Understanding the relationship between individual prejudice and regional prejudice

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Table of Contents

Chapter 5:

ABSTRACT

For over 80 years, social psychology has studied intergroup prejudice as a phenomenon situated within the psyche of the individual. Yet people live in societies, which surely play some role in shaping the attitudes of individuals in those societies. The burgeoning area of regional prejudice – the study of prejudice incorporating elements of individuals situated within geographical regions – refocuses attention on the socio-geopolitical influences on prejudice and its associated outcomes. The exact nature of the relationship between individual-level prejudice and regional prejudice remains unclear. In fact, because of limited research attention, there are basic questions and information about regional prejudice that remain unknown. This research tackles some of these basic questions and description, hopes to increase understanding and serve as a foundation for further research. It is guided by the overarching question: What is the relationship between individual-level prejudice and regional prejudice? I have decomposed this dissertation into three studies answering the questions: Do people's prejudices change as they change regions? What aspects of the environment might influence individual prejudice? and Are individuals conscious of the prejudice in their region? This work is one of the first to begin interrogating the relationship individual-level prejudice, regional prejudice, and the socio-political influences that constitute society. Broadly, this work situates the individual in the situations and societies they are embedded within, allowing for a more ecologically valid and holistic understanding of intergroup prejudice.

RÉSUMÉ

Depuis plus de 80 ans, la psychologie sociale étudie les préjugés entre groupes comme phénomène situé dans la psyché de l'individu. Pourtant, les gens vivent en société, ce qui joue certainement un rôle dans la formation des attitudes des individus dans ces sociétés. Le domaine en plein essor des préjugés régionaux - l'étude des préjugés en incorporant les régions géographiques des individus en question - recentre l'attention sur les influences socio-géopolitiques sur les préjugés et les résultats qui y sont associés. La nature exacte de la relation entre les préjugés individuels et les préjugés régionaux demeure inclaire. En raison de l'attention limitée portée sur ce domaine de recherche, certaines questions et informations fondamentales sur les préjugés régionaux restent inconnues. Cette recherche abordera certaines de ces questions et descriptions de base pour améliorer la compréhension sur ce sujet et créer une fondation pour la recherche future auprès de ce sujet. La question primordiale, « Quelle est la relation entre les préjugés au niveau individuel et les préjugés régionaux ? » sert comme guide. J'ai décomposé cette thèse en trois études répondant aux questions suivantes : Les préjugés des individus changent-ils lorsqu'ils changent de région, Quels aspects de l'environnement peuvent influencer les préjugés individuels, Les individus sont-ils conscients des préjugés dans leur région, Ce travail est l'un des premiers à commencer à interroger la relation entre les préjugés au niveau individuel, les préjugés régionaux et les influences sociopolitiques qui constituent la société. D'une manière générale, ce travail situe l'individu dans les situations et sociétés dont il est intégré, permettant ainsi à une compréhension plus écologique et holistique des préjugés entre groupes.

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Onward and Upward

But Who Jah Bless

To my family: May the limbs you've sacrificed birth dumbfounding, indomitable, and sustaining joys.

CONTRIBUTION TO ORIGINAL KNOWLEDGE

Individuals have needs, desires (Higgins, 1987, 1996), and preferences, or prejudices (Brewer, 1985). Individuals also experience, live, and move through different geographical environments. The exact relationship of how different geographical environments may influence individuals' bias remains outstanding to social psychologists. Over the past eight years, researchers have begun marshalling large amounts of data collected over the internet to form conclusions about the geographic distribution of different types of biases across North America (i.e., regional bias). This approach has enabled the study of important social phenomena difficult to study in the lab. Indeed, variance in individuals' prejudices aggregated by the geography has been associated with outcomes in healthcare (Leitner et al., 2016a, 2016c, 2018a; Orchard & Price, 2017a), education (Riddle & Sinclair, 2019a), and civil protests (Zerhouni et al., 2016) to name a few. Yet, the outstanding question of the influence of geography on an individual's prejudice remains. This dissertation therefore provides novel insights to the outstanding question, employing more naturalistic methodologies (longitudinal, diary studies) and nuanced variance proportioning statistical approaches (multi-level modelling, latent profile analysis).

The first study (**Chapter 3**) tracked individuals' biases as they move between geographical regions in mostly North America. A crucial contribution of the chapter is that it is the first work since the beginning of regional prejudice research to test extant working theories in the field (Calanchini et al., 2022; Payne et al., 2017b). Chapter 3 observed the effects of geography on individuals' racial (Black-White) and cultural-linguistic (Francophone-Anglophone) biases. In addition to providing the longest estimates of the stability of implicit and explicit bias up to date, Chapter 3 probes the effects of geography on individuals' biases. Lastly, the chapter introduces regional moderators not discussed by current theoretical frameworks.

Together, results provide important constraints on theories of how context might shape bias and necessitates updates to theoretical models.

The second study (**Chapter 4**) tracked individuals' biases as they moved between different contexts within the US over a two-week period. The study tracked biases towards 15 social groups (e.g., Neo-Nazis, White people, atheists) and identified distinct daily contexts (40) that are meaningful in the expression of prejudice. Furthermore, Chapter 4 explored some situational and environmental variables that may result in fluctuations of individuals' prejudice. Chapter 4 heeds critiques for the field of prejudice to develop more comprehensive frameworks of bias by studying a diverse host of biases (Bergh & Brandt, 2021; Brandt & Crawford, 2019). Lastly, the chapter begins the process of outlining potential moderators and control variables to be accounted for, especially given the mercurial nature of implicit bias, and stable nature of explicit bias as individuals moved between geographical regions or contexts.

The third and final study of this dissertation (**Chapter 5**) explores a potential mechanism by which regions may influence individual bias: individuals' awareness of the prejudice of those around them. Chapter 5 explores individuals' perception of the biases (Anti-Asian American, Anti-Black, Anti-gay/lesbian) of those in their region and variances in these biases. Chapter 5 reveals consensus and accuracy of the perceptions of bias is contingent on social groups. Whereas there is a consensus in perceptions of anti-Asian American and gay/lesbian biases, there is not for anti-African American bias. Interestingly, individuals overestimated bias against Asian-Americans, accurately estimated bias against gays/lesbians, and were inaccurate in assessing anti-Black bias. Relatedly, individuals were inaccurate about the level of variance in people's biases in their regions for all three groups. Chapter 5 provides a concrete step in untangling

mechanisms – and for which social groups – through which geography at large may shape individual bias.

Collectively, and programmatically, the three studies composing this body of dissertation fill in gaps while inspiring new questions in current understandings of the relationship between individual bias and geographical regions. Employing more naturalistic methods, and more appropriate statistics, the work presents initial answers to the most basic and fundamental questions in the theory creating and theory finessing of individual bias and regional bias. Ultimately, this dissertation takes incremental steps in the advancing of the nascent subfield of regional bias.

CONTRIBUTIONS OF AUTHORS

Chapters 1 and 2: General Introduction and Literature Review

As the author of this dissertation, I conceptualised, prepared, wrote, and revised these chapters. As my supervisor, Dr. Eric Hehman provided feedback on this chapter.

Chapter 3: Ofosu, E. K., Axt, J, & Hehman, E. (Submitted). Changes in geography do not necessitate changes in prejudice.

As the first author, I was seminal in the design of the quasi-experiment and was responsible for the execution of the project. Specially, I secured Research Ethics Board approval, pilot tested stimuli, recruited participants, curated, and analyzed primary and secondary data, interpreted the results, drafted, and revised the manuscript for publication.

As second author, Dr. Jordan Axt helped in the development of the study design, programed the study, and help draft and revised the manuscript for publication.

As senior author, Dr. Eric Hehman helped in the development of the study design and analysis, prepared maps, and help draft and revised the manuscript for publication.

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As second author, Dr. Sally Xie provide support in the participants recruitment, and helped generate the code for data analysis.

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As senior author, Dr. Eric Hehman helped in the development of the study design, analysis, and help draft the manuscript.

Chapter 6: General Discussion

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CHAPTER 1
GENERAL INTRODUCTION

Self and Social Groups

Humans – like all other organisms – are born naked, and then develop an intimate sense of self (Bloom & German, 2000; Premack & Woodruff, 1978), and then, an identity. As humans mature, from how they dress (Hester & Hehman, 2023), to how they physically move through the world (Johnson & Tassinary, 2005) communicate their most proud and private selves (Self-Discrepancy Theory; Higgins, 1987, 1996), consciously or not.

Humans have an innate need to belong (Baumeister & Leary, 1995). The need to belong is quite innate such that arbitrary groups carry great membership significance to its members (Tajfel, 1970). The need to belong is fundamental as it helps individuals grow, become full fledged selves (Aron et al., 2013; Aron & Aron, 1986), and become members of social groups. The emergence of social groups induces the perception (and at times the occurrence) of threats. These threats can be simultaneously realistic and symbolic (Brandt & Crawford, 2020; Kinder & Sears, 1981; LeVine & Campbell, 1972; Sears & Henry, 2003; Sherif & Sherif, 1953). Perceptions of the scarcity of resources to meet basic needs (Maslow, 1943), biological differences, to differing ideologies (Jost et al., 2009; Ysseldyk et al., 2010; Brandt, 2017; Hennes et al., 2012), all contribute to the occurrence of prejudice in society.

Social psychology has therefore to more “unobtrusively” understand the individual dis-embedded from their environments and society. This intellectual enterprise has yielded some knowledge. With an overarching understanding of social psychology today being that, individuals categorise each other into groups, compare within and between such groups, and identify with certain groups (Tajfel & Turner, 1986). Group identity is also deeply tied to personal identity, and self esteem. Intrinsically, humans require a healthy level of self-esteem, and engage in several processes to maintain a positive sense of self. First, individuals prefer and

positively view those that belong to their group (Brewer, 1999), as this reinforces one's self-esteem. Accordingly, individuals bask in the pride and glory of their group, especially after an attack to their personal identity, and ego (Smith & Tyler, 1997).

Yet humans crave uniqueness. They may exempt themselves or an individual from the stereotypes associated with the person's social group, and in so doing, attribute either positive or negative characters to the individual ("Oh, Obama is Black, but he's not like the other Black people"; Subtyping; Hewstone et al., 1994). Simply put, humans desire to feel good about themselves. Humans therefore compare themselves to others (Festinger, 1954), but ideally, strive to belong to a group while still being individuated, while still being *unique* (Leonardelli et al., 2010).

Perception of Social Groups

Humans categorise individuals into groups, and can even at times within seconds perceive traits about such groups (Chwe & Freeman, 2023). Socials groups vary on several dimensions. Social categorisation can be by the self (Turner et al., 1991) or by others based on their perceptions. Humans can be flexible in their categorisations. Although an individual might be initially assigned to a group (Black or Brown), humans are capable of redefining the constituting elements of groups (Dovidio et al., 1993), and even including themselves in the newly conceptualised group (Dovidio et al., 1993; Hehman et al., 2010). Humans are quite dynamic that while recognising defining features of a group, can observe shared similarities between their own groups and other groups (Crisp et al., 2006), and can even structure such unique groups into a larger group (Gaertner et al., 1990). Indeed, a superordinate group is often cued to engender communal support and identity.

As individuals can be members of multiple perceptive and meaningful social groups (Kang & Bodenhausen, 2015; Petsko et al., 2022; Petsko & Bodenhausen, 2020; Purdie-Vaughns & Eibach, 2008; Remedios & Sanchez, 2018), these social identities may provide diverse, at times complementary senses of belonging, while also activating contradicting group stereotypes. In a classic textbook illustration of these contradicting stereotypes around identities: Black gay men were not only offered a higher salary in comparison to Black heterosexual men, White heterosexual men, and White gay men, but Black gay men were further "whitened". That is, due to their sexual group, Black gay men were not perceived as threating and violent, stereotypes ascribed to Black men. They were de-racialized, and were further stereotyped – recategorized – as White (Pedulla, 2014; Petsko & Bodenhausen, 2019).

Prejudice

How humans understand and feel about groups has enormous consequences. Individuals can hold and express negative affective attitudes towards groups to which they do not belong (Allport, 1954). This prejudice may stem from a sense of moral superiority, threat, and perceptions about humanity (M. B. Brewer, 1999). Should individuals perceive social groups to be defined by an immutable biological-up, that produces an *essence,* which makes groups unredeemable and irrevocably different from each other, then this perception will result in prejudice (Haslam et al., 2006; Keller, 2005). Indeed, individuals tend to believe that due to Black individuals' "thicker (Black) skin", they experience less physical pain (K. M. Hoffman et al., 2016; Trawalter, Hoffman, et al., 2012). Put differently, a belief that groups are who or what they are simply because this is biologically, intrinsically, and cognitively their nature will result in stereotypes and prejudice against the group, and its members (Bastian & Haslam, 2006; Brescoll & LaFrance, 2004; Condit et al., 2004; Jayaratne et al., 2006; Williams & Eberhardt,

2008). This belief of outgroups being *essentially* different from one's group is ultimately tied to such outgroups being perceived to be less (evolved) human(s) (Dehumanization Theory; Bastian & Haslam, 2010; Haslam & Stratemeyer, 2016; Kteily et al., 2015; Kteily & Landry, 2022).

The modality of communication sheds light on how constituting prejudice can be of the self, given the relationship between thoughts and the self which are both manifested through communication. In fact, prejudice has at times been conceptualised as a personality trait (Allport, 1954; Duckitt, 2005; Sibley & Duckitt, 2008). The prejudiced understanding of outgroups can be both cognitive and cultural that it becomes embedded and evident in culture and communication. The type and valence of words (e.g., slurs/epithets/innuendo/double entendre) used in describing outgroups depicts how we dehumanise such groups, and affectively perceive them to be fundamental inferiority in a hierarchy of humans (Bilewicz & Soral, 2020; Cervone et al., 2021). Higher levels of communication such as the level of syntax, grammar, sophistication, and abstraction used highlight the potentials and roles ascribed to groups (secondary emotions, victim and perpetrator; Linguistic Intergroup bias theory; Arcuri et al., 1989; Graf et al., 2013; Maass, 1999). Prejudice via communication and language has historically been, and is, employed to disparage, derogate, and disempower outgroup members (expressive function; Anderson & Lepore, 2013, 2013; Croom, 2011, 2013). Such nature and structure of communication can furthermore justify prejudice, its expression, and downstream consequences (Justification-suppression model of prejudice; Crandall et al., 2002).

Outcomes of Prejudice

Prejudice – implicit and explicit – can negatively affect those that are targets of it. The prejudice of hegemonic social groups tend to be promulgated in societies (Berard, 2008a; Trawalter et al., 2020a). These promulgation may occur through societal norms and laws (e.g.,

Jim Crow laws Miller & Prentice, 2016; Tankard & Paluck, 2016). As a result of intergroup prejudice, and related discrimination, marginalised and disadvantaged social groups may have more negative life outcomes. Members of non-dominant social groups (e.g., non-male, non-heterosexual, non-White, non-able, etc.) have negative health outcomes (Garrison et al., 2017; Green et al., 2007; Leitner et al., 2016a; Orchard & Price, 2017a), lower job prospects (Bertrand & Mullainathan, 2004; Dovidio & Gaertner, 2000), lower romantic prospects (Chopik & Johnson, 2021), are stopped and shot more, and accorded less respect by police (Hester & Gray, 2018; Pierson et al., 2020; Ross, 2015; Voigt et al., 2017) just to cite a few.

Furthermore, the mere perception of prejudice is associated with both lower physical and mental health for marginalised social groups (Pascoe & Smart Richman, 2009; Smart Richman et al., 2010). Understandably, group members that are the most prototypical of their groups – possess the most salient defining features of their groups (e.g., benevolent sexism; Glick & Fiske, 2001) – or fail to adhere to dominant groups' expectation often experience the most prejudice and discrimination (Hostile sexism; Glick & Fiske, 2001; Kleider-Offutt et al., 2017; Maddox & Perry, 2018; Monk, 2014; Pachankis et al., 2018; Uzogara et al., 2014). Given how determining hegemonic social groups' interests are (Vescio & Schermerhorn, 2021), nonconformity results in societal (at time deadly) displeasures (Asch, 1955, 1956; Foucault, 1978). Black men with more Afrocentric features – darker hue, wider nose, fuller lips – were more likely to be sentenced to death with a White victim (Eberhardt et al., 2006).

With how pernicious and pervasive intergroup prejudice and its outcomes can be, social psychology has explored ways of reducing individuals' biases. Individuals may first need to be concerned and motivated to reduce their prejudice for any attempts of reduction to be fruitful. There are be two sources for this motivation: internal and external (Plant & Devine, 1998).

Sincere attempts by the individual have been understood as an internal motivation to control for bias whereas egalitarian behaviours and attitudes because of societal laws and norms are understood as external motivations. Complicating the distinction between internal and external motivation is the finding that individuals that are intrinsically motivated to control their prejudice often are individuals who tend to internalise social norms (Crandall et al., 2002). Generally, however, having meaningful contact with an outgroup member under the optimal conditions where: both groups are of equal status, cooperative interdependence between groups is required, groups share a common goal, there are supportive norms, and opportunities for personal interactions have been observed to reduce intergroup bias (Allport, 1954; Brown & Hewstone, 2005; Dovidio et al., 2003; Pettigrew, 1998). Over 515 studies spanning decades have found decreases in prejudice as a result of intergroup contact (Mousa, 2020; Pettigrew & Tropp, 2006a). However, for societal disadvantaged groups intergroup contact has been associated with a decrease for societal change aimed at equality (Hässler et al., 2020; Kauff et al., 2016). Most of the efforts to reduce prejudice has focused on implicit bias as societal laws and norms ban the expression of explicit prejudice, and presumably, discrimination extending for it. Currently, there emerges no conclusive theoretical approach or intervention that durably reduces implicit bias (Devine et al., 2012a; Forscher et al., 2017; Lai et al., 2016).

CHAPTER 2
LITERATURE REVIEW

General Introduction

Individuals derive a sense of self – history and identity– from their environments. These environments can be prolonged situational contexts, time periods, or geographical regions. Environments may provide not only personal life narratives but also a script for interpreting and navigating one's social world (Ainsworth, 1982; Nisbett, 2018). To understand how individuals perceive their society, and members of different social groups in their society, social psychology has traditionally studied the prejudices of the individual. While the influence of the environment is included in many theoretical models of attitudes, most empirical research has relatively side-stepped the role of environment in shaping individuals' prejudices. And a paucity of models has only speculated on the role of environment.

In contrast, in my dissertation I will probe the phenomenon of regional prejudice – the prejudices of environments/regions. Specifically, I will explore the question: what is the relationship between individual-level prejudice and regional prejudice? To understand regional prejudice and its relationships, it is first imperative to understand how prejudice has been studied at the individual-level over the past eighty decades, and what the pros and cons of this approach have been. I will therefore spend several paragraphs reviewing extant work on individual prejudice, then, socio-geopolitical influences and prejudice. I will subsequently present the subfield of regional prejudice and propose a series of studies to initially better understand and describe the relationship between regional prejudice and individual prejudice.

Literature Review

Individual Prejudice

Prejudice is defined as a negative sentiment towards an individual because of their social group membership (Allport, 1954). In the past 30 years, social scientists have examined both implicit and explicit versions of prejudice. Explicit prejudice is most often considered intentional, conscious, and controlled attitudes, whereas implicit prejudice is conceptualised as differential and more automatic, less deliberative associations between groups and sentiments (Dovidio et al., 2002; Gawronski et al., 2008). Explicit bias is commonly measured directly by self-report questionnaires. The nature and measurement of explicit bias however renders it susceptible to socially desirable responding (Fazio et al., 1995; Greenwald & Banaji, 1995). Implicit bias has been measured in a variety of ways (Gawronski & De Houwer, 2014; Nosek et al., 2011), with most measurements however likening speed and accuracy of response to the strength of implicit prejudice. Implicit bias gained popularity within the study of attitudes with the Implicit Association Test (IAT;Greenwald et al., 2003) becoming the most used measure of implicit bias (Nosek et al., 2011). Implicit bias has also taken hold in the public consciousness, for example being satirized by pop culture (Cook & DiMartino, 2003), but has also been cited as a factor of racism in policing during a US presidential debate (*First US Presidential Debate 2016*, 2016).

