce cortisol, also does not lower anger or bolster ingroup identity.

The presented research strengthens previous conclusions regarding societal harm associated with perceiving threat. Over the course of four studies, our participants showed how perceptions of threat are associated with physiological stress and/or feelings of anger, as well as diminished ingroup identity. Participants in our studies were presented with a relatively mild threat. Given that threatening experiences in day-to-day life may involve other forms of threat (e.g., realistic threats) and forms of contact that deeply involve the self (e.g., face-to-face contact), it is unsurprising that a large body of research suggests that frequent perceived discrimination has serious physical and mental health impacts (Carter, 2007; Clark, Anderson, Clark, & Williams, 1999; Harrell, 2000; Hahm, Ozonoff, Gaumond, & Sue, 2010; Pascoe & Richman, 2009; Stephan & Renfro, 2009; William & Mohammed, 2009). Perceptions of threat are associated with unhealthy

behaviours such as smoking and substance abuse, and non-participation in behaviours that are deemed healthy (e.g., diabetes management; Pascoe & Richman, 2009).

Moreover, if people cope with perceptions of threat by thinking about the outgroup and choosing to derogate, there are additional stress-related consequences, further aggravating the health-related impact of the experience.

Frequent experiences of intergroup threats not only have important health-related consequences, but may also increase anticipatory vigilance and sensitivity to intergroup interactions, resulting in attempts to regulate future intergroup contact. Intergroup contact can play a key role in lowering intergroup bias, especially if such contact meets certain criteria (see Allport, 1954; Dovidio, Love, Schellhaas, & Hewstone, 2017). However, avoiding further intergroup contact and focusing on threatening experiences can, on an individual level, mold peoples' attitudes and behaviours towards the outgroup (Cheon & Hong, 2016). On a societal level, expressing biased beliefs can lead to them being transmitted and shared, and eventually result in biased representations of reality. In a recent study investigating print news articles about immigration from Mexico in the four states bordering Mexico, researchers found that there was clear support for the use of writing consistent with LIB in three of the states (Dragojevic, Sink, & Maestro, 2017). In particular, positive ingroup behaviours and negative outgroup behaviours were described with more abstraction than negative ingroup behaviours and positive outgroup behaviours (Dragojevic et al., 2017). Reading biased messages such as these can influence perceptions and behaviour towards the outgroup without one's awareness. Moreover, given that negative contact has been found to be more likely to increase prejudice than

positive contact decreases it (Barlow et al., 2012), these negative contact experiences can be very influential.

Studies one through three focused on physiological indicators of stress, while the last incorporated a measure of anger. Emotions and stress are distinct but related concepts with key overlapping features (Kubzansky & Winnings, 2016; Lazarus, 1993). Both are believed to impact health through the hypothalamic-pituitary-adrenal and sympathetic-adrenal-medullary axes (Prather, 2016). The literature on emotions, especially with regard to their physiological correlates, has mainly been derived from the literature on stress, coping, and health (Kubzansky & Winnings, 2016). While anger is the emotion that is most often reported following experiences of discrimination (e.g., Mackie et al., 2000; van Zomeren et al., 2004), it has rarely been assessed in conjunction with neuroendocrine indicators. The exact neuroendocrine correlates of different emotions are only just being studied, with some evidence suggesting that anger in response to threat is associated with an increase in cortisol (Moons, Eisenberger, & Taylor, 2009), while elsewhere this relationship has not been found (Lupis, Lerman, & Wolf, 2014), or the opposite was found (Kazen, Kuenne, Frankenberg, & Quirin, 2012). Thus, more research is needed on the relationship between anger and cortisol.

This program of study points to the importance of incorporating multimethod approaches to studying intergroup relations. This allows for the direct measurement of the consequences of threat, rather than it being inferred from a third variable (Scheepers, 2013). It also helps circumvent the self-presentation concern, which is a legitimate issue in studies that deal with sensitive topics such as intergroup relations. The present findings further illustrate the importance of comparing and contrasting different methods of

assessing stress in order to obtain a clearer picture of the consequences of both choosing to derogate and choosing not to derogate. They suggest that what participants report and what is physiologically occurring are not always congruent. Moreover, it is also evident that there are different consequences associated with different means of derogation.