Yet a full understanding of what implicit bias is, how it manifests in discrimination, and how it is related to explicit bias remains elusive. Over the past 25 years, researchers have observed three inconsistencies or puzzles regarding the nature of implicit bias (Payne et al., 2017b). First, implicit bias averages across samples are large, positive (e.g., White people show a strong association of White = good/Black = bad compared to the reverse), but temporally

unstable (Cunningham et al., 2001b; Payne et al., 2010). That is, although groups' averages across different samples are often the same, there is low test-retest reliability within individuals from these samples. Second, averages of implicit bias appear similar across adults and children samples, but implicit bias appears unstable within an individual (Baron & Banaji, 2006; Dunham et al., 2008). These observations beg the question: how can implicit bias be stable across human development yet be unstable within an individual over a short period of time? Lastly, individual differences in implicit bias only weakly predict behaviour, r = .13 - .28 (Cameron et al., 2012; Greenwald et al., 2009; Oswald et al., 2013).The three outlined puzzles therefore challenge the deeply held notion of intergroup implicit bias as an indicator of individual's permanent attitudes, knowledge, or beliefs.

The three inconsistencies of implicit bias are however not so clearly observed with explicit bias. First, individual differences in explicit bias tends to be moderately stable over time, and in comparison to implicit bias (Gawronski et al., 2017a). Second, studies show that children are explicitly taught social norms regarding respecting all social groups. This explicit instruction is different from how implicit bias is theorised to emerge and be maintained during child development (Dunham et al., 2006, 2008, 2013). Lastly, explicit bias is much more predictive of judgments and behaviours with an average r = .36. The predictive validity of explicit bias however displays great variance, with the measure more predictive in less socially sensitive domains (Greenwald et al., 2009). Taken together, individual levels of explicit bias appear to be more stable and predictive of judgments and behaviours (though still weak) in comparison to implicit bias.

Classic theories have conceptualised prejudice, stereotyping, and discrimination as group-based evaluations, beliefs, and disparate treatment respectively (Allport, 1954). These

evaluations and beliefs are believed to reside in individuals' minds and accordingly, the field of psychology has mostly studied prejudice at the individual level. Sociology, however, has explored the occurrences of discrimination within social systems rather than in the individual's psyche. Sociology defines intergroup bias as "systemic" or "structural" bias. Structural bias is the way that hierarchies (e.g., racial, gender, etc.) are embedded into history and culture in ways that pervade almost all aspects of society (Feagin, 2006; Feagin & Feagin, 1986). Theories of structural bias posit that in a prejudiced system, minorities will be systematically disadvantaged regardless of the attitudes of individuals.

Social-Geopolitical Influences and Prejudice

Within psychology, prejudice researchers have paid more attention to the individual and less to the systems and contexts that the individual is embedded within. Indeed, this lack of more substantial attention to socio-geopolitical influences may have limited the understanding and prediction of human behaviour the field strives for. These socio-geopolitical influences are often calcified and reinforced as structural institutions, prejudice, and/or norms. Put differently, given the diffusive and ever-present nature of socio-geopolitical influences (Bulter, 1990; Burr, 2003; Foucault, 1972, 1977, 1978, 1988), structural prejudices are bound to inform an individual's level of prejudice to some extent. In line with this notion, the established body of works on norms influencing behaviour and attitudes provides some evidence for this premise (Asch, 1955; Cialdini et al., 1990; Cialdini & Goldstein, 2004; Miller & Prentice, 2015; Tankard & Paluck, 2016).

Recent works have documented the influence of social-geopolitical factors – which may vary regionally – on prejudice. The occurrences of Black Lives Matter (BLM) protests across the US – a response to anti-Black racism and an affirmation of Black folks' resilience in the face of

deadly oppression in a "post-racial" America (Garza, 2014; Petersen-Smith, 2015) – was associated with a shift towards more egalitarian implicit racial views (Sawyer & Gampa, 2018). Similarly, the legalization of same-sex marriage by the US Supreme Court was associated with both decreased implicit and explicit anti-gay prejudice (Ofosu et al., 2019a; Tankard & Paluck, 2017). Interestingly however, although the prejudice of individuals in states without state-level same-sex marriage legalization was decreasing prior to the federal legalization, their prejudice increased after the federal legalization, highlighting the dynamism between a hierarchy of socio-geopolitical factors, perception/categorisation, and attitudes.

Regional Prejudice

Experimental psychology has paid less attention to structural bias, and at most, assumed that structural prejudice contributes to individual prejudice bias (Greenwald & Krieger, 2006; Jost & Banaji, 1994; Rudman, 2004). The in-attentivity of experimental psychology has been attributed to little consensus on how to measure systemic bias in psychology and broader methodological challenges (Payne et al., 2017). Either way, although little is known about regional attitudes and how they influence interpersonal attitudes, theoretical models commonly posit that regional attitudes would influence individual prejudices. Thus, this dissertation will test fundamental questions and assumptions, along with describing characteristics of regional prejudice.

Recent approaches have developed methodologies to gauge the average prejudice of a region, and in so doing, examine socio-geopolitical factors disproportionally influencing people in geographical regions (Hehman et al., 2019). This work defines regional prejudice as the prejudice of individuals per a particular geographical region, e.g., county, postal code, state, province (Hehman et al., 2019). The ever-emerging availability of large datasets (e.g., Project

Implicit, American National Electorate Survey, General Social Survey, The MyPersonality project, YourMorals), enables researchers to geolocate large numbers of participants and examine shared biases of people within the same geographic area. Thus, regional prejudice probes the prejudices of regional populations rather than that of individuals. Though such an approach is relatively new, present work using this approach has offered insights on the relationship between the prejudice of social geo-political populations and societal outcomes.

Initial construct validity research has provided evidence for the substantive, structural, and external validity of regional prejudice (Hehman et al., 2019), with subsequent works highlighting some environmental features associated with the prejudice of geographical populations (Hehman et al., 2020; Payne et al., 2019). Regional prejudice has been associated with disproportional use of lethal force by police against Black individuals (Hehman et al., 2018), health disparities (Leitner et al., 2016a, 2016b; Miller et al., 2016; Orchard & Price, 2017), disparities in access to health care (Leitner et al., 2018), and more recently, with Covid-19 health outcomes (Thomas et al., 2020). Furthermore, regional prejudice is closely linked with segregation and ethnic diversity (Rae et al., 2015; Sadler & Devos, 2018), federal policies (Leitner et al., 2018; Ofosu et al., 2019), and activism following terrorist attacks (Zerhouni et al., 2016). Lastly, regional bias is implicated in the disproportionate disciplinary actions in schools against Black students (Riddle & Sinclair, 2019), criminality associations (Johnson & Chopik, 2019; Somo et al., 2020), and online aggression (Rosenbusch et al., 2020). Thus far in its early years, regional prejudice attempts to bridge the gap between individual prejudice and structural prejudice while providing answers to the 3-inconsistencies observed with individual-level implicit bias.

The Bias of the crowds model is currently the only model that infers a relationship between individual prejudice and the potential structures within one's environment (Payne et al., 2017). In so doing, the theory provides a model that resolves some of the observed features of implicit bias laid out above. In its most elementary form, the model describes individuals as conduits for implicit bias: as a wave passes through enraptured fans in a stadium, so does implicit bias pass through individuals in an environment. The Bias of the crowds model posits that implicit bias is less of a personal trait, but varies as a function of one's environment (Payne et al., 2017b; Payne, Vuletich, & Brown-iannuzzi, 2019). In other words, implicit bias reflects fleeting associations between targets and attributes elicited by stereotypes and inequalities in social environments. The model expands that individual measures of implicit bias may be capturing biases that are "ephemeral", "noisy", and "idiosyncratic", but just like the "wisdom of Crowds", aggregated levels of implicit bias may reflect the inequality in an environment (Galton, 1907; Surowiecki, 2005). It is important to note that the predictions of this model refer to implicit bias alone, and the model is agnostic as to how context might influence explicit biases. Yet the "puzzles" that this model attempts to resolve are phenomena specific to implicit bias and not explicit bias. Various assumptions and elements of this model will be tested in the proposed research.

The Present Research

Regional prejudice situates the individual within a society, accounting for the socio-geopolitical influences on prejudice, allowing for the reconciliation of the inconsistencies of individual implicit prejudice and more robust predictions of societal outcomes. The subfield of regional prejudice has however not mapped the exact relationship between individual prejudice and regional prejudice, and steps along this pathway is the goal of this dissertation. First, I will

explore how strongly does prejudice of geographical regions influence individual prejudice (**Chapter 3**). Next, I will examine how strongly contexts influence individual prejudice (**Chapter 4**), then finally, I will probe how accurately individuals can estimate prejudice in their regions (**Chapter 5**). I will do so using a mix of longitudinal studies, experience sampling, multi-level modelling, and structural equation modelling.

CHAPTER 3

Changes in geography do not necessitate changes in prejudice.

(Ofosu, Axt, & Hehman, 2023, Submitted)

Ofosu, E. K., Axt, J., & Hehman, E. (Submitted). Changes in geography do not necessitate changes in prejudice.

Abstract

Recent work has refocused attention on the extent to which context causes changes in intergroup bias. Yet "context" is a broad term with many possible interpretations, and theoretical models do not specify which aspects of context matter, and when. The current research tests one theoretically important operationalization of context: geographic location. We tracked participants' (N = 522) biases for a year as they moved across geographies, testing the effect of geography on implicit and explicit biases towards fictitious, racial, and cultural-linguistic groups. Overall, nineteen of the 24 direct-tests of the theorized geography -> bias causal link did not provide support for this idea. The remaining five tests offering small, tentative evidence suggesting that specific local factors might be responsible for changes in bias. Together, results provide important constraints on theories of how context might shape bias, and necessitate updates to theoretical models.

Keywords: regional bias, intergroup, prejudice, bias

Introduction

Social scientists have long believed that individual behavior and attitudes are a function of both the person and the environment (Lewin, 1947). Yet due to a historical focus on individual differences and the primacy of the experiment for causal inference, lab-based research has arguably enabled a better understanding of the influence of the person, rather than the context. Regarding intergroup bias specifically, early theorising (Allport, 1954) gave rise to a fruitful individual differences perspective that has dominated research in this area for decades (Adorno et al., 1950; B. Altemeyer, 1988a; Duckitt, 2005).

More recently, technological advancements have enabled a more advanced study of the influence of context on individual attitudes. The internet has facilitated approaches such as experience sampling (Koval et al., 2022; Thai & Page-Gould, 2018a; S. Y. Xie et al., in press), geolocation analyses exploring how the local context influences attitudes (Götz et al., 2021; Hehman et al., 2021; Oishi et al., 2015; Orchard & Price, 2017b), and longitudinal tracking as individuals move across space. The present research adopts this longitudinal approach to understand how geography might influence intergroup bias by tracking people as they move across locations.

Individual Bias

In the social sciences, bias has traditionally been conceptualized in two ways: implicitly and explicitly. Implicit bias is thought of as reflecting less intentional attitudes, and is measured indirectly, whereas explicit bias reflects more deliberate processes that are measured more directly (Dovidio et al., 2002; Gawronski et al., 2008).

To understand how much a changing context might impact bias, it is important to understand the stability of an individual's bias over time, absent a changing context.

For implicit biases, studies of the retest reliability of the Implicit Association Test have revealed low to moderate reliabilities over an hour (r=.45; Bar-Anan & Nosek, 2014), two weeks (r = .31; Cunningham et al., 2001), and two months (r = .42; Gawronski et al., 2017). Measures of explicit bias perform better, such as r = .78 across a two-month timespan (Gawronski et al., 2017b). The weaker stability of implicit bias has traditionally been either attributed to the psychometric properties of cognitive behavioral measures (Hedge et al., 2018) or the lack of consensus as to what implicit bias measures capture (Blanton & Jaccard, 2017).

Regional Bias

An alternative explanation for low reliability of implicitly measured biases is a larger influence of context. Theories of local or regional influence on attitudes are scarce, given the only recent focus on regional factors. Important exceptions include work laying out how psychological characteristics might emerge, persist, and be expressed at a regional level (Rentfrow et al., 2008). Specific to intergroup bias, theoretical frameworks have focused on how local structure and context might shape the bias of individuals in those places (Murphy et al., 2018; Murphy & Walton, 2013a), or that the variance in attitudes shared by people of a given region captures their collective attitudes (Calanchini et al., 2022).

The Bias of Crowds model posits that implicit bias is particularly influenced by the local context (Payne et al., 2017b). Specifically, context may influence individual's implicit bias by altering the accessibility of certain mental content: local cues (e.g., police interacting with Black individuals) may make some schemas and associations more accessible and activated than others (e.g., the association between Black people and crime). Because this mechanism relies upon cognitive accessibility and associations, context may impact implicit bias more than explicit bias, potentially explaining differences in retest reliability.

Some work is consistent with these context -> bias perspectives. For example, correlational work adopting a regional approach has found relationships between local biases and societal disparities, including police killings (Hehman et al., 2018), mortality rates (Leitner et al., 2016b), birth weights (Orchard & Price, 2017b), regional spending on Medicaid (Leitner et al., 2018b) and school discipline (Riddle & Sinclair, 2019b). Stronger causal evidence has capitalised on naturalistic variation over time, with anti-gay attitudes decreasing at a sharper rate following the legalisation of same-sex marriage (Aksoy et al., 2020; Ofosu et al., 2019b), anti-Black biases decreasing during Black Lives Matter protests (Sawyer & Gampa, 2018), and anti-fat biases rising during periods of media "fat-shaming" (Ravary et al., 2019).

Perhaps the strongest evidence supporting a context -> bias link is a reanalysis of bias-reduction intervention data (Vuletich & Payne, 2019). This work examined university students before and after a bias intervention, finding that participants' biases returned to a university-level mean, rather than the previous individual-level mean. Further, university means were associated with markers of structural bias (e.g., Confederate statues). The authors concluded that results were more consistent with theory that implicit bias is influenced by context rather than individual dispositions (Vuletich & Payne, 2019).

Context

While there is abundant evidence consistent with the idea that context causes bias, the models in this theoretical space are relatively new given this less explored domain, and accordingly, are thin on details that articulate when, where, and how context should change bias. For example, the very broad concept of "context" is often used as a catch-all, and is regularly interpreted in a wide variety of ways across the social sciences. To some, context involves elements of socialization, as the attitudes of people around you influence your own attitudes

either directly through things like conversation or teaching, or indirectly by observation (Lamer et al., 2022; S. Perry et al., 2021; Skinner & Perry, 2020). To others, context might reflect temporary environmental conditions, like the temperature or the weather exerting an effect on attitudes (Anderson et al., 2000; Reifman et al., 1991; Xie et al., in press). Still others have considered context the functional goals that one might have in a given environment at a given time, like working, romance, or employing deception (Rauthmann et al., 2014; Rauthmann & Sherman, 2015a). Finally, it could be visual features of the local environment (Brambilla et al., 2018; Correll et al., 2011), or societal structures, like the local laws and institutions disproportionately affecting one group over another, that are observed and influence attitudes (Payne, Vuletich, & Brown-Iannuzzi, 2019). Abundant other interpretations and operationalizations exist.

Central to the theorizing of the current work, modern theories fail to specify which aspects of context are responsible for changes in attitudes, and identifying these mechanisms is important. What all these theories have in common is that context should change with changes in geographic location (Calanchini et al., 2022; Murphy & Walton, 2013a; Payne et al., 2017b). Accordingly, the present research provides, to our knowledge, the first comprehensive tests of whether geography causes changes in bias. Here, geography, defined as the physical location of the participant at the time of completing a measure, is a more specific operationalization of context. Of course, this operationalization does not capture all the possible interpretations of context that exist or that are laid out above, but it does test the current theories of regional bias as specified. And while tracking changes in geography we additionally measured and tested a number of the other factors that could theoretically be a driving mechanism as to why context

might cause bias. We consider this important to continuing to develop psychological theory as to the specific aspects of context that do and do not contribute to change in bias.

Current Research

Accordingly, the current research adopted a longitudinal and quasi-experimental design, tracking individuals' biases as they moved across geographies, to begin answering fundamental questions about the contribution of context to bias. As described above, context or environment can be conceptualized in numerous ways, and we henceforth refer to context more specifically as "geography", corresponding with how we tracked physical locations of participants.

We preregistered sample size, data collection schedule, and specific analyses [https://osf.io/7vahr/?view_only=8cb776e8ae2646f78bf4c3509485caa3]. Consistent with the broad hypotheses that changes in geography cause changes in bias, analyses explored the degree to which individuals' level of bias was more similar (i.e., had less variance) when measured in a shared versus different geography.

Methods

Design and Participants

Data and other relevant materials are available here: [https://osf.io/7vahr/?view_only=8cb776e8ae2646f78bf4c3509485caa3]. The study was a four-phase ABAB repeated measures, staggered, quasi-experimental design. Data were collected between November 2019 and August 2021. The study capitalised on anticipated natural migration of students as they moved for summer and winter breaks, before returning to campus for the semesters. Thus, two measurement points were mid-semester, and two were mid-break.

We recruited 1271 undergraduates from McGill University (Montreal). 976 (76.79%) participants opted to continue the longitudinal portion following an intake survey. Of the 976

participants, 522 (53.48 %) completed more than one measurement point. The final sample consisted of these 522 participants (51% White, 22% East Asian, 10% more than one race, 6% South Asian, 5% prefer not to disclose, 2% Latin American, 2% Black, 2% Other/missing data, 86% female, M_{age} = 20.6, *SD* = 2.1). 67% of the sample identified as Anglophone, 15% as Francophone, and 18% as Other. Participants received a half-course credit and/or financial compensation based on surveys completed. The final dataset had 1543 observations though *n* varies per analysis due to missingness and excluded outliers..

Procedure and Materials

In each session, participants completed implicit and explicit bias measures for racial groups (Black-White), cultural-linguistic groups (Francophone-Anglophone) and fictitious social groups (Lappian-Niffian), in random order. Afterwards, participants answered questions about their geography. All phases after March 2020 contained a question assessing participants' perception of an increase in their region's bias since the COVID-pandemic, which we collected for an alternative project and do not discuss further. See Supplementary Materials for wave schedule.

Measures

For demographics, participants provided age, race, gender, cultural identity (Anglophone/Francophone/other), and how strongly they identified as Quebecois (1- "Not at all" to 7- "Very much").

Implicit bias

Implicit bias was assessed with an Implicit Association Test (IAT; Greenwald et al., 1998), a speeded categorization task in which respondents simultaneously categorized social targets (e.g., pictures of Black and White-people) and attributes (e.g., pleasant and unpleasant

words) by timed computer-key press. The speed with which people respond to one set of target-attribute pairings (e.g., Black-pleasant words, White-unpleasant words) relative to the other set of pairings (e.g., Black-unpleasant, White-pleasant words) is thought to reflect the strength with which the target categories are associated with one versus the other attribute category. The cultural-linguistic IAT was developed for this research. It used prototypical Francophone and Anglophone names as category exemplars, as previous research using stereotypical names as IAT stimuli (Salles et al., 2019). Pilot-testing indicated these names were recognised as prototypical of their respective cultural-linguistic groups (see Supplementary Materials).

Explicit bias

Explicit attitudes were assessed using an item shown to correlate strongly with the IAT (Axt, 2018). Participants reported their attitudes on a 7-point scale anchored at 1- "I strongly prefer [Group A] to [Group B]", 4- "I like [Group A] and [Group B] equally", and 7- "I strongly prefer [Group B] to [Group A]."

Geography survey

The survey assessed participants' geography (Which time below best captures how long it has been since you left Montreal? 1-"Still in Montreal", 2- "1 day", 3- "3 days", 4- "1 week" 5- "3 weeks", 6- "1-month", 7- "3-months"), and their perceptions of how biased their geographies were (How prejudiced is your current town/city toward Black people/French-speaking people? 1- "Not at all", 4- "Neutral", 7- "Very Much"). Participants also provided their postal code, why they were in their current geography, and length of time in current geography across their lifetime (Across your entire life, which time below best captures how much time you've spent in your current town/city? 1 - "1-day", 2- "3-days", 3- "1-week", 4- "3-weeks", 5- "1-month", 6- "3-months", 7- "6-months", 8- "1-year or more").

Operationalisation of geography

One important element was defining whether participants remained in Montreal. To ensure results were robust to our operationalization, we created two operationalizations of presence in Montreal based on subjective and objective participant reports. For the subjective measure, we classified participants as in Montreal if they had responded "Still in Montreal" to our question asking if they were in Montreal (henceforth "subjective"). However, participants also reported their postal codes, which only matched subjective reporting 87% of the time. Accordingly, our second classification was based on whether reported postal code began with "H", the island of Montreal (henceforth "objective"). We report both throughout.

Analytic Framework

Data Cleaning

Explicit and implicit bias measures were calculated such that more positive values represent more positive attitudes toward Niffians, White people, and Francophones. Outliers were excluded at +/-3 standard deviations from the mean of each group.

Hierarchal Models

We analysed results in a multilevel framework using the R lme4 package (Bates et al., 2015), with measures from up to four timepoints cross-classified by participants and geography. We clustered-centered survey order and season to control for order or seasonality effects. Degrees of freedom, test statistics, and *p*-values were derived from Satterthwaite approximations in the lmerTest package (Kuznetsova et al., 2017).

Moderation by Local Characteristics

Beyond comparing differences when in and out of Montreal, we explored whether some characteristics of geography explained changes in bias. Linear regression models tested whether

the characteristic of interest moderated participants' difference in bias when they were in versus outside of Montreal.

Moderators included a proportional difference in population demographics between participants' shared and unique geographies (e.g., the difference between the % of Black people in Montreal versus where participants traveled), and a version converted to absolute difference (results were identical). Further, we tested participants' subjective ratings of their geography's bias, as well as more objective metrics of aggregate implicit and explicit biases per geography. Bias data from 2004 – 2018 (Black-White IAT, Project Implicit; Xu et al., 2014) was aggregated to forward sortation areas (i.e., first-three characters of the Canadian postal code). These analyses using objective aggregate metrics of bias were restricted to Canada to ensure regional units were equivalent. As a proxy for potential Black-White intergroup contact, Black-population percentages were calculated from Statistics Canada (Statistics Canada, 2017). Similarly, as proxies for regional Quebecois cultural and political strength, we used both percentage of French speakers per region (Statistics Canada, 2017) and the average vote percentages of Francophone political parties Bloc Québécois and Parti pour l'Indépendance du Québec for 2019 and 2021 (Elections Canada, 2022). Lastly, we explored distance from Montreal a proxy for culture differences. Characteristics with extreme outliers (e.g., distance from Montreal) were recoded to be 3*SD* above the mean. The distance between geographies was calculated using the R-package geosphere (Hijmans, 2021).

Results

Our design was quasi-experimental, and an important assumption was that participants would move to diverse locations to provide a compelling test of the hypotheses. Figure 1 reveals

the substantial variation in geographies that participants visited. We interpret this to indicate there was meaningful heterogeneity in geography.

Figure 1. Geographies visited by participants. See Supplementary Materials for North America specific visualisation.

Results are organized in four sections. First, we report the retest reliability of bias across timepoints, both when participants moved locations and when they did not. Second, we tested whether the variance in bias was greater when participants did not share a location relative to when they did. Third, we tested bias mean changes in and outside of Montreal. Finally, we tested whether regional characteristics moderate the change in bias observed from one geography to another. In each section, we use both the subjective and objective operationalization of location.

Retest Reliability

With notable exceptions listed in the introduction, it has been rare to track bias longitudinally, and so we consider the descriptive aspect of the retest reliability important. However, it additionally functioned as a test of our hypotheses. If retest reliability was higher when participants were in the same geography relative to when changing geographies, this would

broadly support the idea that geography influenced biases, with changes in geography driving reliability downwards.

To examine overall retest reliability of bias, we calculated intraclass correlation coefficients (ICCs) from null multilevel models (Shrout & Fleiss, 1979), with repeated measures nested within participants. We first calculated overall reliability ignoring geography, then for the subset of participants that stayed in the same geography, and lastly, for participants that changed geographies (Table 1). Objective operationalization reliabilities were near identical. Results are broadly consistent with reliabilities measured over shorter time periods (Bar-Anan & Nosek, 2014; Cunningham et al., 2001a; Gawronski et al., 2017b). Reliabilities did not change meaningfully across geographies, and we interpret this pattern as inconsistent with geography causing changes in bias.

Table 1. Reliability of implicit and explicit biases.

	Overall	Same Geography	Changed Geography
Lappian-Niffian Implicit	.32	.42	.40
Black-White Implicit	.42	.42	.40
Franco-Anglo Implicit	.55	.55	.54
Lappian-Niffian Explicit	.16	.20	.06
Black-White Explicit	.63	.66	.65
Franco-Anglo Explicit	.70	.72	.69

Variance

Next, we tested whether there was greater variance in bias when participants did versus did not share a geography (Figure 2).

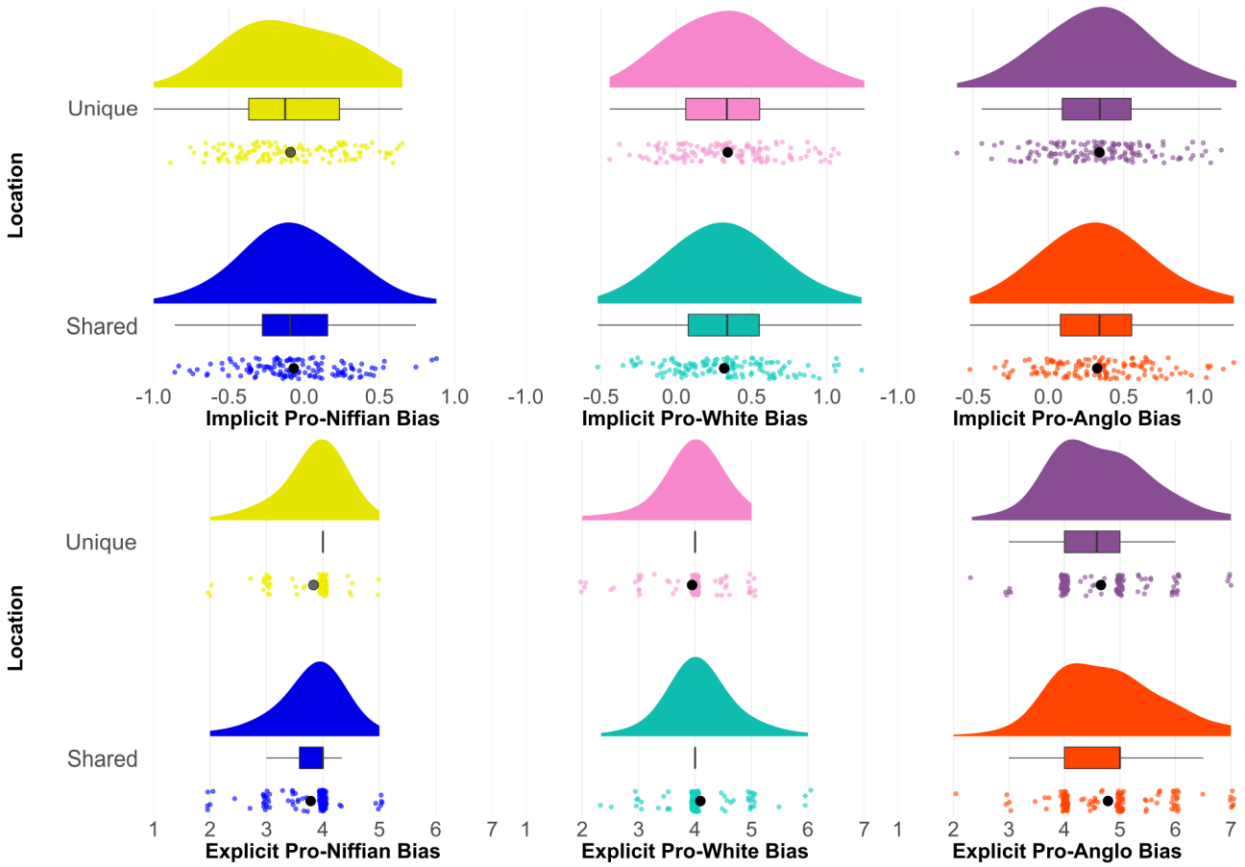

Figure 2. Observations and distributions of Laapian-Niffian, Black-White, and Franco-Anglo implicit and explicit biases when participants were in shared vs. unique locations. Black circles represent the mean. Higher values represent a bias toward the panel label.

In multilevel models, we regressed bias on contrast-coded location controlling for cluster-centered survey order and seasonality. To test heterogeneity, we performed an analysis of variance on the squared residuals (i.e., Levene's test, Table 2). The majority of comparisons were not significant, with two exceptions, though these were in the opposite direction of what would have been consistent with a geography -> bias link. When in a *shared* geography, there was more variance in implicit Black-White bias ($\sigma^2 = 46.586$) and Franco-Anglo Bias ($\sigma^2 = 48.630$), in comparison to when participants were in unique geographies, Black-White bias ($\sigma^2 = 42.506$),

Franco-Anglo Bias ($\sigma^2 = 43.161$). We interpret this pattern as inconsistent with geography causing changes in bias.

Table 2. Analysis of variance comparing the variance in bias when participants were in shared vs. unique locations. 95% CIs represent the contrast coded location variable.

	Subjective				**Objective**			
	df	*F*	*p*	95% CI	*df*	*F*	*p*	95% CI
Implicit								
Lappian-Niffian	583	0.013	.911	[-0.009, 0.008]	472	0.204	.652	[-0.008, 0.012]
Black-White	590	1.097	.295	[-0.003, 0.011]	475	3.999	.046	[-0.014, -0.0001]
Franco-Anglo	586	0.584	.445	[-0.005, 0.010]	472	6.901	.009	[-0.018, -0.003]
Explicit								
Lappian-Niffian	585	0.236	.627	[-0.042, 0.025]	473	0.082	.775	[-0.031, 0.041]
Black-White	583	2.438	.119	[-0.026, 0.003]	481	2.864	.091	[-0.003, 0.037]
Franco-Anglo	603	0.033	.856	[-0.039, 0.033]	484	1.575	.210	[-0.014, 0.065]

Power Analysis

Our most conservative sample had an N of 411. Thus, we performed a sensitivity power analysis in G*Power 3.1.9.7 for our mean differences in bias. A dependent matched-pair t-test, assuming a two-tailed test, with an alpha of .05, provided 95% power to detect a small effect of Cohen's $d = .18$. Although the median effect size for highly controlled experiments in social psychology is $d = .38$ (Lovakov & Agadullina, 2021), we anticipated a much smaller effect size outside of the lab (Abelson & Abelson, 2004; Ofosu et al., 2019b; Paradies et al., 2015; Pettigrew, 1997; Rosnow & Rosenthal, 2003; Sisk et al., 2018)**.**

Mean Differences

It was possible that while overall variance didn't change across different geographies, the mean of biases would. Accordingly, we tested whether mean bias changed when participants

moved geographies. Bias was regressed on dummy coded participants' geography in a multilevel framework, again controlling for cluster-centered survey order and seasonality. Evidence was mixed, with some biases showing fairly consistent changes across measures and operationalizations (Franco-Anglo), and some showing inconsistent patterns (the mismatch between implicit and explicit measures of Black-White bias). Together, changes in bias were consistent enough and robust to location operationalization that we consider these findings to be some evidence consistent with idea that geography influences biases (see General Discussion)

Table 3. Changes in participants' biases as they changed geographies.

	Subjective					**Objective**				
	B	SE	*t*	*p*	95% CI	B	SE	*t*	*p*	95% CI
Implicit										
Lappian-Niffian	0.027	0.028	0.966	.334	[-0.027, 0.081]	-0.013	0.033	-0.402	.688	[-0.079, 0.052]
Black-White	0.012	0.025	0.489	.625	[-0.036, 0.061]	0.060	0.028	2.133	.034	[0.005, 0.116]
Franco-Anglo	0.043	0.029	-1.513	.132	[-0.013, 0.100]	0.098	0.036	-2.714	.007	[-0.169, -0.027]
Explicit										
Lappian-Niffian	0.086	0.041	2.087	.038	[0.011, 0.167]	0.058	0.050	1.154	.250	[-0.041, 0.156]
Black-White	-0.058	0.030	-1.911	.057	[-0.118, 0.001]	-0.138	0.041	-3.382	.001	[-0.219, -0.058]
Franco-Anglo	0.106	0.048	2.189	.029	[0.011, 0.201]	0.134	0.059	2.255	.025	[0.018, 0.250]

Regional Characteristics as Moderators of Change

The sections above tested average effects across our sample. Yet the magnitude of how much one's biases change across geographies may be a function of characteristic differences between geographies. Essentially, we tested whether local characteristics moderated the magnitude of change in individual biases in a shared relative to unique geography. We did so by regressing participants' Location B biases on their Location A (shared geography) biases, moderated by local characteristics of Location B in multilevel models. We tested these moderators for Black-White and Franco-Anglo biases (see Methods for moderators).

For subjective location, none of the regional characteristics moderated implicit biases. See Supplementary Materials for reporting.

For explicit bias, some moderations were observed. Time spent within a location over one's lifetime moderated the relationship between the Black-White bias participants reported in a shared vs. unique geography (B = -0.073, SE = 0.033, p = .028, 95% CI [-0.137, -0.008]). Simple effects revealed that people who had spent more time in a given location changed their biases more from Montreal to that location (B = 0.186, SE = 0.037, p = .001, 95% CI [0.112, 0.259]), while people who were newer to the area changed their biases less (B = 0.331, SE = 0.045, p = .001, 95% CI [0.242, 0.420]), expressing more similarity to their Montreal levels of bias. Percentage of Black population also moderated bias (B = 0.033, SE = 0.015, p = .030, 95% CI [0.003, 0.062]) such that participants who visited geographies with a higher Black population had less change in their Black-White biases (B = 0.237, SE = 0.030, p = .001, 95% CI [0.178, 0.297]) than those that visited geographies with a lower Black population (B = 0.119, SE = 0.056, p = .036, 95% CI [0.008, 0.229]). No other regional characteristics moderated Black-White bias and Franco-Anglo bias (see Supplementary Materials for reporting).

For objective location, there were some differences from that above. For implicit bias, the vote percentages of the political parties moderated participants' Franco-Anglo bias as they switched geographies (B = 0.013, SE = 0.006, p = .021, 95% CI [0.002, 0.024]). Simple effects indicated the interaction was driven more by an increase in bias of participants visiting geographies with higher vote percentages of Quebecois political parties (B = 0.127, SE = 0.066, p = .055, 95% CI [-0.003, 0.258]), though this slope was only marginally significant. Participants moving to locations with lower percentage votes did not change (B = -0.020, SE = 0.125, p = .875, 95% CI [-0.267, 0.227]).

For explicit bias, percentage of Black population moderated bias (B = 0.099, SE = 0.038, p = .010, 95% CI [0.024, 0.174]) in the same way as subjective location. Participants who visited geographies with a higher Black population than the shared geography had less change in their Black-White biases (B = 0.364, SE = 0.056, p = .001, 95% CI [0.252, 0.475]) than those that visited geographies with a lower Black population (B = 0.165, SE = 0.050, p = .001, 95% CI [0.066, 0.265]).

General Discussion

What role does geography play in individuals' biases? The present work tested predictions from modern theories of regional bias as currently specified. By generating a sample with – to our knowledge – the biggest size and longest duration (~10 months) of measures of implicit and explicit intergroup bias, we tested the broad principle of whether context can shape bias. Focusing on geography specifically, we find some but limited evidence consistent with notion that presumed changes associated with geographies cause changes in individuals' bias. The effects identified were small, often emerging with only one operationalization of location,

and were limited for certain measurements and types of bias. Evidence from some analyses (i.e., reliability, heteroskedasticity) was not present.

Location

An important issue to first discuss are the two operationalizations of location. The strength of evidence for whether geography causes bias hinges on the validity of each approach. Generally, when location was operationalized as self-report, "Are you currently in Montreal?", there was far less evidence of a geography -> bias link. One advantage of this approach is that participants' *perceptions* of whether they have entered a new geography or not may be more important to any particular influence on biases than an objective measure. For example, a person may change from one suburb to another, but feel that these two geographies are near identical.

Yet certainly it is possible that geography might influence our attitudes in ways in which we are not aware, and therefore objective measures of location change might be more valid. One practical limitation to the objective location operationalization is less data (approximately 110 fewer observations were from those electing to provide postal codes). Therefore, while one interpretation is that objective location better captures a geography -> bias link, another is that it is the different subsamples responsible for such a conclusion. Supplementary analyses attempting to disentangle these two possibilities were inconclusive. Patterns of results between the two operationalizations were never at odds or in opposite directions, yet more tests were significant with objective relative to subjective. While both individuals' subjective perceptions and objective change of location are of potential interest, it is true that more evidence for geography causing changes in bias was observed with the objective location operationalization.

Results Consistent with Geography -> Bias Link

There was some evidence that changes in geography caused changes in bias, which is consistent with the broader theoretical framework that contexts influence attitudes and behaviors. First, for both subjective and objective location, people reported less explicit pro-Anglo attitudes when moving *outside* of Montreal. This result was consistent for implicit bias, but not for subjective location. Most participants were Anglophone, moved to places that were more Anglophone than Montreal, which is located in a majority-Francophone region. We consider it more consistent with existing theory that moving to a geography with more ingroup members would have increased ingroup bias. Yet we do consider some *post-hoc* explanations.

One possibility is a selection effect. People moving to Montreal may have found the Francophone/Quebecois culture desirable or developed affection for it over time. Then, participants may have experienced feelings of nostalgia when leaving Montreal, increasing positive associations with Francophone culture (Wildschut et al., 2006).

Ultimately of the 24 direct-tests of the hypotheses across implicit and explicit biases for Black-White and Franco-Anglo attitudes – which involved tests of reliability, variance, and means using both objective and subjective forms of geography – only three were possibly consistent with a geography->bias link.

Results Inconsistent with Geography -> Bias Link

We had reasoned that if geography influenced attitudes, within-subject retest reliability would be lower when people changed locations. Similarly, we reasoned that overall variance in attitudes would be higher when people were in unique than shared locations. Of the 16 tests within these two frameworks using non-fictitious groups, none were supportive. It is important to note that for objective location tests of Black-White and Franco-Anglo implicit, there *were*

differences in variance dependent on location. Yet results were in the opposite direction than what would be predicted by a geography causing bias effect, as participants showed greater variance in attitudes when in shared than unique locations.

Tests of mean bias change across subjective location, Black-White implicit and explicit, and Franco-Anglo implicit, were not consistent with geography causing changes in bias. For objective location, there were differences across Black-White implicit and explicit, but results from the analyses were in opposing directions. As individuals moved from a shared to unique geography, they expressed an *increase* in implicit anti-Black bias but a *decrease* in explicit anti-Black bias. While explanations for why this disconnect between implicit and explicit attitudes can be developed *post-hoc*, we consider that both biases should move in the same direction (as they did with Franco-Anglo biases) more consistent with the general idea of a context exerting an influence on attitudes. Ultimately, of the 24 overall tests of the hypotheses, 19 were clearly interpretable as no evidence for a geography -> bias link.