Limitations and Future Directions

This program of research is one of the first to incorporate physiological indicators of stress with issues of intergroup communication. As we were developing this new paradigm, some important limitations were encountered.

The studies presented here involved a university sample and thus, the findings may not be representative of the general population. Moreover, in order to ensure that our participants would be threatened by our manipulation, we only recruited those whose mother tongue was English, who were born in Canada, and who exclusively identified as Caucasian Canadians. Given these inclusion criteria, our findings are hardly extendable to other groups. As members of the Canadian group, our participants are part of the dominant group and are a high-status group, and thus it is possible that their responses to the threat and derogation tasks might not be representative of all groups, especially those that more frequently experience threat.

There is considerable research suggesting that physiological and self-report measures of stress do not correspond (see Scheeper, 2013), and consequently, both were not measured within the same study in this program of research. Nevertheless, a research paradigm that allows for both types of stress indicators to be investigated at once might highlight, for example, when impression management concerns play a role. In study 4,

implicit and explicit measures of derogation resulted in different findings. Future research should also include both forms of derogation while studying physiological indicators of stress in order to determine which forms of bias are associated with an increase in cortisol levels.

In this program of research, two neuroendocrine stress response systems were assessed. For both the SAM and HPA systems, there was a delay between when activity commences and when alpha-amylase and cortisol were detected in saliva. In order to keep the intergroup threat salient during this delay, participants were asked to summarize the research presented in the threat manipulation, as well as respond to questions about it. This was also done to ensure that participants were not engaging in other strategies to alleviate stress while waiting to provide saliva samples. For example, previous research has shown how reaffirming personal values can protect against ingroup threats (Creswell et al., 2005). Although it is possible that while summarizing the threat and responding to questions, participants derogated against the outgroup or engaged in other stress reduction strategies, our findings suggest that for threatened participants who derogated, it nevertheless was associated with an increase in cortisol. In order to address this issue, future research should include electrophysiological measures (e.g., heart rate, skin conductance) or intracranial measures (e.g., electroencephalogram) that would provide a continuous index of stress. In addition, multiple stress indicators could further clarify how physiological indicators of stress and psychological ones align.

Given the breadth of the research covered in this thesis, it was not possible to incorporate additional variables that would have been informative. It would have been interesting to also measure other emotions and general feelings of stress. While the

literature on threat has predominately been focused on anger, considering other emotions such as fear and shame might also be fruitful. For example, there is some recent evidence suggesting that sentiments of fear mediate the relationship between being on either extreme of the political spectrum and outgroup derogation (van Prooijen et al., 2015).

Finally, there is a significant literature on stress and coping (Lazarus, 1991). While feeling angry is associated with specific action tendencies, it would be insightful to know whether participants also used other coping methods. Coping consists of efforts to deal with situations that are appraised as exceeding a person's resources (Lazarus & Folkman, 1984). Action tendencies are perceived to be more of a biological urge, for example, the urge to attack when angry. Coping, on the other hand, is perceived to be a more complex mechanism in which actions are planned. It would be fruitful in future studies to explore both problem- and emotion-focused coping; the former relates to more action-oriented coping, and the latter is a more cognitive approach that involves thinking about the stress-inducing context differently. It is possible that participants who were asked to complete the control task also engaged in other forms of coping, given that they were not as directly able to aggress as those in the derogation conditions.

Conclusion

Traditionally, intergroup research investigating the relationships between variables such as threat, identity, communication, and derogation has used self-report measures. These methodologies cannot always distinguish between competing theories and ideas, and are subject to self-presentation concerns. We suggest the use of a multimethod approach in which both social neuroscience and traditional methods are employed together so that the research being conducted can be better interpreted and the

scope of the field can be extended. Our results show a sharp difference between the physiological and verbal consequences of derogation. Most importantly, they introduce to the field of intergroup relations the role played by intergroup communication in defining the physiological outcome of intergroup conflict.

Due to migration, globalization, conflicts, and technological developments, exposure to and contact with members from other groups have never been more frequent. While positive contact experiences have been found to play a constructive role in intergroup relations, negative contact experiences can have especially destructive consequences. These negative experiences can play influential roles at the individual, group, and intergroup levels. Given the far-reaching negative consequences associated with being subject to threatening intergroup contact and engaging in derogation, these studies highlight the importance of continuing to investigate intergroup threats and reactions to it. A better understanding of what defines “us” and “them” is the inescapable conclusion of our results. The very fabric of our multicultural societies depends on it.

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Appendix A: Typical Informed Consent Form for Studies 1-3

Principal Investigator: Sinthujaa Sampasivam
Vanier [removed] (613) 562-5800 ext. [removed]
E: [removed]@uottawa.ca

Co-Investigators: Dr. Richard Clément
Vanier [removed] T: (613) 562-5800 ext. [removed]
E: [removed]@uottawa.ca

You are invited to participate in a study entitled “What you think and what you spit” by Sinthujaa Sampasivam of the School of Psychology at the University of Ottawa. This study will comprise a portion of the doctoral thesis of Sinthujaa Sampasivam and is conducted under the supervision of Professor Clément.

This study explores the relation between cultural differences and physiological responses. Participation consists of answering an online questionnaire and providing five saliva samples. To provide these samples, you will be asked to hold a sponge-like swab in your mouth for 3 minutes then place the swab into a small container designed for this purpose. In order to ensure the reliability of saliva samples, you have been asked to refrain from eating a major meal, and drinking coffee, milk, or juice, for 60 minutes before the start of the experiment. You will be required to participate for one session for approximately one hour and a half.

Participation will consist of reading a number of texts, answering questions, watching several short videos, and providing saliva samples. It is not expected that you will encounter any foreseeable risks, harms, or inconveniences while participating in this experiment. It is also not expected that you will derive any direct benefit from participation other than 2 course credits.

To preserve your anonymity, you will be assigned a code. You will only be identified through your assigned number so that identifying information and data will not be linked.

The information you share will remain strictly confidential. The information collected in this study will only be used for research purposes. It is intended that the results of this study will be presented both orally and in print. In reporting findings, the researchers will only discuss a summary of the results obtained from all participants in the study. Information connecting your personal information and data file will not be recorded. In order to minimize the risk of security breaches and to help ensure your confidentiality we recommend that you use standard safety measures such as signing out of your account, closing your browser and locking your screen or device when you are no longer using them / when you have completed the study.

Only research personnel directly involved in this experiment will have access to your anonymous data files which will be kept in a secure manner and in a locked laboratory on

the University of Ottawa campus for five years. After five years the data will be permanently destroyed. Saliva samples will be stored in a freezer in a locked laboratory until they are analyzed. Saliva samples will be labeled with participant ID numbers and with no identifying information. Once they are analyzed, the saliva sample will be stored for one year, and thereafter discarded.

Please be aware that participation is voluntary. At any time, for any reason, you may withdraw yourself from the experiment without any negative consequences. This includes declining to answer any particular question or to take part in any portion of the experiment. If you choose to withdraw, all data gathered until the time of withdrawal will immediately be destroyed. Please be aware that you will still receive your compensation should you choose to withdraw from the study.

If you would like to receive a summary of the research results please send an email to the principal investigator. You are encouraged to contact the researchers at any time to give them your reactions and comments regarding the study.

Any information requests or complaints about the ethical conduct of the study may be addressed to the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5.
Tel.: (613) 562-5387

It is recommended that you print a copy of this information for your personal files.

If you choose not to participate, click “I do not consent to participate”. You will not be permitted to start the experiment. If you choose to participate, click “I consent to participate”. You will gain access to a secure website.

I understand the nature of this experiment and am fully aware of my rights as a participant. Given this,

I do not consent to participate.

I consent to participate.



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Appendix B: Consent Form Study 4

Principal Investigator: Sinthujaa Sampasivam
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E: [\[removed\]@uottawa.ca](mailto:[removed]@uottawa.ca)

Co-Investigators: Dr. Richard Clément
Vanier [removed] T: (613) 562-5800 ext. [removed]
E: [\[removed\]@uottawa.ca](mailto:[removed]@uottawa.ca)

You are invited to participate in a study entitled “What you read and how you think” by Sinthujaa Sampasivam of the School of Psychology at the University of Ottawa. This study is being conducted as an independent student project, under the supervision of Professor Clement.

The purpose of this experiment is to investigate how different types of texts impact people.