Regional Moderators

While most of our direct-tests of the hypotheses were inconclusive, geography might certainly cause bias in more complex ways, such that a larger causal effect is only observed dependent on conditions involving the person or the geography. Indeed, perhaps the strongest evidence of a geography -> bias causal link came from our tests of moderation.

Specifically, we found evidence that several factors moderated the strength of relationship between bias measured in one place and another. First, under the subjective measure of geography Black-White explicit biases were moderated by how long participants had stayed in the unique geography over their lifetime. People who moved to a new area changed their biases less. One interpretation is that the longer an individual had previously spent in a geography, the

more likely for them to perceive, interpret, and be influenced by local bias cues, and therefore, the more likely their biases were to be influenced by these signals. Yet it is important to note this effect did not replicate with objective measures of Black-White explicit bias, or for implicit biases.

A more consistent moderator was the population of the geography to which participants traveled, relative to their shared geography (Montreal). Participants who traveled to geographies with a higher Black population exhibited a more stable explicit bias than those traveling to places with a lower Black population. This effect was consistent across both subjective and objective location measures, but not implicit bias. Given that Montreal is an urban center, it has a higher Black population than the majority of places to which participants traveled. People traveling from Montreal to these places experienced a greater change, which may explain changes in attitudes. Future work might continue investigating how individual history and regional characteristics moderate biases toward different groups, as current theories remain silent on these relationships.

Limitations

While our quasi-experimental within-subjects staggered design can provide strong causal evidence, there were still some important events that occurred during this study that might act as confounders: COVID and a heightening of the Black Lives Matters movement in 2020. These were momentous events that constitute a potential "history" confound. The social isolation caused by the pandemic response may have impacted various effects. Further, the Black Lives Matter movement received increased media attention during our study. And indeed, we observed a decrease in anti-Black biases when people left Montreal, which tended to be towards the latter part of the study (following the summer of 2020). Thus, while our design did not provide the

resolution to target the Black Lives Matter movement as an effect, it may have decreased anti-Black bias in the latter dates of the study, and this effect might have overwhelmed any potential effect of geography (Sawyer & Gampa, 2018). Nonetheless, a decrease in anti-Black bias outside of urban Montreal is also inconsistent with a geography -> bias link.

Finally, our findings are also limited by our mostly liberal, young, White, undergraduate, and female sample, and whether our conclusions generalize to other groups requires subsequent testing.

Implications for Theoretical Models

Beyond these limitations, there are a number of reasons why the present research might not have found any change in bias across geography. A useful metaphor for thinking about the current project is a drug intervention. Patients can receive an equal sized treatment by either taking a small dose over a longer time-period, or receiving larger doses over a shorter time-period. In this work, participants can receive a larger "treatment" of geography by spending more time in a geography (i.e., longer time-period), or by moving to an area very different from the previous geography (i.e., larger dose). We speculate that the duration of stay in a geography may make it more likely one will be exposed to factors of a region that influence attitudes, such that the longer one spends in an area, the higher the chance for these factors to influence attitudes. Second, traveling to a geography in which there are very different norms may impact attitudes to a greater extent. Should one change geographies but remain in a psychologically similar context, geography may not impact bias, as no change is perceived.

By both of these criteria, we consider the current project a medium-strength test of the causal effect of geography on bias as currently specified by existing models. Participants spent an average of three months in new locations, and travelled to many locations that are arguably

meaningfully different than Montreal. Particularly concerning for the geography-> bias link are the limited changes in Franco-Anglo attitudes, which we considered a strong test of the theory. We included this domain because Quebec is uniquely Francophone in North America, and we can say with some confidence that Franco-Anglo attitudes should be different outside of Quebec (e.g., 33 - 42% of our sample returned to areas outside Quebec where English is the dominant language, and 35 - 44% of our sample returned to areas where French is not the dominant language depending on which operationalisation was used). Despite this design, our results are generally not supportive of a large causal effect of geography on bias.

Alternatively, context operationalized as a small city or shared residence within a postal code may not adequately capture the factors of context that influence attitudes. We do note this possibility would be inconsistent with previous work finding implicit biases returned to a "campus mean" following a bias intervention (Vuletich & Payne, 2019), in which many of the campuses were in cities larger or more heterogeneous than Montreal (e.g., New York, Austin, San Diego). Nonetheless, establishing a method of measuring psychological context with more precision is an important step toward examining any possible effect on bias for the field.

What we can confidently conclude from the *present data* is that simply residing in a different geographic area for, on average, 3 months, in a fairly different cultural context, is not enough to elicit detectable within-person changes in implicit and explicit biases. Further, the heterogeneity in implicit and explicit bias scores when people are living roughly in the same location is not different than when they are living in dramatically different locations. Each of these conclusions are at odds with the predictions of current theoretical models of regional bias as currently specified (Calanchini et al., 2022; Murphy & Walton, 2013a; Payne et al., 2017b), and the present results can help refine these theories moving forward.

Indeed, in these current theoretical models, the word “duration” does not appear a single time (“length” appears two times but only as “commute length”). Furthermore, “Moderator” only appears two times, and never in a context to articulate specific moderators of the effect, and lastly, the word “age” does not appear in these papers. Clearly, a factor such as duration of residence in a context should matter, and the current work presents some evidence that it does. Building upon these foundational models, our present work suggest that future works on the geography-> bias must make clear that the factor of time as a moderator, along with other potential moderators.

However, despite this lack of support in the current data, we believe it likely that contexts shape attitudes in some way. Thus, this project then serves as a useful benchmark, and we hope empirical attention can be turned from “whether” context influences bias, to “under what conditions” we would be most likely to observe a context -> bias link. Existing theories (Calanchini et al., 2022; Murphy & Walton, 2013a; Payne et al., 2017b) do not consider these factors in much detail, and our results reveal that future work must more concretely outline these conditions when updating theories. Our results suggest that changing geographies does not necessitate changes in bias, so future work must better contend with *when* changing contexts does cause changes in bias. For instance, future work might examine a) potential changes over a period longer than 3 months and without a period of social isolation, b) other periods in life than age 18-22, as people may be more sensitive to change in earlier years, c) larger cultural changes (though we believe the current design to be strong in this respect), d) more precise measurement of “context” even within a small geographic region, and e) identifying the individual and regional moderators that may enable context to influence attitudes for some people but not others.

Conclusion

Social scientists have long believed that individual behavior and attitudes are a function of both the person and the context (Lewin, 1947). However, intergroup research has yet to more fully explore the relationship between an individual's biases and the contexts, environments, and regions in which they are embedded (Trawalter et al., 2020; Calanchini et al., 2022). The present work tests some early hypotheses, establishes boundary conditions, and begins laying the groundwork for a more integrated understanding of the interactive nature between the person, their contexts, and the regions they traverse.

Supplementary Materials: Changes in geography do not necessitate changes in prejudice

Methods

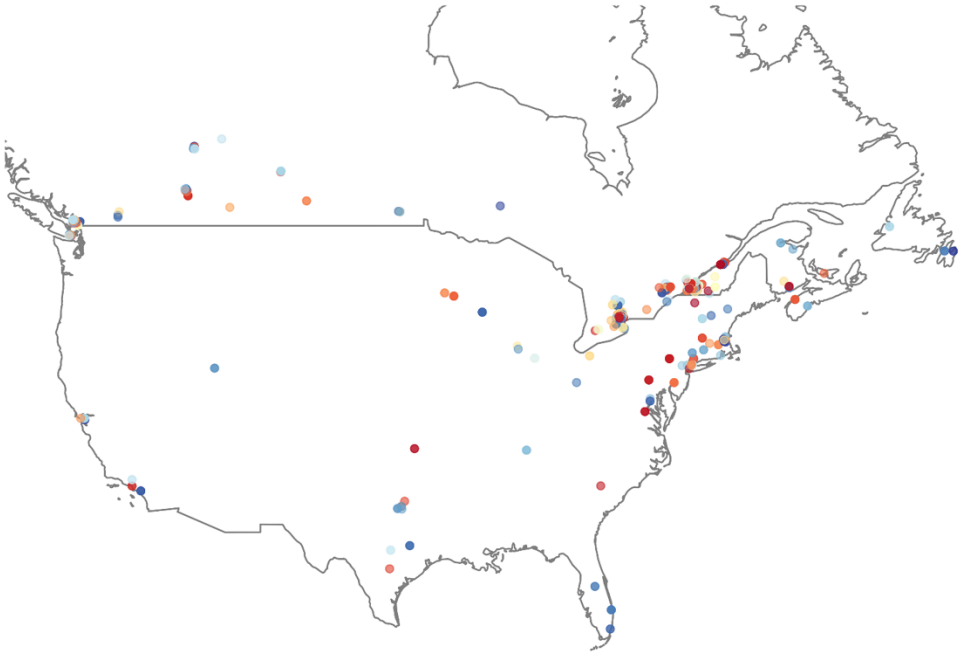

Figure 1. Geographies in North America visited by participants.

Table 1. Schedule for the phases of data collection.

Stream	Phase 1	Phase 2	Phase 3	Phase 4
1	Fall 2019	Winter break 2019	Winter 2020	Summer 2020
2	Winter 2020	Summer 2020	Fall 2020	Winter break 2020
3	Summer 2020	Winter break 2020	Winter 2021	Summer 2021
3B	Early Fall 2020	Winter break 2020	Winter 2021	Summer 2021
3C	Mid Fall 2020	Winter break 2020	Winter 2021	Summer 2021

Cultural-linguistic IAT

Sixty Mturk workers were recruited to rate how stereotypically Anglophone or Francophone 80 first names were (1 Anglophone – 7 Francophone). The 80 names (40 female/40 male) were generated from a Google search of stereotypical English and French names. We aggregated ratings per first name across participants. A two-tailed *t*-test confirmed that the

perceived difference between the top 10 stereotypical Francophone names (M= 5.94) was significantly different from the top 10 stereotypical Anglophone name (M= 2.25), t= 94.03, p < .0001. The five highest rated female and male names were selected as Francophone names. The five lowest rated female and male names were selected as Anglophone names.

Results

Subjective Geographical Operationalisation

Regional Characteristics

Implicit Bias. Subjective regional bias (B = -0.10, SE = 0.025, p = .687, 95% CI [-0.059, .038]), objective regional bias (B = 0.136, SE = 0.258, p = .599, 95% CI [-0.373, .646]), distance between shared and unique geography (B = 0.017, SE = 0.026, p = .523, 95% CI [-0.035, .069]), time spent at local geographies across lifetime (B = 0.001, SE = 0.037, p = .986, 95% CI [-.073, .074]), and differences in Black population at geographies (B = 0.024, SE = 0.015, p = .110, 95% CI [-0.005, .053]) did not moderate the participants' Black-White bias as they moved between geographies. Similarly, subjective regional bias (B = -0.007, SE = 0.030, p = .809, 95% CI [-0.065, .051]), distance between shared and unique geography (B = 0.031, SE = 0.023, p = .193, 95% CI [-0.016, .077]), time spent at local geographies across lifetime (B = -0.012, SE = 0.031, p = .699, 95% CI [-.073, .049]), percentage of French speakers per region (B = -0.002, SE = 0.001, p = .605, 95% CI [-.003, .002]), and vote percentages of the Bloc Québécois and Parti pour l'Indépendance du Québec parties (B = 0.001, SE = 0.003, p = .649, 95% CI [-0.004, .007]) did not moderate the participants' Franco-Anglo bias as they switched local geographies.

Explicit Bias. Subjective regional bias (B = -0.025, SE = 0.025, p = .317, 95% CI [-0.075, .024]), objective regional bias (B = -0.038, SE = 0.105, p = .721, 95% CI [-0.245, .170]),

and distance between shared and unique geography (B = 0.032, SE = 0.028, p = .261, 95% CI [-0.024, 0.087]), did not moderate the participants' Black-White bias as they travelled between local geographies. For Franco-Anglo bias, subjective regional bias (B = -0.038, SE = 0.048, p = .427, 95% CI [-0.134, .057]), distance between shared and unique geography (B = -0.026, SE = 0.047, p = .577, 95% CI [-0.119, .067]), time spent at local geographies across lifetime (B = 0.023, SE = 0.041, p = .569, 95% CI [-.057, .104]), percentage of French speakers per region (B = 0.002, SE = 0.002, p = .445, 95% CI [-.006, .003]), and vote percentages of the Bloc Québécois and Parti pour l'Indépendance du Québec parties (B = 0.026, SE = 0.070, p = .707, 95% CI [-.113, .166]) did not moderate the participants' bias as they moved between local geographies.

Objective Geographical Operationalisation

Regional Characteristics

Implicit Bias. Subjective regional bias (B = -0.009, SE = 0.020, p = .673, 95% CI [-0.049, .032]), objective regional bias (B = -0.044, SE = 0.233, p = .851, 95% CI [-0.505, .417]), distance between shared and unique geography (B = -0.001, SE = 0.030, p = .978, 95% CI [-0.060, .058]), time spent at local geographies across lifetime (B = 0.020, SE = 0.029, p = .478, 95% CI [-.036, .077]), and differences in Black population at geographies (B = 0.009, SE = 0.016, p = .565, 95% CI [-0.023, 0.042]) did not moderate participants' Black-White bias as they moved between local geographies. Similarly, subjective regional bias (B = 0.004, SE = 0.030, p = .903, 95% CI [-0.056, 0.063]), distance between shared and unique geography (B = 0.053, SE = 0.029, p = .071, 95% CI [-0.005, 0.110]), percentage of French speakers per region (B = 0.002, SE = 0.003, p = .485, 95% CI [-.003, .007]), and time spent at local geographies across lifetime

(*B* = -0.010, *SE* = 0.036, *p* = .785, 95% CI [-.082, .062]) did not moderate the participants' Franco-Anglo bias as they switched local geographies.

Explicit Bias. Subjective regional bias (*B* = -0.040, *SE* = 0.027, *p* = .148, 95% CI [-0.094, 0.014]), objective regional bias (*B* = -0.036, *SE* = 0.111, *p* = .745, 95% CI [-0.257, .184]), distance between shared and unique geography (*B* = 0.016, *SE* = 0.034, *p* = .647, 95% CI [-0.052, 0.084]), and time spent at local geographies across lifetime (*B* = 0.017, *SE* = 0.025, *p* = .486, 95% CI [-0.032, 0.067]), did not moderate the participants' Black-White bias as they travelled between local geographies. For Franco-Anglo bias, subjective regional bias (*B* = 0.032, *SE* = 0.036, *p* = .383, 95% CI [-0.040, 0.103]), distance between shared and unique geography (*B* = 0.022, *SE* = 0.048, *p* = .654, 95% CI [-0.074, .117]), time spent at local geographies across lifetime (*B* = -0.019, *SE* = 0.055, *p* = .726, 95% CI [-.127, .089]), percentage of French speakers per region (*B* = -0.001, *SE* = 0.003, *p* = .871, 95% CI [-.007, .006]), and vote percentages of the Bloc Québécois and Parti pour l'Indépendance du Québec parties (*B* = 0.000, *SE* = 0.008, *p* = .977, 95% CI [-0.016, .017]) did not moderate the participants' bias as they moved between local geographies

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CHAPTER 4

Minimal evidence for individual-context influence on prejudice

(Ofosu, Xie, Thai, & Hehman, 2023, in prep)

Preface to Chapter 4

The studies presented in Chapter 3 probed how geography influences individuals' intergroup prejudices. A crucial finding of this chapter was that current working theories (Calanchini et al., 2022; Payne et al., 2017b) on individual bias and regions should have more precise boundaries and directed hypothesis. Chapter 3 calls for important constraints on theories of how context might shape bias and necessitates updates to theoretical models. The following chapter of this dissertation – Chapter 4 – more earnestly begins the boundary test process.

Although two regions may be geographically different (e.g., Montreal, Canada, North America, and Wroclaw, Poland, Europe), both regions may have a very similar if not identical environment (e.g., McDonalds franchise restaurant). The feelings, ambiance, and context this world-renowned franchise (i.e., environment) creates and might induce in the individual may – and has been honed to be – almost identical regardless of an individual's geographical coordinates on earth. Similarly, situational contexts can be unaffected by changes in geographies. Put differently, although an individual may have physically changed geographies, they might experience the same environmental and situational contexts.

Thus, Chapter 4 of this dissertation examines how different psychological, environmental, and situational contexts (Brown et al., 2015; Horstmann et al., 2017; Parrigon et al., 2017; Rauthmann & Sherman, 2018) influence individuals' prejudice. Chapter 4 zooms in from the more bird's eye view of Chapter 3, zooming into explicitly demarcated legal state/national borders, and unmarked US counties in exploring how changes in locations influence bias.

Chapter 4 explores what qualities of a context (e.g., temperature, presence of potential romantic partners, temporal interaction with an outgroup member) affect prejudice towards an

array of social groups. Chapter 4 further aims to provide a starting point for the number of distinct contexts that can exist within and across geographical regions. These distinct classes – and by extension – this endeavour will be seminal for within and across regions mechanisms for the influence of geographical region on individual biases. Lastly, the following chapter of this dissertation will explore which contextual variables predict ingroup prejudice towards 15 social groups.

Ofosu, E. K., Xie, S., Thai, S. & Hehman, E. (in prep). Minimal evidence for individual-context influence on prejudice.

Abstract

Individuals move daily through diverse situational and environmental contexts. These mercurial or prolonged contexts inform individuals' impressions and attitudes. Extant research, however, is unclear of how situational contexts influence prejudice in the real world. The present research therefore tracked individuals' biases as they experienced mundane and dynamic contexts for 14 days. Employing a diary study methodology (experience sampling), and multi-level modelling, we observed individuals' expressed bias towards 15 social groups. We found limited evidence that individual contexts are an important factor in explicit prejudice. Individuals' context does not systematically influence explicit bias in a consistent manner. Importantly, the current work finds the individual, social group, and their interaction emerged as a non-negligible (~35% of variance explained) source of variance. The work calls for the greater attention and emphasis on *who* expresses bias, *whom* bias is expressed towards, and the *interplay* of the *who* and *whom* in intergroup prejudice research.

Keywords: explicit bias, contexts

Introduction

Individuals live in a dynamic world. In this dynamic world, individuals can experience a multitude of different environments and contexts. These varying environments and contexts can occur within a relatively short duration. Accordingly, individuals strive to be consistent in their attitudes and beliefs. Consistency in attitudes not only helps individuals navigate an at times unpredictable world, but it helps them maintain a sense of self (Festinger, 1957; Kelley, 1973). It is this sense of self that informs how individuals perceive and interact with others of similar or different social identities.

Humans are social creatures, who move daily through contexts that inform their attitudes. These contexts may result in the forming of new impressions or attitudes or updating prior beliefs. Research examining context is limited, with the paucity of works situated within the face impression literature. These provide some insights as to how context might affect a phenomenon. Contexts are diverse, and sometimes overarching. Research have understood context to encompass geographical regions (Jaeger et al., 2019), personal environments (Barrett & Kensinger, 2010), and even experienced situations (Rauthmann & Sherman, 2018b). A twin study observed that genetics accounted for little variability in facial impressions in comparison to an individual's personal environment (Sutherland et al., 2020). Furthermore, broader cultural context explained minimal variability in relation to individual differences (Hester et al., 2021). These patterns of result therefore inspire the notion that meaningful contextual variability might be more present at the situational, daily level of an individual's experience.

If factors that shape everyday experiences are psychologically meaningful, then they may sway impressions and attitudes. In this line of thinking, when the concept of harm was salient , individuals assessed others as angrier (Holbrook et al., 2014; Maner et al., 2005), larger (Fessler

et al., 2012), and perceived others as much more physically threatening (Wilson et al., 2017), versus when individuals were experiencing neutral contexts. Furthermore, individuals' moods can interact with features of an environment in how individuals perceive a situation. Individuals form impressions that are similar to the mood they are experiencing (Abele & Petzold, 1994; Forgas, 1992; Forgas & Bower, 1987), relatedly, features of one's environment can shape one's mood (Chartrand et al., 2006). Thus, the psychological experience of an individual can influence the way they perceive and interact with others from the same and different social groups.