Participation consists of answering an online questionnaire at a time of your convenience. You will be required to participate for one session for approximately one hour.

Participation will consist essentially of one online session that will take approximately one hour to complete.

Participation will consist of reading a number of texts and answering questions. It is not expected that you will encounter any foreseeable risks, harms, or inconveniences while participating in this experiment. It is also not expected that you will derive any direct benefit from participation other than one course credit.

The information you will share will remain strictly confidential. The information collected in this study will only be used for research purposes. It is intended that the results of this study will be presented both orally and in print. In reporting findings, the researchers will only discuss a summary of the results obtained from all participants in the study. The data collected in this study will be stored outside of Canada. Information connecting your personal information and data file will not be recorded. In order to minimize the risk of security breaches and to help ensure your confidentiality we recommend that you use standard safety measures such as signing out of your account, closing your browser and locking your screen or device when you are no longer using them / when you have completed the study.

Only research personnel directly involved in this experiment will have access to your anonymous data files which will be kept in a secure manner and hence be stored on a CD-ROM in a locked laboratory on the University of Ottawa campus for five years. After five years the data will be permanently destroyed.

Please be aware that participation is voluntary. At any time, for any reason, you may withdraw yourself from the experiment without any negative consequences. This includes declining to answer any particular question or to take part in any portion of the experiment. If I choose to withdraw, all data gathered until the time of withdrawal will not be analyzed.

If you would like to receive a summary of the research results please send an email to the principal investigator. You are encouraged to contact the researchers at any time to give them your reactions and comments regarding the study.

Any information requests or complaints about the ethical conduct of the study may be addressed to the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5
Tel.: (613) 562-5387

Email: ethics@uottawa.ca

It is recommended that you print a copy of this information for your personal files.

I understand the nature of this experiment and am fully aware of my rights as a participant. Given this,

I do not consent to participate.

I consent to participate.

If you choose not to participate, click “I do not consent to participate”. You will not be permitted to start the experiment.
participate, click “I consent to
access to a secure website.

If you choose to
participate”. You will gain



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Appendix C: Demographic Questions

1. Age: _____
2. Gender: _____
3. In what country were you born? _____
 - a. If you were born in Canada, in what province were you born?

4. In what country was your mother born? _____
 - a. If she was born in Canada, in what province was she born?

5. In what country was your father born? _____
 - a. If he was born in Canada, in what province was he born?

6. In what city, province, and country have you lived the longest?
 - a. City: _____
 - b. Province: _____
 - c. Country: _____
7. In what province do you consider yourself at home?
 - a. Québec
 - b. Ontario
 - c. Other (please specify): _____
8. What is your mother tongue? (first language spoken and still understood)
 - a. French
 - b. English
 - c. Other (please specify): _____
9. What language do you currently use most frequently?
 - a. French
 - b. English
 - c. Other (please specify): _____
10. Do you speak a second language? Yes _____ No _____
 - a. If yes, please specify: _____
11. Please indicate your academic unit:
 - a. Psychology
 - b. Other (please specify): _____

Participants in studies 1-3 were asked the following additional questions:

Please answer these questions as honestly as you can. The reason we need to know this information is because these factors can influence the integrity of your saliva samples and could affect our results.

1. Have you had any of the following within the **last hour**?
 - a. A major meal?
 - b. Coffee, milk, or juice?
 - c. Strenuous exercise?
 - d. A cigarette?
2. Have you had any of the following within the last **12 hours**?
 - a. Alcohol?
 - b. Medication? (ex. Birth control, Tylenol, nasal sprays, asthma inhalers, ointments, injections)
 - i. If yes, please specify: _____
3. Did your gums bleed when you brushed or flossed this morning?
4. Have you had dental work, an oral injury, or lost any teeth within the last week?
5. At what time did you wake up this morning?
6. At what time do you typically wake up during the school week?
7. If you are female, please indicate the number of days since your last period. It is okay to give an approximate answer.

Appendix D: Threat Manipulation

No Threat

Thank you for consenting to participate!

Please read the following information carefully.

Different psychology and demography institutes have investigated the **similarities and differences in the behaviors of Canadians and Chinese** with respect to work habits, family structure, hobbies, and values. The research conducted so far shows great differences in values and behaviors, among others, between Canadians and Chinese.