As the limited research on how context influences phenomena have concerned with impression formation, how context affects the nature prejudice remains unknown. Individuals tend to be consistent in how warmly they say they feel towards members of different groups (Devine et al., 2012b). The consistency of explicit bias is highlighted by the strong correlation (r = .75) of explicit bias measured between different time points. On average, expressed bias at a particular time can accounted for about 56% of the variance in such bias expressed at a subsequent time (Gawronski et al., 2017a). Individuals' prejudices fluctuate across contexts. And traditionally, the stability of explicit bias has been probed in experimentally controlled laboratories over the past decades. Statistically meaningful changes have been observed in expressed bias after individuals have read a vignette on (Abu-Rayya & Brown, 2023), to imagining an interaction with individuals from a different social group (Miles & Crisp, 2014). Accordingly, insights from these structured experimentations have provided theoretical frameworks for the conceptualisation of intergroup prejudice, and its related study of discrimination.

Although the stability of explicit bias was established through manipulations of, and in different contexts, all such contexts can be subsumed into the overarching environment of

confined lab. Additionally, these contexts are manufactured as to probe how a particular antecedent and or manipulation will influence explicit bias of individuals. These fruitful endeavours might not reflect "in vivo" naturally occurring fluctuations in prejudice, and accordingly, may not be comprehensively advancing our understanding intergroup prejudice.

To understand how context influence explicit prejudice in the real world, we employed an experience-sampling paradigm (Thai & Page-Gould, 2018b) to observe how biases vary as individuals go about their daily lives, experiencing different contexts in a naturalistic manner. To our knowledge, no other studies have probed how naturally occurring contexts influences individuals' stable biases as expressed by such individuals. Emerging theories have speculated on how individuals' biases may implicitly be influenced as they move through diverse contexts, and even possibly in their geographical regions (Calanchini et al., 2022; Murphy & Walton, 2013b). Furthermore, when biases are measured in social psychology, they have been captured at only a timepoint. Single measurements often do not allow for a more nuanced understanding of a psychological phenomenon. Historically, when multiple measurement of bias occurred, it is confined to a single social group (Cunningham et al., 2001a; Dasgupta & Greenwald, 2001; Devine et al., 2012b; Gschwendner et al., 2008; Hu et al., 2015).

Present Research

To understand how daily contexts inform individuals' prejudices, we asked participants their bias towards 15 social groups, as well as aspects of their physical and psychological states. Our two research questions were: how do individuals' everyday context matter for bias? Which individual contexts are important in the systematic expression of bias across different participants? With a quasi-experimental design over an extended time, we ensure natural sources

of with-individual variability to occur and explore how individuals' contexts meaningfully influence variability in explicit prejudice.

Methods

Experience Sampling

The present study probes how individuals' everyday contexts affect their expressed prejudice using experience sampling (Thai & Page-Gould, 2018b), to track daily fluctuations in individuals' context as they express their attitudes towards different social groups. The term "context" is used as an umbrella term to capture individuals' environment and psychological states which may affect within-individual variability in biases. We therefore focused on state-like variables with the greater likelihood of oscillating within a day.

Participants

We recruited 538 US participants though Amazon's Mechanical Turk, all who completed at least one daily survey. We over recruited as to enable a final sample size comparable to previous works adopting the experience-sampling method (Thai & Page-Gould, 2018b; S. Xie et al., 2022). 220 (41%) participants successfully completed the two-week study finishing 24 daily surveys. Of the 538 participants, 52% identified as female, and 8% as either gay or lesbian. The sample was 75% White, 8% Black, 7% East Asian, 5% Hispanic/Latino, 5 % other/did not disclose. Lastly, with a mean age of 36.31 years (9.44 SD), 57% identified as liberal, and 22% as conservative.

Procedure

Participants completed an on-boarding questionnaire where they provided their demographics along with their zip code and state. They were provided an overview of the study

and guide towards the installation of the *ExperienceSampler* (Xie et al., 2022) smartphone app – which would be documenting their daily surveys for 15 days.

Data collection occurred in multiple waves from October 2021 to April 2022. Participants were notified two times daily for 15 consecutive days at quasi-random times via the app. Participants provided their availabilities to ensure they were contacted at optimal times. When responding to a notification, participants were asked how warmly they felt towards five social groups, randomly selected from 15 social groups. Participants were also asked the nature of contact they had experienced with a member of the five social groups. Afterwards, participants completed questionnaires about their current situation, environment, mood, and physiological state. The order of the questionnaires was randomized per survey. Measures were intentionally succinct to reduce participant fatigue and attrition. Participants were asked to reflect on the past 2 hours as they completed all the measures.

Measures

We gauged multiple ways how physical environments and psychological states might vary within individuals across 15 days, while acknowledging the myriad of factors that may influence one's immediate psychological context. As it is not feasible to comprehensively examine all contexts, measures were opted for based on salience, the researchers subjective intuitions, and similar work exploring daily variability in individual impression formations and attitudes (Xie et al., 2022).

Prejudice. A warmth thermometer was used to gauge bias. (i.e., How warm do you currently feel towards [social group], on a scale from 1 "very cold" – 7 "very warm"). Similar thermometer scales have been used and validated within the field of intergroup relations (Axt, 2018; Buttrick et al., 2020; Ofosu et al., 2019). As compared to Likert-type scales, a

thermometers scale was used given its ease on a phone, and to minimize the possibility that some participants would choose the same value repeatedly (since their choice would be more identifiable on a Likert-type scale vs. a thermometer). To understand prejudice holistically, it is important to study not only groups that have traditionally received the majority of prejudice research, but all groups (Brandt & Crawford, 2016). Accordingly, we included a variety of groups that have been a) traditionally the recipients of the negative consequences of prejudice, as well as b) some relatively neutral groups, and c) those who have historically enacted discriminatory behaviours in North America. The 15 social groups were: Asian people, atheists, Black people, conservatives, overweight people, Gay men or Lesbians, Neo Nazis, liberals, Muslims, Indigenous people, nerds, the elderly, police officers, transgender people, and White people. The 15 groups were selected from past works that aimed to study prejudice more comprehensively (Brandt & Crawford, 2019).

Intergroup Contact. Intergroup contact has been observed to influence individual prejudice (Pettigrew & Tropp, 2006b). Thus participants' contact with outgroup was assessed using a single item, inspired by the general intergroup contact quantity and contact quality scale (Islam & Hewstone, 1993). The item was: if you have had a personal interaction with a [social group member] within the past 2 hours, what was the nature of the contact? 1 Negative - 7 Positive. An option was also provided for "no interaction".

Situations. Extensive work has been done on the measurement of the subjective perceptions of situations (Brown et al., 2015; Horstmann et al., 2017; Parrigon et al., 2017; Rauthmann & Sherman, 2018). Given the overlapping of taxonomies, the shortest validated measure available for the systematic assessment of situations that focuses specifically on the description of everyday situations was used: the ultra-brief (8-item) form of the Situational 8

DIAMONDS (Rauthmann & Sherman, 2016, 2018), a taxonomy of situation characteristics comprising (D)uty, (I)ntellect, (A)dversity, (M)ating, p(O)sitivty, (N)egativity, (D)eception, and (S)ociality. This ultra-brief form of the DIAMONDS (Rauthmann & Sherman, 2015b) has one item tapping each dimension (e.g., "Are you in a situation where work has to be done?"), on 1-"Not at all" to 7-"Totally" Likert-type scales.

Environment. To measure environment variables, we included weather (i.e., sunny, rainy) measured on 1-"Not at all" to 7-"Very much" Likert-type scales, temperature (in Fahrenheit, on a sliding scale from Very Cold: -20 to Very Hot: 120), and checkboxes indicating whether participants were indoors or outdoors, alone, with strangers, or with familiar others.

Mood. To gauge mood, six items are introduced: happy, calm, energetic, fearful/anxious, angry, and sad. These adjectives strongly loaded onto the mood factors identified in the UWIST Mood Adjective Checklist (Matthews et al., 1990). Participants answered the prompt, "Thinking about yourself and how you feel in the past 15 minutes, to what extent do you feel: […]", on a Likert-type scale from 1-"Not at all" to 7-"Very much". We modified the initial 30-minute window to 2 hours for a wider window to capture more variance in mood.

Physiological State. The two basic physiological states probed were: Tired and Hungry. Participants answered the prompt, "How [tired / hungry] are you right now?" on a 1-"Not at all" to 7-"Very much" Likert-type scale.

Demographics. Participants completed demographic items regarding their gender, race, and age.

Analysis 1

Contextual Variability in Bias

We had not hypothesis about which contexts would influence bias, so we randomly divided the data into exploratory (n = 264, k warmth ratings = 22,293) and confirmatory (n = 263, k warmth ratings = 22,218) datasets to reduce the possibility that our models were not overfitted our data. As a previous study had employed a similar methodology and analytic approach to probing how contexts inform variance in forming facial impressions (Xie et al., 2018), we followed a similar pipeline.

Analytic Approach A cross-classified multilevel model with no predictors (i.e., null model) was constructed to proportion the data into variance stemming from context, individual, and social group, and their higher order interactions. Similar constructed models have been used to proportion variance in social psychological explorations (Hehman et al., 2017; Hönekopp, 2006; Judd et al., 2012; Kenny, 2019). The level-1 unit of analysis was warmth rating at the time of participants' each survey, which is cross-classified by individuals, social groups, and contexts. The *lme4* package (Bates et al., 2015) was used in R (R Core Team, 2021) to estimate models.

Variance from different contexts. Each warmth rating in Level-1 of the model was nested in a categorical context cluster, as it was also nested in an individual and social group cluster. As there are 20 predictors, it appeared improbable to model all higher-order interactions by estimating them as predictors in a multilevel model. If we modelled these higher-order interactions, there would over 1,000,000 parameters. To circumvent this, a strategic step is to identify distinct individual contexts, and then assign each warmth rating to a distinct context in a class of contexts. For example, a context (e.g., outdoors, cold, sunny, social environment, hungry) may be differentiated from the next (e.g., indoors, angry, tired) based on individuals'

responses to different contextual variables. As no hypotheses were established as to which permutations of individual-level contextual variables would be psychologically meaningful, we employed a data-driven approach.

We decided to categorise qualitatively distinct contexts that emerge from permutations of contextual features. We adopted a latent profile analysis (LPA) to investigate how individuals' responses to these contextual variables cluster together and created unique classes of contexts in a data informed process, using quantitative data to express qualitatively distinct contexts. This strategy was rendered feasible given the longitudinal nature of the dataset: observations that are repeated within (and between) participants who differ in trait characteristics (e.g., ideologies) but who may experience similar psychological states as they experience almost identical contexts. This plan of analysis facilitated the estimation of the variance in explicit prejudice arising from contexts. We executed LPA using the tidyLPA package in R (Rosenberg et al., 2018).

Latent Profile Analysis. LPA gauges underlying categorical latent variables from continuous indicators (Hox & Roberts, 2011; Pastor et al., 2007). LPA copies higher-order interaction terms, quantifying complicated interaction effects in a simple way. Subsequently, LPA names them as subgroups or "classes". Such is ideal for datasets in which subgroups (i.e., qualitative differences) may exist (Hox & Roberts, 2011; Pastor et al., 2007). In our analysis, the 20 contextual indicators to describe qualitatively distinct real-world contexts experienced by individuals as they answer our daily surveys. LPA has been employed to probe unique subtypes of personality (Merz & Roesch, 2011), goal orientation (Pastor et al., 2007), and contexts important in impression formation (Xie et al., 2022).

Concerns that plague classes generated include sensitivity of class separation and the number of latent profiles correctly identified (Bauer & Curran, 2003; Peugh & Fan, 2013). We

adopted a class-invariant unrestricted parametrization, which offers some improvement in model recovery over the default of assuming local independence to ensure the correct identification of latent profiles (Pastor et al., 2007; Peugh & Fan, 2013). We examined between 2 and 51 classes to ensure a broad range of possible classes (51 is a computational ceiling). We selected our model according to two indices: the Bootstrap Likelihood Ratio Test (BLRT) and the Bayesian Information Criterion (BIC). These were found to outpace fellow indices as they more correctly and reliably recovered the true number of classes from different sample sizes (Nylund et al., 2007). The BIC tempers goodness-of-fit with parsimony (Raftery, 1995); reductions of 10 points or more between two models indicates improved fit. The BLRT weights the fit between two models, with p-values below .05 communicating superior fit of class k versus k – 1. Lastly, we conclude upon the number of latent profiles according to both the exploratory and confirmatory datasets.

LPA designates the response to each survey to a particular class based on the highest probability of belonging to each class. Using the exploratory dataset, we searched for the ideal number of classes using the lowest BIC and significance on the BLRT. As LPA was created to model heterogeneity in observed data, it seems unlikely that the ideal number of classes should replicate exactly across different observed datasets. We do, however, anticipate that the ideal number of classes be similar between our exploratory and confirmatory datasets. The process of first, identifying the best-performing model of the exploratory dataset, and then validating its performance in the confirmatory dataset, provides much certainty that the LPA had provided the ideal number of latent profiles from the observed variables.

In our primary analysis, we inputted this individual-contextual class variable into a cross-classified model as a random cluster, along with individuals and social groups. Estimates from

these models were used to calculate intraclass correlation coefficients (ICCs). These ICCs represent the percentage of variance in explicit bias explained by various clusters of the multilevel model.

Analysis 2

Which Contexts Are Important for Predicting Prejudice?

Analytic approach. We used a predictive modeling approach to assess which individual-level contextual variables might expressed bias. We fashioned a model where warmth ratings towards social groups served as the outcome variable in a cross-classified multilevel model, with each questionnaire item (e.g., "How sunny is it?") entered as a separate predictor. Models were cross classified at the perceiver and target levels.

We entered all 21 participant-mean centered contextual variables into the model (at Level 1) along with each participant's mean for each variable (at Level 2) to estimate both between- and within-perceiver effects. Models included random slopes for all level-1 predictors. Given the already complex model and no theoretically derived predictions, we did not include higher-order interactions (i.e., given 20 predictors, to estimate all three-way and two-way interactions would require estimating an additional 1,771 parameters). Models were estimated using the lme4 (Bates et al., 2015) and brms (Bürkner, 2017) packages in R.

Results

Using an LPA approach, we found some qualitatively distinct individual-contexts in our observed datasets. LPA conducted on the exploratory dataset (n = 264, k warmth ratings = 22,293) found the ideal numbers of contexts to be 34, 38, 37, 33, and 40. We assessed the robustness of this estimate with the confirmatory dataset (n = 263, k warmth ratings = 22,218), which provided the number of classes of 41,40,36. As 40 was the first class to appear in both

datasets, it was chosen as the ideal number of classes in this collective dataset (i.e., as the class had significant BLRT p-values across both datasets and the lowest BIC values).

We hence opted for the 40-class model for our primary analyses. Furthermore, we do not understand these 40 classes as a representative, generalizable taxonomy of real-world contexts experienced by individuals, but instead, as the number of unique individual contexts present in the dataset. For example, recent works using an identical analysis approached identified 44 classes in its collective dataset (Xie et al., 2022). This enabled the inclusion of the contextual cluster (i.e., with 40 distinct contexts) as a random cluster in a multilevel model. In the main analysis, each survey response was assigned to a "context" class based on the LPA solution with 40 classes.

Table 1. LPA Output.

Class	**Exploratory**		**Confirmatory**	
	BIC	BLRT P	BIC	BLRT P
2	1430982	0.0099	1411101	0.0099
3	1411129	0.0099	1397556	0.0099
4	1396686	0.0099	1401007	0.0099
5	1396322	0.0099	1385272	0.0099
6	1396379	1	1385418	0.0099
7	1392055	0.0099	1382247	0.0099
8	1389588	1	1372955	0.0099
9	1389536	0.0099	1381885	0.0099
10	1388586	0.0099	1376126	0.0099
11	1375627	0.0099	1373975	0.0099
12	1375451	0.0099	1363339	0.0099
13	1373491	0.0099	1369151	1
14	1374857	0.0099	1361650	1
15	1379037	0.0099	1364717	0.0099
16	1373523	0.0099	1359682	0.0099
17	1373368	0.0099	1359266	1
18	1372628	0.0099	1361509	0.0099
19	1370681	0.0099	1356910	0.0099
20	1369116	0.0099	1358364	0.0099

21	1370447	1	1355365	0.0099
22	1370403	0.0099	1355364	0.0099
23	1370086	0.3069	1357624	1
24	1368955	0.0099	1352797	0.0099
25	1369797	0.0099	1355843	0.0099
26	1367376	0.0099	1355285	0.0099
27	1368592	0.0099	1351378	0.0099
28	1369671	0.0099	1344220	0.0099
29	1359195	0.0099	1347458	0.0099
30	1359731	0.0099	1342430	0.0099
31	1368329	0.86	1350897	0.0099
32	1355737	0.0099	1347808	0.0099
33	1354651	0.188	1351841	0.0099
34	1352418	0.0099	1347314	0.0099
35	1360278	1	1349771	0.0099
36	1357205	0.0099	1341711	0.0099
37	1352868	0.0099	1347319	0.0099
38	1352855	0.0099	1349532	0.0099
39	1364342	0.0099	1349176	0.0099
40	1355330	0.0099	1340249	0.0099

Analysis 1

Contextual Variability in Bias

Variance in bias towards 15 social groups was decomposed into between-individual, between-social group, between-context, individual × social group, individual × context, social group × context, and residual variance in multilevel models. We first present all ICC estimates from the exploratory and confirmatory datasets (Table 1).

Table 2. Intra-class Correlation Coefficients by dataset.

	Dataset	
	Exploratory	Confirmatory
ICC		
Individual	0.180	0.197
Social Group	0.374	0.383

Individual X Social Group	0.367	0.339
Context	0.000	0.000
Individual X Context	0.009	0.007
Social Group X Context	0.000	0.000
Residual variance	0.070	0.075

Context Contribution. How do day-to-day contexts influence bias towards social groups? We observed that the contextual factors examined here do not, on their own, contribute any unique variance to face impressions (~0%). This means that the average warmth rating made in one context class (across all individuals towards all groups) does not differ from the average rating made in another context class (across all individuals rating all groups). For illustration, in a much-simplified scenario in which being in a rainy setting or not was a distinct context experienced by individuals, if warmth ratings were consistently different when individuals were in a rainy versus less rainy setting, then a higher context-ICC would be documented. Importantly, individuals' experienced contexts do not meaningfully contribute variance to warmth towards social groups regardless of the individual or social group being rated.

Tallying across all traits, the individual × context interaction ICC contributed only ~.87% (exploratory) and ~0.68% (confirmatory) of the variance in warmth towards social groups. This suggests that different individuals experiencing different contexts did not vary in their warmth. As a hypothetical example, if nervous people express more bias on a rainy day, whereas less nervous people express less bias on such a day, then there would have been an observation of a higher individual-by-context ICC. In such a scenario, differences between individuals (how nervous they are on average) interact with their experienced contexts (how rainy it is when they respond to the survey) to shape their warmth towards social groups. However, these individual × context interactions contributed very little variation in warmth, suggesting that different

participants were not differentially affected by their day-to-day contexts when expressing warmth.

Similarly, the social group × context ICC contributed ~0.00% (exploratory and confirmatory) of variance, suggesting that different social groups being rated on the warmth they elicit in different individual-contexts did not elicit different ratings (regardless of individual). As a hypothetical example, if individuals were more biased towards social groups stereotyped as promiscuous when individuals were in a work situation, whereas the same individuals were less biased towards social groups stereotyped as demurred in such a situation, then we would observe a higher social group-by-context ICC. However, differences between social groups (e.g., stereotype about vitality) do not appear to interact with any individuals' experienced context (being in a work situation) to shape bias towards social group.