In subsequent interviews, the Chinese participants had no problem admitting the existence of differences which, in their opinion, are caused by superficial cultural differences. Specifically, participants felt as though these differences are insubstantial compared to the similarities between Canadian and Chinese cultures. Moreover, these interviews reveal a number of **favourable statements towards Canadians**. The following are excerpts from the transcripts of interviews with Chinese participants:

“When I first came to Canada, um, I, uh, really missed living in China and kind of [sic] wanted to go back... when I got home though, I actually thought... well, I actually missed my life in Canada! [smiles]. I missed talking to different people. ...It’s really multicultural in Canada, you know? I also liked the different foods...and I even missed the cold Canadian winter! [laughs]. Skating and skiing are so much fun.”

“My English was uh, really not good when I came to Canada... so that made it hard for me. I couldn’t - I couldn’t do many... so many things. It was hard to shop...go to a restaurant... work... It was easy to make friends with the people I worked with though. I think Canadians are so friendly! Even though my English was bad, we became friends...like really fast, and we work well together.”

“Well, when I first moved to Canada, I thought people would look at me weird and like, you know, treat me differently because I looked different. But it turns out that I didn’t look that different after all! [laughs] ... I heard Canada was supposed to be one of the most, uh, multicult... yeah, multicultural places in the world. It is so true. People were so nice to me and helped me out so much. They didn’t care that I wasn’t from here.”

“I heard Canada was very peaceful, and...they help out other countries in more...like, non-violent ways. Like when there are problems, and two countries, or even two groups, like ethnic, religious, or something like that, are fighting, then Canada tries to bring peace. It makes me proud that they do this. It’s like, a better way of doing things...and it really makes a difference to the people they help.”

In this experiment, you will be asked to complete a variety of tasks. Please answer as quickly as you can; it is your first reaction that counts. Also, please answer diligently; although some tasks may not seem relevant, each task represents an important contribution to the purpose of the study.

Your understanding of the research goals will be tested. When you are ready, press next.

Threat

Thank you for consenting to participate!

Please read the following information carefully.

Different psychology and demography institutes have investigated the **similarities and differences in the behaviors of Canadians and Chinese** with respect to work habits, family structure, hobbies, and values. The research conducted so far shows great differences in values and behaviors, among others, between Canadians and Chinese.

In subsequent interviews, the Chinese participants had no problem admitting the existence of differences which, according to their opinion, are caused by fundamental differences in values and profound cultural differences. Moreover, these interviews reveal a number of **discriminatory statements against Canadians**. The following are excerpts from the transcripts of interviews with Chinese participants:

“...I hate when Canadians sit with me and my Chinese coworkers... they’re so loud and obnoxious - they take over the entire conversation and are always talking about themselves....Just because I came here doesn’t mean I have to like them.”

“I always laugh when I see Canadians abroad with Canadian flags on their backpacks...it’s like they, uh, think that putting this flag on their backpack will make them easily recognizable as Canadians - and that’s supposedly a good thing - but the truth is, it just identifies them as stupid uncultured tourists who don’t know anything about the country they’re traveling in.”

“Why do Canadians always think their country is so great? You can always hear them talking about how great Canada is - how they are so multicultural and diverse. But really, China is much more multicultural and diverse - in China, there are, uh, 56 different minority groups and yea, there are a few problems - but Canada has what? Like, 2 - the French people and native people... *[laughing]*... That’s it! And they can barely hold it together. If you think of the way they treat the French and native peoples, why would anyone want to come and live in Canada?”

“It’s so funny to hear Canadians talk about Americans. “Oh they’re so loud and obnoxious and stupid” *[they say]* But, um, the truth is they’re

just like Americans! There's no difference...[*laughing*]... There is no "Canadian" culture – that's why they want to keep the French in – it's the only thing that separates them from the States and makes them interesting. ... "Canadian culture" is such a joke."

In this experiment, you will be asked to complete a variety of tasks. Please answer as quickly as you can; it is your first reaction that counts. Also, please answer diligently; although some tasks may not seem relevant, each task represents an important contribution to the purpose of the study.

Your understanding of the research goals will be tested. When you are ready, press next.