Individual and Social Group Contribution. Results highlight that between-individual differences uniquely contributed 18.04% - 19.65% of variance in bias towards social groups. That is, individuals consistently expressed bias regardless of the social group. Between social groups differences also contributed 37.27% - 38.25% of the variance in bias. Put differently, social groups elicited consistent levels of bias regardless of who was expressing bias. Lastly, the individual X social group ICC contributed 36.74 % - 33.92% of the variance in warmth. In other words, who was expressing bias, and which social groups bias was being expressed towards, all influenced the level of bias expressed.

Analysis 2

Which Contexts Are Important for Predicting Prejudice?

We investigated which specific individual-context predictors influenced prejudice. Due to the large number of predictors and hypothesis tests, we interpreted effects as meaningful only if they were significant ($\alpha = .05$) across both exploratory and confirmatory datasets.

Only the across-individual effect of sad mood was significant across both datasets. On average, individuals who felt more sadness reported less prejudice (exploratory; $B = 0.17$, $SE = 0.07$, 95% CI [0.03, 0.31], Confirmatory; $B = 0.17$, $SE = 0.08$, 95% CI [0.02, 0.33]).

General Discussion

Social psychologists have extensively studied prejudice in highly controlled laboratories. The aims of such controlled laboratory experiments are to gather knowledge about the nature, extent of, and fluctuations in prejudice that can be applied to other contexts where prejudice occurs. As lab studies are confined to more artificial contexts – albeit mimicked natural occurring contexts –, the knowledge they create can be less reflective and meaningful in understanding the experience of intergroup prejudice as it naturally occurs in the world. Here, we offer the first direct investigation into how people's day-to-day experiences shape their prejudice. Employing experience-sampling, we probed to what extent individuals' daily experiences affected their prejudices towards 15 social groups.

The present study found that individuals' experienced contexts did not meaningfully influence their prejudice. The average expressed prejudice in a context an individual was experiencing did not differ from the average prejudice expressed in another context the individual experienced later. This suggests that certain individual-centered factors (e.g., mood, environment, physiological state, psychological situation) are less likely to sway prejudice

towards different social groups. Interestingly, the study finds that individuals and social groups explain more of the stability and predictability of prejudice. Indeed, bias expressed by an individual towards two social groups are more likely to be strongly related than bias expressed in the same context by two individuals. Estimates of the relationship of the stability of individual bias here are slightly less than has been previously documented (Devine et al., 2012b; Gawronski et al., 2017a; Ofosu et al., under review). This reduced estimation may stem from the accounting of other factors pertinent in the stability of bias, such as, social groups towards which bias is expressed, and the interaction between the individual and their attitudes towards different social groups. Similarly, prejudice expressed towards fundamental different social groups can be expected to be related to each other than bias expressed in the same context by two individuals. Putting differently, as per this study, two randomly selected individuals should express similar levels of bias towards the same group (e.g., anti-Black bias). This level of similarity should be greater than the similarity of bias expressed by two individuals towards different groups (e.g., anti-White bias and anti-Gay bias) sharing a table at a café. Barring the limitations of the methodology of this study, the current work provides support that lab-based research can be cautiously applicable to the occurrence of prejudice in the real world.

A major contribution of the present work is the qualifying of the influence of the interplay between different people rating different social groups. This interplay emerged as a non-negligible (~35% of variance explained) effect such that the intensity of prejudice depends on *who* expressed the bias, and *whom* bias is expressed towards. Although there is an implicit understanding in the sub-field of prejudice that who expresses prejudice is important (i.e., hegemonic group members), attention has not been paid to the nuances of the who, whom, and their interplay. The psychological concept of Minority collusion helps illustrates why the who,

whom, and their interplay is important. Some White individuals hold the belief that all non-White individuals collectively as a group plot against White individuals and their interests (Minority Collusion; Knowles et al., 2021). Should researchers fail to account for the fact that Asian Americans are stereotyped as more competent, and as a/the model minority in comparison to other minorities (Goh et al., 2023; Li & Nicholson, 2021; Zou & Cheryan, 2017), stereotypes incongruent to those of poor and criminality ascribed to other non-Whites (Zou & Cheryan, 2017), any study which lumps Asians and non-Whites will result in models and theories less precise and descriptive. Furthermore, Asian Americans might enjoy privileges ascribed to white individuals, and might accordingly act in ways more stereotypically congruent with White individuals than non-White individuals.

The present research also examined which situational and environmental factors predict intergroup prejudice. Trait-level (and not within-person variation) feelings of sadness was the only contextual variable to consistently predict prejudice across both datasets. That is, the more sadness an individual felt, the less prejudice they expressed towards members of different social groups, accounting for an individual's average level of sadness. Sadness being associated with decrease prejudice dovetails with extant literature as works suggest sadness fosters the systematic review of information which subsequently reduces stereotypical judgements (Lambert et al., 1997) or might forestall prejudice (DeSteno et al., 2004). Sadness is furthermore positively associated with empathy (Vuoskoski et al., 2012), with empathy also negatively associated with expressed prejudice (Bäckström & Björklund, 2007; Hudson et al., 2019). Empathy might therefore serve as a mechanism by which sadness may decrease bias.

Future Directions

Future works should explore why and how exactly sadness is associated with reduce bias in the real world. Who is sad directed towards? Is simply being sad at oneself enough for increased warmth towards outgroup members? Or must sadness be directed towards an outgroup member (e.g, old people) for it to generalise to other outgroups (e.g., those once incarcerated). Relatedly, emerging works suggest prejudice is directed towards three types of social groups: the marginalised, privileged, and unconventional (Bergh & Brandt, 2021). Future works should explore the distinct contexts and situational and environmental factors that are associated with bias towards these three types of groups. The current research is more externally valid than previous lab-based studies. As individuals were going about their day, any prejudice expressed would better approximate the psychological contexts that scientists strive to observe in their research. But despite some advantages, the present design is still divorced from reality in a couple of ways.

The present work operationalizes individuals "everyday contexts" as a limited permutations of environmental features, mood, physiological states, and psychological situations that were somewhat subjectively chosen by the researchers. To the extent that other individual contexts meaningfully impact impression formation, our estimates of contextual influence will be underestimates. The conclusions here are limited to contexts in which individuals can complete a study on their phone. Responding to a survey on their phone may have momentarily removed individuals from their experienced context. Moreover, this design may limit the identification of specific contexts in which participants are unable or unwilling to respond to their phone. Lastly, as the 15 social groups of this study neither represent the entirety of social groups, nor possess all

the properties that distinguish groups (Lickel et al., 2000), future works should explore how situational context may impact different types of social groups.

C**onclusion**

The study of prejudice has more extensively been confined to highly controlled lab while its most pernicious and palpable effects are observed in the real world. The present finds limited evidence that individuals' contexts (as operationalised in this study) more meaningfully is a crucial factor in expressed intergroup prejudice. Individual context in of itself does not systematically influence expressed prejudice in a consistent manner—suggesting that individual and social groups idiosyncrasies and their interaction are the most powerful drivers of prejudice. The present work lays the groundwork for more directed probing of the interactions between the individual, social groups, their contexts.

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CHAPTER 5

Individuals are perceptive of some biases of those in their regions.

(Ofosu & Hehman, 2023, in prep)

Preface to Chapter 5

The studies presented in Chapter 3 probed how geography influences individuals' intergroup prejudices. A crucial finding of this chapter was that current working theories (Calanchini et al., 2022; Payne et al., 2017b) on individual bias and regions should have more precise boundaries and directed hypothesis. The studies of Chapter 4 of this dissertation - more earnestly begins the boundary test process, exploring how different psychological, environmental, and situational contexts (Brown et al., 2015; Horstmann et al., 2017; Parrigon et al., 2017; Rauthmann & Sherman, 2018) influence individuals' prejudice.

The final chapter of this dissertation – Chapter 5 – heeds Chapter 3's suggestion for important constraints on theories of how context might shape bias and updates to theoretical models. Chapter 5 thus begins the exploration of mechanisms by geographical region could influence individuals' bias, adopting a descriptive approach in its exploration of mechanisms of how geography may shape individuals' biases. Chapter 5 asks individuals how perceptive they are of the attitudes in their regions, as these surrounding attitudes may be a vector by which geography may influence attitudes. Informatively, Chapter 5 confirms the accuracy of these perception, while probing how intuitive individuals are to the variance in attitudes of their regions.

Ofosu, E. K., & Hehman, E. (in prep). Individuals are perceptive of some biases of those in their regions.

Abstract

How aware are individuals of the prejudice of those around them, and how accurate are these perceptions? Although studies suggest individuals are accurate in gauging their own biases and those they briefly engage with, it is unclear what the spatial limit of this accuracy is. We therefore probe how perceptive and accurate individuals are of the biases of those geographically (US counties) around them. Overall, individuals (N=389) perceive those in their counties to be prejudiced against Asian Americans, African Americans, and gays and lesbians. The accuracy of such perceptions, however, depends on the social group: individuals were inaccurate about bias against Asian Americans and African Americans, but accurately for gays and lesbians. Additionally, individuals did not perceive that much variance in individuals' biases for the three groups. Hence, the present work illuminates a potential mechanism by which environments, and by extension geographies may influence individual bias.

Keywords: regional bias, individual bias, accuracy

Introduction

The attitudes of those around an individual are likely to exert an effect on the attitudes of the individual. Indeed, higher levels of prejudice of a dominant group have been observed to be related to a stronger desire of minority cultural maintenance (Christ et al., 2013). Furthermore, when minorities share social contexts with majority groups who have more positive experiences with minorities, these minorities were more supportive of anti-discrimination laws (Kauff et al., 2016). As individuals live within geographical regions, the attitudes of those in such region might be the mechanism by which regions may influence individuals' attitudes.

Recent works in social psychology have more earnestly began exploring the relationship between people's attitudes, and geographical societal outcomes. Indeed, a growing body of research supports this relationship such as the average anti-Black bias of individuals in a region being associated with the disproportional police killings of Black people (Hehman et al., 2018), Black-White disparities in adoption rates (Bell et al., 2021), and Black-White disparities in disciplinary outcomes in school (Riddle & Sinclair, 2019a). Furthermore, the average anti-Black bias of prejudice of individuals in a region is associated with how dependant a region was on the Transatlantic Slave trade (Payne, Vuletich, & Brown-iannuzzi, 2019), and state spending on healthcare (Leitner et al., 2018a). More works probing the relationship between individual attitudes and societal outcomes suggest a more dynamic and interactive relationship: individuals' anti-gay bias decreased as a result of same-sex marriage legislation (Ofosu et al., 2019a) while individual anti-fat bias increased with the prevalence of more societal "fat-shaming" (Ravary et al., 2019).

Given the recency of the exploration of individual biases and its relationship with geographical and societal outcomes, theories are still being developed about how geography may

influence individuals' attitudes. Indeed, social psychologist has long argued for a more integrated studying of the individual and their environments, as studies of the individual has failed to account for the macro-environments of the individual (Pettigrew, 2018). The Bias of the crowds model suggests that more frequent associations present in individuals' environment (e.g., Black Individual and criminality) may lead to easier, and therefore, more accessible implicit associations (biases) in the minds of individuals (Payne et al., 2017b). Another emerging theory on individuals attitudes and their regions is, the Regional Intergroup Bias theory, which posits that the more important a particular attitude (bias) is to the public discourse of a region (social priority), the more likely individuals are to reach a consensus on that bias (Calanchini et al., 2022; Charlesworth & Banaji, 2019). More quasi-experimental examination of the influence of geography on individual biases to date concludes that, more theoretical benchmarks and precise hypothesise are needed in the mapping of the effect of geography on individuals' biases (Ofosu et al., under review). Specifically, this work found a bit of diverging evidence for changes in individuals' biases as a function of geography.

Thus, in the endeavour of more precise theoretical boundaries and mechanism for the effects of the influence of region on individuals bias, the following hypothesis emerges: for geography to influence individuals' bias – as hinted by recent works (Ofosu et al., under review), there should be signals or cues in a region, these signals or cues must be perceivable by individuals, and individuals must adjust their bias in light of such perception. These signals might be perceived consciously or less consciously. Indeed, the ecological theory of social perception presents support for such adjustment of attitudes. The theory contends that, social perceptions serve an adaptive function such that, individuals detect pertinent social information in their environments and use such information in their judgements (McArthur & Baron, 1983).

Signals and cues may not need to be completely accurately perceived, they only need to be accurate enough for the adaptive navigating of the social environment, and accurate perceptions need to occur more than inaccurate perceptions (Haselton & Funder, 2006). Interestingly, however, in the exploration of geography influencing individuals' attitudes, individuals may not need to *accurately* perceive a signal or cue in a region at all, as long as the individual perceives a signal, and such perceptions leads to a subsequent effect (e.g., moderation, intensification, or polarisation) on individuals' attitudes.

Pertinent to the perception of bias is political orientation. According to the ideological script hypothesis, identifying as a conservative or liberal results in the adopting of different explanations for social problems (Skitka et al., 2002). Accordingly, conservatives and liberals express prejudice towards different social groups (Ideological-conflict hypothesis; Brandt et al., 2014), and therefore may be more likely to perceive some biases over others. Indeed, political conservativism moderates individuals' perception of the racial economic equality. Those with a more conservative political orientation were more likely to underestimate the economic gap between Black and White families in the US (Kraus et al., 2017).

Current Research

The current study therefore examines how perceptive individuals are in their geographical regions. The study is designed to test whether there is the possibility that the attitudes of those around an individual can influence the individual's attitudes.

Specifically, the work probes this by seeing how accurately individuals can infer the biases of people in their region. If individuals are accurate in perceiving the attitudes of those around them, it necessitates that there is a signal in the environment, and subsequent consensus about what the signal means (Blackman & Funder, 1998). Such perceptions may thus serve a

vector by which regions can influence individuals' attitudes. As further proof of concept, we explore how accurate individuals' perceptions of those they share a region are towards several social groups: Asian Americans, African Americans, and gays and lesbians. Additionally, the work explores how accurate individuals are in also perceiving variance in individuals' biases toward the same social group. Lastly, it explores how political orientation moderates the accurate perception of bias and its variance.

Methods

Design and Participants

We recruited 389 Mturk participants from May – June 2021. Participants were randomly recruited from the 50 US States and District of Columbia (Figure 1). Our sample was mostly White (74%, East Asian 8%, Black 6%, South Asian 4%, Latin American 3%, Other/Prefer not to disclose 5%) heterosexual (89%, Bisexual 6%, Gay/Lesbian 4%, Queer 1%, Other 1%), and equally gendered (female 48%, male 51%, other 1%) with an average age of 39.7 years (*SD* = 12.92). The sample also had an average annual income of $52,784 USD (*SD* = 28, 978). Participants were compensated $2.25 USD.

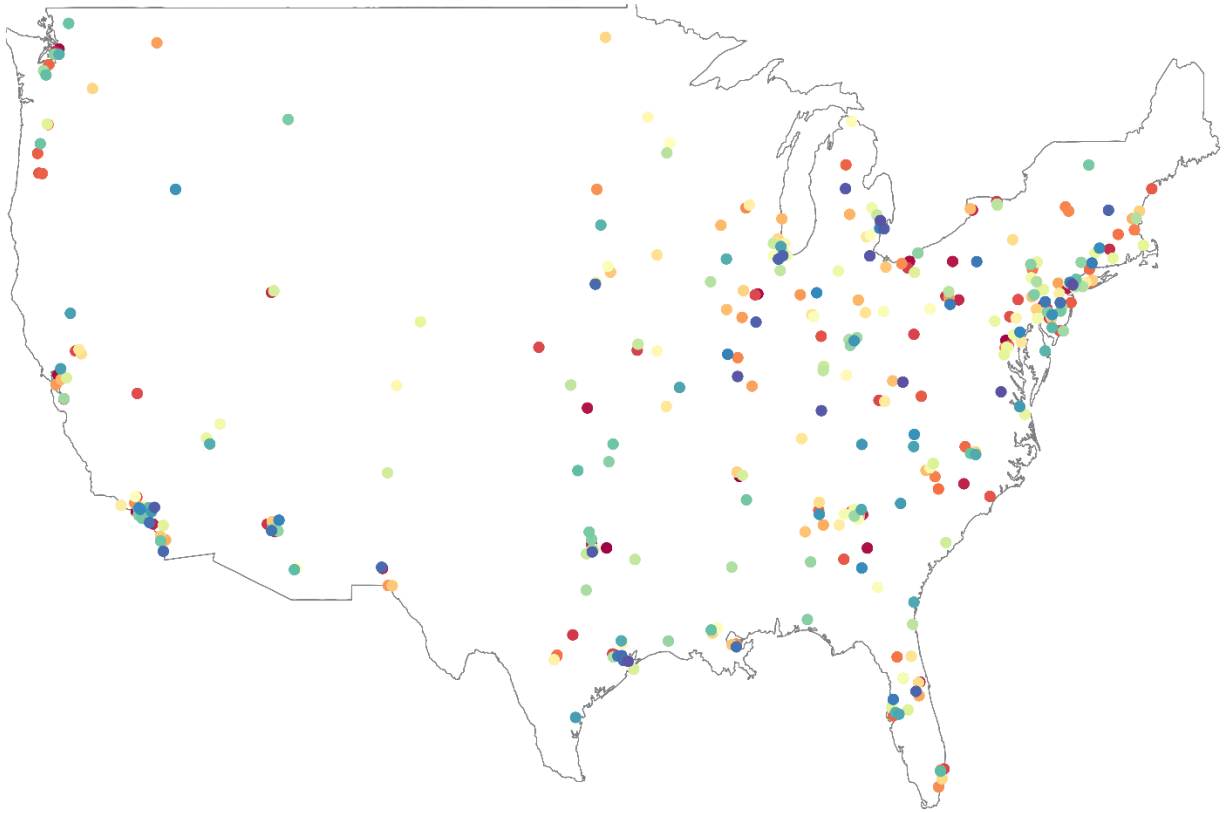

Figure 1. Participants' geographical locations across the US.

Procedure and Materials

Participants first completed a survey assessing how biased they perceive individuals in their county, and then the amount of variance in the bias of these individuals. Participants answered these prompts in relation to African Americans, Asian Americans, and Gays/Lesbians. They then completed prompts about their political orientation. Lastly, participants completed demographics and a geography survey.

Measures

Perceived County Bias Survey

The 3-item 7-response options scale survey gauged how biased individuals thought those they shared a county were. The three items were: **1.** How prejudiced are the people in your

county? *("-3-People in my county strongly prefer [African Americans/Asian Americans/Gays/Lesbians] to [European Americans/heterosexuals]", "0-People in my county like [African Americans/Asian Americans/Gays/Lesbians] to [European Americans/heterosexuals] equally", "3-People in my county strongly prefer [African Americans/Asian Americans/Gays/Lesbians] to [European Americans/heterosexuals")* **2.** On the below scale, if the **national average** of prejudice against (African Americans/Asian Americans/Gays/Lesbians) is 0, what is the average prejudice against (African Americans/Asian Americans/Gays/Lesbians) of **the people in your county**? *(-3-People in my county are much less prejudiced against [1 of 3 social groups] than the national average." - "3 People in my county are much more prejudiced against [1 of 3 social groups] than the national average.")* **3.** On the below scale, if the **state average** of prejudice against (African Americans/Asian Americans/Gays/Lesbians) is 0, what is the average prejudice against (African Americans/Asian Americans/Gays/Lesbians) of **the people in your county**? *("-3 People in my county are much less prejudiced [1 of 3 social groups] than my state's average." - "3 People in my county are much more prejudiced [1 of 3 social groups] than my state's average.")*. Questions were presented in the order stated to ensure that participants' responses capture a bottom-up perspective, and not a top-down one.

Perceived County Variance in Bias Survey

The 3-item 7-response scale survey assessed the degree of agreement/differences individuals thought those they shared a county with had in their biases. The three items were: **1.** How much do people in your county vary in their levels of prejudice against Asian Americans? *("1-very small or no differences in attitudes", "4-some differences in attitudes", "7-very large differences in attitudes")* **2.** On the below scale, if the **national average of differences** in

prejudice attitudes against Asian Americans is 0, what is the average of differences in prejudice against (African Americans/Asian Americans/Gays/Lesbians) of **the people in your county**? *("-3-People in my county have much smaller or no differences in their prejudice against [1 of 3 social groups] than the national average." - "3-People in my county have much larger differences in their prejudice against [1 of 3 social groups] than the national average.")* **3.** On the below scale, if the **state average** of prejudice against Asian Americans is 0 what is the average prejudice against (African Americans/Asian Americans /Gays/Lesbians) of **the people in your county**? *("-3-People in my county have much smaller or no differences in their prejudice against [1 of 3 social groups] than the state average." - "3-People in my county have much larger differences in their prejudice against [1 of 3 social groups] than the state average.").* Questions were presented in the order stated to ensure that participants' responses capture a bottom-up perspective, and not a top-down one.

Political Orientation

Participants' political orientation was measured using a 2-item scale (Skitka et al., 2002). The two items were: 1. How liberal or conservative do you tend to be when it comes to social policy? and 2. How liberal or conservative do you tend to be when it comes to economic policy? *(1-very liberal, 7-very conservative).*

Demographics

Participants provided age, race, gender, sexual orientation, and annual income.

Geography Survey

The survey assessed participants' geography. Participants provided their state, zip code, and the length of time they had spent in their current geography across their lifetime: Across your entire life, which time below best captures how much time you've spent in the County you are

currently in? 1 - “less than a week”, 2- “3-weeks”, 3- “1-month”, 4- “3-months”, 5- “6-month”, 6- “1-year or more”, 7- “3-years or more”).

Regional Mean Implicit Bias

Implicit bias was assessed with an Implicit Association Test (IAT; Greenwald et al., 1998), a speeded categorization task in which respondents simultaneously categorized social targets (e.g., pictures of Black and White-people) and attributes (e.g., pleasant and unpleasant words) by timed computer-key press. The speed with which people respond to one set of target-attribute pairings (e.g., Black-pleasant words, White-unpleasant words) relative to the other set of pairings (e.g., Black-unpleasant, White-pleasant words) is thought to reflect the strength with which the target categories are associated with one versus the other attribute category. Individual biases from 2004 – 2021 were distance-based aggregated to the county-level (Race IAT, Asian American IAT, Sexuality IAT, Project Implicit; Xu et al., 2014). Distance-based aggregation leverages more proximal than distal estimates in aggregating the bias of a particular geographical area (Ebert et al., 2022).

Regional Mean Explicit Bias

Explicit attitudes were assessed using an item shown to correlate strongly with the IAT (Axt, 2018). Participants reported their attitudes on a 7-point scale anchored at 1- “I strongly prefer [Group A] to [Group B]”, 4- “I like [Group A] and [Group B] equally”, and 7- “I strongly prefer [Group B] to [Group A].” Individual biases from 2004 – 2021 were aggregated to the county-level (Race IAT, Asian American IAT, Sexuality IAT, Project Implicit; Xu et al., 2014; Ebert et al., 2022).

Regional Variance

We operationalised variance in biases as standard deviation. Standard deviation provides a measure of the variability in a variable as it indicates whether single scores cluster around the mean or not (Gravetter & Wallnau, 2015)**.** Standard deviation of bias of those that share a county was calculated using observations from a county for both implicit and explicit biases. The Standard Deviation base function of the software R was used (R Core Team, 2021).

Analytic Framework

Data Cleaning

Outliers for individuals' perception were excluded at +/-3 standard deviations from the mean. Explicit and implicit bias measures were calculated such that more positive values represent more positive attitudes toward White people, and heterosexuals.

Hierarchal Models

We analysed results in a multilevel framework using the R lme4 package (Bates et al., 2015), with measures from participants and geographical regions nested when appropriate. When multilevel models failed to converge, we executed linear regressions.

Results

Perceptions of Geographical Bias

Although the primary aim of the current work is exploring how accurate individuals are of the biases of those in their county, we first examined individuals perceived bias of those in their county. We did so by calculating the average of perceptions of biases.

County

Overall, participants perceived individuals in their county to be biased ($B = 0.85$, $SE = 0.05$, $p < .001$, 95% CI [0.756, 0.942]). Decomposing by social groups revealed participants

perceived those they share a region with to be biased against African Americans (B = 0.98, SE = 0.06, p < .001, 95% CI [0.858, 1.095]), Asian Americans (B = 0.60, SE = 0.058, p < .001, 95% CI [0.491, 0.719]), and Gays/Lesbians (B = 0.936, SE = 0.061, p < .001, 95% CI [0.814, 1.061]) .

County in Comparison to Nation

Collectively, and in comparison, to the Nation, participants perceived individuals in their county to be biased (B = 0.22, SE = 0.07, p = .001, 95% CI [0.086, 0.352]). By social groups, participant stated individuals were biased against African Americans (B = 0.27, SE = 0.08, p < .001, 95% CI [0.122, 0.417]), and Gays/Lesbians (B = 0.24, SE = 0.09, p < .01, 95% CI [0.066, 0.410]). In comparison to the nation, participants stated individuals did not prefer Asian American any more or less than European Americans (B = -0.04, SE = 0.07, p = .54, 95% CI [-.183, 0.095]).

County in Comparison to State

Overall, and in comparison, to their state, participants did not perceive those they share a county to be biased (B = 0.09, SE = 0.06, p = .148, 95% CI [-.031, .207]). Unpacking by social group, participant perceived those in their county were bias against African Americans (B = 0.19, SE = 0.09, p = .046, 95% CI [0.002, 0.362]). Participants, however, did not perceive bias against Asians Americans (B = -.12, SE = 0.07, p = .08, 95% CI [-0.257, 0.016]), and Gays/Lesbians (B = 0.12, SE = 0.09, p = .214, 95% CI [-0.068, 0.292]).

Accuracy of Perceptions of Geographical Bias

To determine how accurate individuals' perceptions of the bias levels of those they share a region were, we regressed county estimates of bias onto participants subjective estimation of these biases. Both implicit and explicit regional biases were regressed onto subjective estimates.

County

Implicit Bias. There was no significant relationship between individuals' perceptions of bias and average county bias for African Americans (B = -0.001, SE = 0.001, p = .54, 95% CI [-0.001, 0.003]), Asian Americans (B = 0.002, SE = 0.002, p = .34, 95% CI [-0.002, 0.005]), and Gays/Lesbians (B = 0.002, SE = 0.002, p = .30, 95% CI [-0.001, 0.005]).

Explicit Bias. Whereas there was no significant relationship for African American bias (B = 0.004, SE = 0.003, p = .29, 95% CI [-0.003, 0.010]), there was a negative correlation for individuals anti-Asian American bias (B = -0.007, SE = 0.003, p = .033, 95% CI [-0.014, -0.001]), such that as perceptions of bias increased, objective bias decreased. For anti-gay/lesbians bias, as perceptions of bias increased, so did more objective measures of bias (B = 0.029, SE = 0.006, p < .001, 95% CI [0.017, 0.040]; Figure 2).

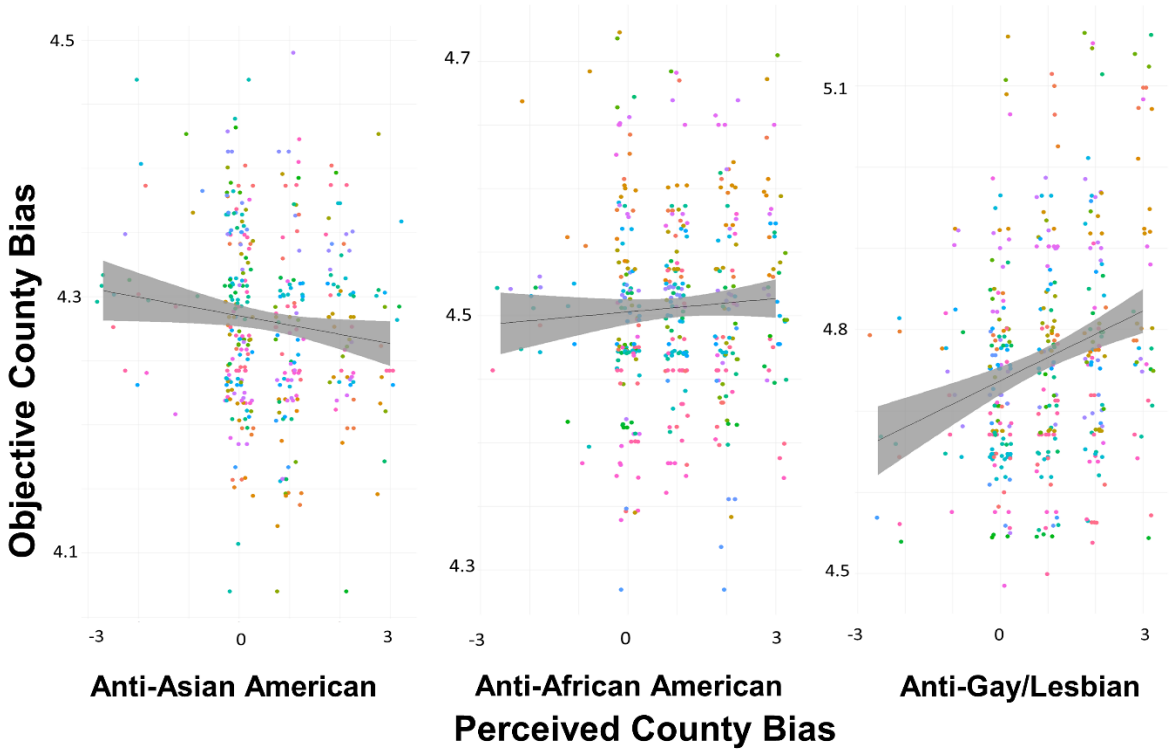

Figure 2. Correlations between perceptions of individuals' biases and regional biases.

Political Orientation

As social and economic political orientation were closely correlated, $r(1131) = .81$, $p < .001$, 95% CI [0.79, 0.83], we averaged them and examined if political orientation moderated the accuracy of individuals' perception of the bias of those they share a region with. Political orientation did not moderate accuracy of perceptions of bias of those in a county (Table 1).

Perceptions of Variance in Geographical Bias

We explored how much variance individuals perceived to be there in the bias of those in their region. We did so by calculating the average of perceptions of variance in biases.

County

Overall, participants perceived there to be more less variance in the biases of those in their county ($B = -0.44$, $SE = 0.07$, $p < .001$, 95% CI [0.756, 0.942]). Decomposing by social groups revealed participants still perceived there to be less variance in anti-African American bias ($B = -0.21$, $SE = 0.09$, $p = .027$, 95% CI [-0.387, -0.024]), anti-Asian American bias ($B = -0.94$, $SE = 0.09$, $p < .001$, 95% CI [-1.122, -0.763]), and anti-gay/lesbian bias ($B = -0.24$, $SE = 0.09$, $p = .006$, 95% CI [-0.416, -0.070]), for those they share a county with.

County in Comparison to Nation

Collectively, and in comparison, to the Nation, participants stated individuals in their county to have less variance in their bias ($B = -0.23$, $SE = 0.06$, $p = .001$, 95% CI [-0.348, -0.104]). By social groups, whereas participant perceived no difference in variance of individuals anti-African Americans bias ($B = -0.09$, $SE = 0.08$, $p = .23$, 95% CI [-0.246, 0.059]), they stated that those they share a county have less variance in their anti-Asian American ($B = -0.46$, $SE = 0.08$, $p < .001$, 95% CI [-0.612, -0.314]), and anti-gays/lesbians ($B = -0.16$, $SE = 0.08$, $p = .043$, 95% CI [-0.308, -0.006]) biases.

County in Comparison to State

Overall, and in comparison, to their state, participants perceived individuals in their county to have less variance in their bias (B = -0.16, SE = 0.06, p = .021, 95% CI [-0.286, -0.039]). Participants did not perceive any difference in the anti-African American (B = -0.07, SE = 0.09, p = .42, 95% CI [-0.252, 0.102]), and anti-gay/lesbian (B = -0.07, SE = 0.07, p = .34, 95% CI [-0.215, 0.073]), biases of those in their county with and the state average. They however found that those they shared a county with had less variance in their anti-Asian American bias in comparison to the state (B = -0.38, SE = 0.07, p < .001, 95% CI [-0.522, -0.239].

Accuracy of Perceptions of Variance in Geographical Bias

To determine how accurate individuals' perceptions of the variance in these biases of those they share a region were, we regressed variance in county estimates of bias, onto participants subjective estimation of these variances. Both implicit and explicit regional biases variances were regressed onto subjective estimations of variance. There were no significant relationships.

County

Implicit Bias. There was no relationship between individuals' perceptions of the variance in biases and the variances in county-level estimates for ani-African American (B = 0.000, SE = 0.001, p = .48, 95% CI [-0.002, 0.001], anti-Asian American (B = 0.001, SE = 0.001, p = .42, 95% CI [-0.001, 0.002], and anti-gay/lesbians (B = 0.000, SE = 0.001, p = .37, 95% CI [-0.002, 0.001] biases.

Explicit Bias. There was no relationship between perceived and more objective measures of variance in bias for anti-African American bias (B = -0.001, SE = 0.004, p = .79, 95% CI [-

0.009, 0.007]), anti-Asian American bias (*B* = 0.005, *SE* = 0.004, *p* = .20, 95% CI [-0.003, 0.012]), and anti-gay/lesbian bias (*B* = 0.001, *SE* = 0.003, *p* = .79, 95% CI [-0.004, 0.006]).

Political Orientation

Political orientation did not moderate accuracy of perceptions of variance in biases of those in a county. (Table 2).

Table 1. Interaction coefficients of perceived bias and political orientation.

	Mean											
	Implicit						Explicit					
	B	SE	*t*	*P*	95% CI		B	SE	*t*	*p*	95% CI	
County												
All Biases*Political Orientation	0.000	0.001	-0.53	.60	-0.002	0.001	-0.001	0.002	-0.36	.72	-0.005	0.004
Anti-African American*Political Orientation	-0.002	0.001	-1.18	.24	-0.005	0.001	-0.004	0.004	-1.15	.25	-0.012	0.003
Anti-Asian American*Political Orientation	0.001	0.001	0.60	.55	-0.001	0.002	-0.001	0.004	-0.29	.78	-0.008	0.006
Anti-Gay/Lesbian*Political Orientation	0.000	0.001	-0.23	.82	-0.003	0.003	-0.003	0.002	-1.16	.25	-0.007	0.002

Table 2. Interaction coefficients of perceived variance in bias and political orientation.

	Variance											
	Implicit						Explicit					
	B	SE	*t*	*p*	95% CI		B	SE	*t*	*p*	95% CI	
County												
All Biases*Political Orientation	0.000	0.000	-0.38	.71	-0.001	0.001	0.002	0.003	0.90	.37	-0.003	0.007
Anti-African American*Political Orientation	0.001	0.001	0.81	.42	-0.001	0.002	0.005	0.004	1.28	.20	-0.003	0.012
Anti-Asian American*Political Orientation	0.000	0.001	-0.71	.48	-0.002	0.001	-0.001	0.004	-0.27	.79	-0.009	0.007
Anti-Gay/Lesbian*Political Orientation	0.000	0.001	-0.89	.37	-0.002	0.001	0.001	0.003	0.26	.79	-0.004	0.006

Discussion

The current work examined the awareness of individuals of the attitudes of those around them. This awareness may serve as the mechanism by which contexts, environments, and encompassing geographies influences individual attitudes. Specifically, the work probed the research question, how accurately perceptive are individuals of the biases of those around them? First, individuals perceive those they share a region with to be biased towards Asian Americans, African Americans, and gays/lesbians. Individuals also perceived less variance in each form of these biases among those in their county. More pertinent to the research question, individuals showed some accurate in perceiving the bias of those they share a region with – but such perceptions were contingent on social groups. Whereas individuals were inaccurately perceived bias towards Asian American and African Americans, they accurately perceived bias towards gays and lesbians. Furthermore, individuals were not accurate in perceiving the variance in biases of those around them towards Asian Americans, African Americans, and gays/lesbians.

Although individuals had perceptions about the signals in their environments, only one of the six perceptions were accurate. Individuals' perceptions were only accurate for the level of anti-gay/lesbian bias of those around them. As extant research provides evidence for individuals still holding biases in the past decade (Charlesworth & Banaji, 2019), albeit decreasing, it follows that there are or will be signals of such biases in an environment. And, indeed, individuals perceived those around them to be biased. Thus, the incongruence between perceptions and objective measures of some biases may be due to a lack of accuracy and/or consensus in the perception of signals of individuals' prejudice.

The lack of accuracy in perception of bias signals may be more pertinent to anti-Asian American bias. Individuals inaccurately perceived signals of anti-Asian American bias such that

there was a negative relationship between perceptions and more objective measure of bias. In other words, there was a consensus in perception, but such a consensus was inaccurate. The signal leading to the consensus was not valid (Funder, 1995). Asian Americans have often being perceived as a model minority group – advanced in financial and educational success (Cheryan & Bodenhausen, 2000; Goh et al., 2023), and related, have been accorded a high status in comparison to other racial minorities (Zou & Cheryan, 2017), although this accordance has not precluded the racial group from discrimination in matters where a knowledge of American culture and English is concerned (Oreopoulos, 2011; Timming, 2017; Yogeeswaran et al., 2012). Accordingly, the present work found that individuals perceived anti-Asian American bias to be less strong in comparison to anti-African American bias among those in their region. It *might* therefore be possible that individuals' overestimation of anti-Asian American bias may stem from the (meta) perception of threat posed by the group (Li & Nicholson, 2021), along with discrimination and hate crimes (or its publicization) towards such group during recent times (Diaz & Romo, 2021). We speculate that as the racial groups of Asian decent might have been given much media attention during the Covid pandemic than prior, the same period of data collection, individuals' perceptions of the anti-Asian American bias of those around them were more influenced by the time of the study than a more comprehensive temporal frame. Further exploration of this inaccuracy should limit the timeframe of objective measures of individuals anti-Asian America to align with the occurrence of the Covid pandemic.

The lack of consensus among those perceiving a signal may result in the cumulative but erroneous perception of individuals not accurately perceiving signals of bias as observed with anti-African American (Black) bias. Anti-Black bias is one of the most enduring, potent, oldest forms of prejudice in North America as evinced by the decades of studies exploring it (Brigham,

1993; Eberhardt et al., 2003; Gaertner & Dovidio, 1986; Jones, 1972; Onyeador et al., 2020; Trawalter, Adam, et al., 2012). Furthermore, this form of bias has been observed to emerge at an early age (Dunham et al., 2015; Raabe & Beelmann, 2011), and is associated with negative societal outcomes for Black individuals (Bell et al., 2021; Hehman et al., 2018; Riddle & Sinclair, 2019a). Thus, how individuals have been socialised (Abaied & Perry, 2021; S. P. Perry et al., 2021), along with their deeply held ideologies tremendously shapes their understanding, position, and perceptions of anti-Black bias. Indeed, recent works find that individuals who prefer less egalitarian intergroup relations (higher Social Dominance Orientation [SDO; Pratto et al., 1994] ideology), and those with a stronger belief in traditionalism and obedience to established authorities (higher Right-Wing Authoritarianism ideology [RWA; Altemeyer, 2006]) were less likely to support collective actions towards justice and equity (e.g., Black Lives Matter Movement, [Ho & Kteily 2020, Holt & Sweitzer, 2020, Choma et al., 2020]). As social and economic political orientation can serve as poxy for ideologies (Sibley & Duckitt, 2008), we explored if they moderated the relationship between perceptions and objective measures. Political orientation did not moderate any relationship. Thus, unaccounted socialisation and ideologies may obscure any meaningful relationship between individuals' perceptions of the anti-Black bias of those they share a with. Further works exploring perceptions of anti-Black bias must more directly account for socialisation and ideologies.