Appendix E: Linguistic Task

Rachael is working on a group assignment with several other students. It is difficult to coordinate everyone's schedule, so the group is making very little progress on the assignment. Rachael decides to take charge of organizing the group and delegates tasks equally to every member. As a result, the assignment is successfully completed on time.

Rachael distributes tasks to the group.

Rachael organizes the group.

Rachael believes in the importance of the assignment.

Rachael is organized.

Michael is waiting in line at a grocery store checkout when he notices a young person budding in line in front of an elderly couple. The couple doesn't say anything but are obviously offended by the person's actions. Michael approaches the person and asks them to wait for their turn at the back of the line.

Michael speaks to the person.

Michael intervenes in the situation.

Michael values fairness.

Michael is assertive.

Emily's parents are getting older and they can no longer manage to take care of themselves and their home. Emily asks them to live with her so that she can spend as much time as possible, before and after work, taking care and spending time with them.

Emily asks her parents to live with her.

Emily supports her family.

Emily cares about her parents.

Emily is loyal.

Peter is given an award for work performance. When he accepts the award, he glosses over his own contributions and hard work and emphasizes the support of his colleagues and especially his mentor.

Peter talks about the contributions of his colleagues.

Peter emphasizes the contributions of his colleagues.

Peter prefers to highlight the contributions of others.

Peter is humble.

Andrew is at a workplace seminar. The group breaks for lunch and everyone stands in line for food. Even though there are many people in line behind him, Andrew takes as much of his favourite foods as he can fit on his plate.

Andrew fills his plate with food.

Andrew ensures he has enough for himself.

Andrew disrespects the other people in the line.

Andrew is selfish.

Amanda is in line to use the ATM but another person is using the machine. After waiting a few seconds, Amanda begins to tap her foot loudly on the floor and sigh loudly. The person feels uncomfortable and tries to leave as quickly as possible.

Amanda taps her foot loudly.

Amanda rushes the person using the ATM.

Amanda feels irritated.

Amanda is impatient.

Stephen is working on a group assignment. The other two people in the group are not contributing anything to the project, leaving all of the work to Stephen. If Stephen spoke to the others, he could get them to agree to take on a more involved role, but he decides not to in order to avoid confrontation.

Stephen does not speak up.

Stephen avoids intervening.

Stephen dislikes confrontation.

Stephen is unassertive.

Melissa's daughter has missed her curfew by just 5 minutes because her bus was late. Melissa is very disappointed in her and grounds her for one month.

Melissa does not discuss the circumstances with her daughter.

Melissa ignores the details of the situation.

Melissa is not willing to compromise.

Melissa is inflexible.

Yanling Li, a woman, is buying some items at a convenience store. The cash register is broken so the clerk apologetically asks her to return later to purchase the items. However, Yanling Li is able to mentally calculate that she owes the clerk \$23.87. She is able to purchase the items on the spot.

Yanling Li calculates her total.

Yanling Li avoids returning to the store later.

Yanling Li feels competent.

Yanling Li is intelligent.

Tao Zhu, a man, is working on a project with some of his colleagues. His work schedule changes and he is able to leave early for his vacation. Instead of leaving right away, he waits until he fulfills his commitment to the group.

Tao Zhu does not leave work early.

Tao Zhu helps his colleagues.

Tao Zhu values group commitment.

Tao Zhu is responsible.

Yunbo Liu, a man, is on a trip with his hiking club. The club members stay out longer than usual and it is getting dark. The group becomes lost but Yunbo is able to use his skills to take charge and lead the group home.

Yunbo Liu shows the other members the way.

Yunbo Liu leads the hiking group.

Yunbo Liu knows how to navigate to safety.
Yunbo Liu is resourceful.

Bojun Wang, a man, is at a party. Even though he already knows a few people, Bojun Wang spends most of the time speaking to new people and, as a result, makes many new friends.

Bojun Wang talks to people.
Bojun Wang engages others in conversation.
Bojun Wang enjoys socializing.
Bojun Wang is extroverted.

Liya Duan, a woman, is reviewing her son's report card. Even though he has above average grades in every subject, Liya Duan tells him that he is not doing well enough in school.

Liya Duan tells her son to do better in school.
Liya Duan belittles her son's achievements.
Liya Duan expects a lot from her son.
Liya Duan is strict.

Tingting Zhao, a woman, is team leader of a work project and has noticed that some team members have missed important deadlines. Rather than addressing the issue with the offending team members, Tingting Zhao takes on the extra work load herself such that her own work suffers.

Tingting Zhao does not speak with her team members.
Tingting Zhao avoids speaking up for herself.
Tingting Zhao hates conflict.
Tingting Zhao is unassertive.

Jian Wu, a man, is at a restaurant with some friends. As the orders arrive, Jian Wu realizes that the waitress has got his order wrong. Jian Wu starts to belittle her, humiliating her in front of the entire table.

Jian Wu yells at the waitress.
Jian Wu degrades the waitress.
Jian Wu disrespects the waitress.
Jian Wu is rude.

Jun Chen, a woman, is at an amusement park with her friends. The group is trying to decide on which ride to go on next. All of Jun Chen's friends want to go on a rollercoaster but Jun Chen wants to go to the water park. Even though they will not be allowed to ride the rollercoaster after getting wet in the water park, Jun Chen forces her friends to do what she wants.

Jun Chen goes to the water park with her friends.
Jun Chen insists that they go to the water park.
Jun Chen disregards the opinions of her friends.
Jun Chen is domineering.

Appendix F: Control Task

In the space provided below, please write briefly about your views on time management. You can draw on your experiences as a student in a Canadian university. You have approximately 30 minutes.

Appendix G: Emotions scale

As a Canadian, indicate to what extent you feel each of the following emotions by circling a number from 1 (not at all) to 7 (extremely).

Angry

Displeased

Irritated

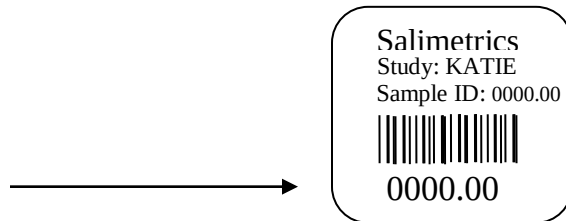
Furious

Appendix H: Saliva Sample Instructions

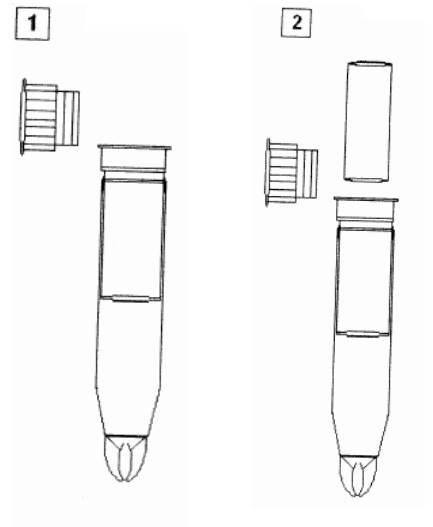
Saliva Sample 1

Okay, now it's time to give your first saliva sample.

1. Please take a drink of water and rinse your mouth before swallowing.
2. You will find 5 labeled tubes to your right. Find the tube with a label that looks like this:



3. Take off the lid. You can see that there is actually a smaller tube inside the larger tube. Inside this smaller container is a soft white cylinder. This is called the swab. Take the swab and place it under your tongue. Don't worry- it's non-toxic!



Next

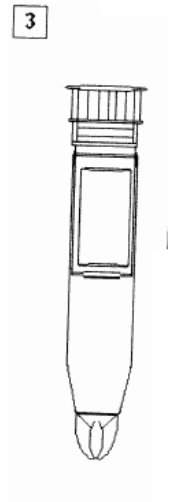
PAGE 2

Please keep the swab underneath your tongue. Don't chew on it. The next page will automatically appear at the end of 3 minutes.

If your mouth feels dry and you feel like you're not producing enough saliva, try pretending that there is food in your mouth and make chewing motions with your jaw. This will stimulate saliva production.

4. Please remove the swab from underneath your tongue and place it back into the small inner tube. Next, place the small tube back into the larger tube.
5. Snap the lid on securely, and that's it!

Next



Appendix I: Resource Allocation Task

This laboratory has been contracted by the University of Ottawa to determine how to distribute funds between associations for different cultural groups. You have been assigned to report your opinion on how resources should be divided between Canadian and Chinese student associations.

This task will involve using the following types of tables:

Canadian	13	12	11	10	9	8	7	6	5	4	3	2	1
Chinese	1	2	3	4	5	6	7	8	9	10	11	12	13

The columns in each table represent a ratio of funds to be distributed to Canadian and Chinese student associations. For example, you may decide to divide the funds in a ratio of 13 to 1, 8 to 6, or 1 to 13. Please note that you must choose a ratio from only one column. You may not choose, for example, 13 to 13.

Carefully consider the values and labels in each table as they will differ, and indicate your opinion on how resources should be divided between Canadian and Chinese student associations by selecting one ratio.

Canadian	19	18	17	16	15	14	13	12	11	10	9	8	7
Chinese	1	3	5	7	9	11	13	15	17	19	21	23	25

Canadian	25	23	21	19	17	15	13	11	9	7	5	3	1
Chinese	7	8	9	10	11	12	13	14	15	16	17	18	19

Canadian	19	18	17	16	15	14	13	12	11	10	9	8	7
Chinese	25	23	21	19	17	15	13	11	9	7	5	3	1

Canadian	1	3	5	7	9	11	13	15	17	19	21	23	25
Chinese	7	8	9	10	11	12	13	14	15	16	17	18	19

Canadian	16	17	18	19	20	21	22	23	24	25	26	27	28
----------	----	----	----	----	----	----	----	----	----	----	----	----	----

Chinese	16	15	14	13	12	11	10	9	8	7	6	5	4

Canadian	4	5	6	7	8	9	10	11	12	13	14	15	16
Chinese	28	27	26	25	24	23	22	21	20	19	18	17	16

NOTE: Only the third and fourth matrices were analyzed for the purposes of this dissertation.

Appendix K: Typical Debriefing Form

Thank you for participating in our study today! While you thought you participated in a study called ‘What you think and what you spit’, it’s actually a study entitled ‘The Antecedents and Consequences of Outgroup Derogation,’ whereby the overall purpose was to study the purposes behind why people engage in derogation or biased language use. In this study, you were first asked to provide a saliva sample and give some demographic information about yourself. Then you read a composition on the relationship between Canadians and Asians, provided another two saliva sample, completed a cognitive task, and provided a fourth and fifth saliva sample.

It is important that you understand that the paragraph of information you read at the beginning of the study was completely fabricated. In fact, there were two versions of the composition: both implied that Canadians and Chinese people are very different but one implied that some Chinese participants had made some unfavourable comments towards Canadians. It is also important that you are aware that you might have been placed in the control condition after providing your third saliva sample. You were either asked write a short essay on time management or were asked to complete a linguistic task describing the behavior of Canadians and Chinese people. The purpose of the time management task was to act as a control and thus allow us to compare the stress patterns of those who were in the control and experimental conditions. Hence, this data collected in the control condition will not be analyzed.

The purpose of the composition with the discriminatory comments was to threaten your Canadian identity and to induce a small amount of stress. We took samples of your saliva so we could measure the amount of cortisol in it - cortisol is a hormone that is released when you feel stress. Research has shown that people may be motivated to discriminate against groups in order to make themselves feel better about themselves in the face of a threat. If people engage in discrimination in order to bolster their identity or self-esteem, then we expect a threat to identity to increase the amount of bias shown in the linguistic task. That is, describing the same behaviour differently for members of their own group and for members of other groups.

In this way, the purpose of the experiment was to determine whether using salivary cortisol as a measure of stress can be a useful tool in the investigation of processes behind linguistic biases. It is hoped that the results of this study will contribute to the understanding of the role of language in the perpetuation of stereotypes, as well as why people engage in biased language use. We find this topic very interesting. If you would like to find more information on the role of language in stereotype transmission, you can start by reading about the linguistic intergroup bias:

Maass, A., Salvi, D., Arcuri, L., & Semin, G.R. (1989). Language use in intergroup contexts: The linguistic intergroup bias. *Journal of Personality and Social Psychology*, 57, 981-993.

Thank you very much for participating in this experiment. If you have any questions or

concerns, please feel free to contact the investigators of this study. If I have any questions regarding the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5 Tel.: (613) 562-5387
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I consent.