Across all biases, individuals perceived there to be not that much variance in the bias of those in their region. That is, individuals did not perceive those around that to have various levels of biases towards Asian Americans, African Americans, and gays and lesbians. Consistently again across all biases, there was no meaningful relationship between these perceptions and more objective measures of these differences in biases. An explanation for the lack of meaningful

relationship in individuals' perceptions and objective measures of variance in bias may be due to the individuals residing and socialising within echo chambers. First, not only are individuals sensitive to their own levels of implicit bias (Hahn et al., 2014), but they are also sensitive to the biases of others after a short interaction (Richeson & Shelton, 2005). Furthermore, individuals select to live in regions with ideologies like their own, as this fulfills their need to belong (Motyl et al., 2014). This selection of communities that are more congruent with the individual is facilitated by ambient cues in such communities, with individuals preferring to leave communities they perceive to have uncongenial ambient cues (Motyl et al., 2020). Thus, individuals' self segregation may form echo chambers within a greater region isolating them from others with differing ideologies. Accordingly, such isolation would result in individuals not being accurate in gauging the differences in biases of their greater region (county).

Future Directions

The present lays for the groundwork for future works examining how aware individuals are of biases of those they share a region with. A logical step from these findings is how group membership informs individuals perceptions of the bias they share a region with. Since the knowledge of the biases of those in an environment may be more beneficial for those belonging to minority groups, such minority group members might be more sensitive to signals of bias in their environment. Members of minority groups may therefore be more accurate in the perceptions of these signals, as such signals would not only communicate whether a region is safe for the group's existence, and advancement, as discrimination might be less frequent, but this would communicate the potential for such individuals to thrive as non-minorities group members may be more equalitarian and welcome, ensuring a sense of belonging. A tertiary study expanding the scope of this research should examine if the pattern of the two studies generalises

across different types of social groups (e.g., concealable identities, permeable groups [atheist, Police officers]). The study could further account for how ideologies such as Social Dominance orientation, Right-wing Authoritarianism and system-justification (Jost, 2020) among others either mediates or moderates the perception of individuals of biases those they share a region with, and more objective measures of these biases.

Conclusion

The current study presents some evidence for individual awareness and perceptions of signals of bias in their environments. Worth noting, individuals' perceptions were only meaningfully associated with the explicit bias of those they share a region with. Relating the present work to working theories on individual bias and geography: whereas the Bias of the crowds (Payne et al., 2017b) model posits individuals' attitudes may be influenced through implicit processes, and the Regional Intergroup Bias theory (Calanchini et al., 2022) implies more explicit processes, the pattern of results here hints at individuals being more attuned to the explicit attitudes of those around them. These perceptions of that one share a region with may serve as a vector by which environments, and by extension, geography may influence individuals' biases. As theories on regional prejudice are still in development, the present work provides a building block for a more comprehensive understanding of the individual's attitude, its formation, and possibly its maintenance.

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CHAPTER 6

General Discussion

General Discussion

Researchers have investigated prejudice for almost a century, but have mostly focused on the individual in lab-based experiments absent strong contexts. Thus, the primary goal of this dissertation was to explore the relationship between the individual's prejudice and the society they are embedded within. This dissertation heeds critiques that call for a move earnest inclusion of contexts, environments, and society in the study of prejudice (Berard, 2008a; Pettigrew, 2018; Richeson & Sommers, 2016b).

Brief Introduction

Prejudice can either be implicit or explicit. Implicit bias is conceptualized as quicker, less deliberative associations between social groups and sentiments whereas explicit bias is understood as more deliberative and intentional associations (Dovidio et al., 2002; Gawronski et al., 2008; Gawronski & Bodenhausen, 2006, 2011). In efforts to understand the relationship between individuals' biases and their environments, two working theories have emerged: The Bias of the crowds model (Payne et al., 2017c) and the Regional Intergroup bias model (Calanchini et al., 2022).

The Bias of the crowds model puts forth that frequency of particular associations in an environment will make cognitive accessibility of such associations more likely. Specifically, the more prevalent an occurrence is in a region (e.g., police interacting with Black individuals), the more likely individuals in that region are to make a particular association (Black individuals and crime). Thus, the varying amounts of frequency in a region will be reflected in the unequal occurrences of events, which will lead to easier and more frequent negative individual associations (Payne et al., 2017c, 2017a; Payne & Hannay, 2021).

Much more overarching, and early in its development, The Regional Intergroup Bias model frames regional bias – the aggregated bias of individuals per a region – as distinct from the prejudice of the individuals that live in a particular region. The model furthers that current understandings of individual-level bias may not necessarily generalise to the regional levels (Simpson's paradox; Simpson, 1951). The model concludes that regional bias reflects the consensus on, and priority of attitudes towards social groups. Whereas the Bias of the crowds model solely focuses on implicit bias, the regional intergroup bias model is applicable to both implicit and explicit biases and does not have different explanations for the observed patterns of each type of bias.

Dissertation

Using the Bias of crowds and Regional intergroup bias models as general working guiding models, this dissertation explores how environments inform individuals' prejudice. As research of prejudice is in the nascent stages of exploring the relationship between the individual and their environments, the current dissertation asked descriptive and fundamental questions essential in the development of more robust and predictive theories of the relationship between individual prejudice and context. The present work therefore makes incremental advances in this endeavour. Specifically, the present work aimed to address the following three questions: how strongly the changing of geographical regions influences individuals' prejudice (**Chapter 3**), how strongly contexts influence individual prejudices (**Chapter 4**), and lastly, how accurately individuals can estimate prejudice in their regions (**Chapter 5**).

Summary of Chapters

Chapter 3 provided insights as to how physical movements between geographical regions influence individuals' prejudice. The chapter adopted a longitudinal study design tracking undergraduate students' (n = 522) biases over a year as they moved between a shared geographical region (Montreal) and non-shared geographical regions (non-Montreal). It examined participants' racial (Black-White) and cultural-linguistic (Francophone-Anglophone) biases. We opted for a cultural-linguistic bias as it would be a more stringent exploration of the research question as North America is hegemonically anglophone. Accordingly, we also tracked individuals' bias towards a fictitious social group (Laapians-Niffians) as a barometer to contextualize any changes in bias. The study with both a subjective and objective operationalization of geographical region examined the stability (reliability), differences in (variance), and mean differences of intergroup bias. Overall, 19 of the 24 direct-tests of the theorised geography influencing bias did not provide support for this idea. The remaining five other tests offered small but tentative evidence in support of a change caused by geography and suggest that specific local factors might be responsible for changes in bias.

Chapter 4 examined how situational and environmental contexts affects prejudice. The chapter tracked individuals' biases (N = 538) for 14 days as they moved between mundane and dynamic contexts using a daily diary methodology (experience sampling). Adopting a multi-level modelling approach, cross-classified models were used to appropriately proportion variance in the bias towards 15 social groups. These 15 social groups reflect groups who had historically been the recipients of discrimination, enactors of discrimination, or have not been primary social groups in the study of discrimination. Analysis found contexts did not systematically influence

bias towards social groups. However, the individual, the social groups, and their interaction explained a significant majority of the variance in bias expressed.

Chapter 5 explored individuals' perceptions of the prejudice of those with which they share a region (US county), and the accuracy of such perceptions. This descriptive study design and correlational analysis observed that individuals (N =389) perceived their counties to be slightly prejudiced towards Asian Americans, and even more slightly perceived bias towards African Americans and gays/lesbians. With respect to how accurate these perceptions of bias were, individuals were inaccurate about how biased their regions were towards Asian Americans and African Americans but were for gays/lesbians. Chapter 4 also gauged how sensitive individuals were to differences in bias towards a particular social group. Overall, individuals perceived those in their county to not have that much differences in their Anti-Asian Americans, Anti-African Americans, and anti-gays/lesbians' biases. The relationship between perception of variance in bias and the accuracy of such variance was not meaningful. Individuals therefore appear to have some understanding of the bias of those they share a region with – the accuracy of such perceptions is however contingent upon social groups.

Overarching Takeaways

The current dissertation provides answers to the following three questions. How do geographical regions influence individuals' biases? How strongly do situational contexts influence individuals' biases? How accurate are individuals in estimating the bias of those in their regions? This dissertation – barring its limitations – found that: geographical regions exert little influence on the individuals' biases, situational contexts explain little of the changes in individuals' biases, and lastly, that individuals are accurate about the biases of those in their regions, but such accuracy depends on the social groups towards whom bias is being expressed.

Does context influence individuals' biases? The results of this dissertation suggest that geographical and situational contexts might only slightly influence individuals' biases. This dissertation can not make a definite claim as to which working theory of regional prejudice is correct or not since the scientific method is a data collecting process. A process that makes conclusions after a body of evidence has amassed over a sizeable duration. However, evidence from this dissertation aligns relatively less with the Bias of the crowds model and more with the Regional intergroup bias model. It is worth noting that this dissertation used an implicit bias measure for only one of its three chapters. This limited used of implicit measures might have provided more opportunities for the integration of the dissertation's findings with the regional intergroup bias model.

The Bias of the crowds model states that individuals' implicit bias is mercurial as a result of them experiencing different contexts, geographies, and structures in such regions. This dissertation, however, did not observe much consistent changes in individuals' biases as they moved between regions. The dissertation also observed that a series of diverse situational contexts did not contribute much to the changes in explicit bias. Given the weak correlation between implicit and explicit biases (Hofmann et al., 2005), this dissertation will refrain from speculating on how the latter finding relates to the bias of the crowds model. The dissertation also found individuals were unaware or inconsistent about the implicit bias of those in their region. The Bias of the Crowds model has not speculated much on how aware individuals are of the implicit associations those in their regions are making, and/or experiencing because of their environments. The findings of this dissertation hints that individuals may be unaware of structures in their regions leading to disparate outcomes for social groups.

The Regional intergroup bias model in summation states that regional bias reflects social priorities, and cultural consensus. From this perspective, the non-consistent changes in individuals' biases as they moved between regions observed by this dissertation dovetails with the model. Since regions have different social priorities and cultural consensus, and participants visited regions which were not subsequently grouped by any qualities, it would indeed follow that a less than clear pattern of changes would be observed in individuals' biases. The regional intergroup bias model also states that regional bias magnifies "whatever" (context) is stable in a region, as individual idiosyncrasies when expressing bias are averaged out. The model is although not explicit on what exactly constitutes context. As this dissertation probed more transient contexts and observed them not explaining much of the variance in explicit bias, this dissertation helps provide a less ambiguous definition for what context can mean within a regional intergroup bias model framework. Furthermore, the work probed whether socialisation or local norms might be a vector by which geography influences bias. The dissertation presents evidence in favour of the regional intergroup bias model as individuals showed some accuracy about attitudes in their regions based on local cues. These local cues stem from the social priorities and cultural consensus of individuals' regions.

Although the dissertation found that context only slightly influenced prejudice, it also found that the individual, social groups, and their interaction explain much more of the changes in expressed prejudice. The present work's conclusion of paying closer attention to who expresses bias, towards whom bias is expressed, and the interaction between the who and whom, provides further support for a similar call from the regional intergroup bias model. The model asserts that should regional bias reflect a shared culture of a region, then attitudes of a group should predict regional outcomes as a function of the group's power (Calanchini et al., 2022).

For example, the regional aggregated bias of only White individuals is associated with the militarisation of police forces (Jimenez et al., 2022), and the disproportional lethal shootings of Black individuals (Hehman et al., 2018). Yet, psychotherapy interventions have been noted to be less successful for Black individuals in comparison to White individuals (Price et al., 2022), and to be less successful for girls in comparison to boys in more sexist counties (Price et al., 2021). These findings therefore suggest that closer attention should be paid to whose attitudes are examined, and who is being affected by such attitudes and outcomes, as centering the studying of hegemonic groups may have unintended – and potentially adverse - implications.

The present work finds that geographical regions and situational contexts only slightly influence individuals' biases. Although this dissertation can not falsify a particular model – as this requires a plethora of evidence, its findings dovetail more with the Regional intergroup bias model than the Bias of the crowds model. Situating this dissertation within the broader literature, effect sizes in social psychology tend to be small, with in-field intervention effect sizes being comparatively smaller (Lovakov & Agadullina, 2021). This dissertation's findings of smaller contextual effects are therefore congruent with theoretical benchmarks. Cumulative, small, contextual effects, however, have palpable and meaningful effects in the world (e.g., where people vote impacting *how* they vote (Berger et al., 2008); same-sex legislation being associated with reduce anti-gay prejudice (Ofosu et al., 2019), a growth-mindset effect on overall academic achievement (Sisk et al., 2018), exposure to immigrants (Intergroup Contact) being positively associated with support for pro-immigration policies (Pettigrew, 1997), and physicians' prescription of daily use of aspirin to reduce heart attacks (Rosnow & Rosenthal, 2003); Greenwald et al., 2015) just to cite a few.

Significance

Comprehensively, this dissertation makes incremental steps to the extant understanding of the relationship between individual bias and environments. It is first more (quasi) experimental works to study individuals' biases as they traverse different geographical, situations and context. The dissertation is worthwhile as it is the first of its kind to explore the overarching research question within the parameters of current working models (Calanchini et al., 2022; Payne et al., 2017b).

Secondly, the current work also provides initial insights to addressing some of the critiques of the working models such as: the speculated role of contexts and situations within larger environments/geographies (Daumeyer et al., 2017; Garcia-Marques et al., 2017; Payne et al., 2017a; Rae & Greenwald, 2017). Third, the dissertation introduces additional moderators not speculated on by either originators or critiques of the working models: life histories with environments, regional political identity, age for the ideal effects of environment to manifest, intergroup contact (although, Rae et al., 2015). Subsequently, the current work provides initial data analysis for some of these moderators as starting points for future scientists.

Thus, this dissertation then serves as a useful benchmark, and hopes attention can be turned to "under what conditions" we would be most likely to observe a context -> bias link. Attention to establishing "under what conditions" a phenomenon should occur are crucial as phenomena, i.e., conformity (Gaither et al., 2018), norm (Lewis et al., 2021), once understood as robust have been documented not to occur. As existing theories of regional bias (Calanchini et al., 2022; Murphy & Walton, 2013a; Payne et al., 2017b) do not consider these factors in much detail, and this dissertation highlights that future work must more concretely outline these conditions when updating theories.

Future Studies

I suggest an interactionist perspective for future works and propose the studying of the individual as a dynamic being influenceable by individuals around them, situations, contexts, and larger geography. Allport – seminal intergroup researcher – entertained the notion of prejudice as a personality trait (Allport, 1954). Pettigrew – seminal intergroup researcher – applauds the emergence of "contextual social psychology" (Pettigrew, 2018), and Funder – seminal personality researcher – presents the following equation: behaviour = Person * Situation (Funder, 2006) to understand the individual.

Statistical Modelling

Thus, a logical step in the further developing of theories on individual bias and environment is the exploration of individual bias as more of a stable trait with oscillations across contexts. If bias can function as a trait, then first establishing the "stable baseline" before administering any "treatment" of situation, context, or geography will be essential to understand how mutable prejudice is. To appropriately explore bias fluctuations as a function of environments from an interactionist perspective, I propose modelling such relationships as a Longitudinal growth curve (Structural equation model). This statistical approach will not only provide a baseline of an individual's bias but will also provide a concrete measure of the cumulative effects of different contexts, situations, and/or geographies on this relatively stable trait of the individual. Although some have suggested the modeling of the relationship between bias and environment within an MLM framework and rightfully so (Kofman & Mather, 2017; Payne et al., 2017a), none have put forth an SEM approach. An SEM approach strikes the core of

the interactionist perspective, providing an estimate for the trait of bias, while quantifying the range within which it can sway.

Ideologies

The role of ideologies has neither been suggested nor explored within the theoretical niche of individual bias and environments. The belief in a societal hierarchy is established as a major predictor of intergroup prejudice (Social Domination Orientation; (Amiot & Bourhis, 2005; Kteily et al., 2011; Sibley et al., 2007; Sibley & Duckitt, 2010; Sidanius et al., 1994). Accordingly, the adherence to strict rules, and conservatism is also predictive of bias (Right-Wight Authoritarianism; Altemeyer, 1988; Altemeyer & Hunsberger, 1992; Bob, 1981; Laythe et al., 2002). Lastly, the need to understand the world as a fair and preserve the status quo (Jost, 2020; Jost et al., 2004; Jost & Banaji, 1994), can also contribute to individuals' prejudice (Jost, 2019).

These ideologies are understood to be more traits-level and therefore should be relatively stable. I propose accounting for ideologies in further exploration as they may yield insights as into how and whose bias may be more likely to be influenced by their environments and to what magnitude. Indeed, not only did accounting for ideologies (i.e., SDO) explain more variance in repeated measures of prejudice (Sibley et al., 2007), but non-dominant social group members presented both ingroup and dominate group implicit favoritism (Axt et al., 2018). The earlier proposed statistical modeling (Longitudinal growth curve) adeptly tracks how multiple trait-like variables such as ideologies will over time influence oscillations in bias. In conclusion, incorporating ideologies into the study of individual bias and environment is vital as although individuals are changing regions, they themselves are relatively stable entities, and just like accounting for bias as a stable trait, related traits should be accounted for. This line of research

would provide more systematic understanding of the effects of contexts on the fluctuations in bias.

Structures in Environments

A potential mechanism by which geography (encompassing contexts, situations, and environment) may influence individuals' biases by structural bias. Structural bias is often defined as policies or practices by which hierarchies (including race, gender, class and others) produce unequal outcomes for social groups (Feagin, 2006; Feagin & Feagin, 1986). The concept of structural bias may be influential in understanding of how historical and cultural systems perpetuate inequalities and continue to shape modern attitudes. For example, although legal slavery in the US ended over 100 years ago, US counties that had a higher percentage of slaves show higher levels of anti-Black prejudice today (Payne et al., 2019). Similarly, the number of Confederate statues in a county is associated with the historical number of lynchings (Henderson et al., 2021). However, psychology research exploring structural bias is extremely limited.

Structural biases can be subtle in nature. For example, research finds that White individuals overestimate the financial progress made by other racial groups over the past half century, and are unaware of the financial inequality that exists between racial groups (Kraus et al., 2017, 2019, 2022). As further evidence of subtlety, housing policies in the 1930s US resulted in less trees being planted in non-White neighbourhoods. This lack of vegetation now results in more extreme temperatures for non-White neighbourhoods during heat waves. These extreme temperatures are correlated with higher occurrences of negative health outcomes for non White neighbourhoods (e.g., asthma, heart failures; Hoffman et al., 2020). These are but two examples that illustrate just how subtle structural biases may be, making the disparate impacts of such structures harder to be discerned by dominant group members and plausibly by impacted

minority groups as well. And to be being more explicit, the subtlety of structural bias may render it a potent factor that shapes the biases of individuals as they move within their social worlds. Thus, future works examining the relationship between bias and geographies should account for the more passive and diffused structures of these regions.

Conclusion

This dissertation explored how individuals' geographical and situational contexts influence their prejudice. This body of work found that, first, moving between geographical regions for a three-month period has little and non-consistent effects on individuals' biases (i.e., racial and cultural-linguistic). Secondly, the dissertation observed that, situational and environmental contexts only slightly explain fluctuations in prejudice towards 15 social groups and that, the situational feeling of sadness consistently reduces the expression of bias. Finally, the dissertation found that individuals are somewhat aware of the explicit biases of those in their geographical regions. The awareness stems from the perception of local cues (the social priorities and cultural consensus) of a region. Such an awareness may be a mechanism by which context could influence prejudice. The overarching takeaway from this dissertation is that geographical, situational, contextual factors slightly influence individuals' biases. The dissertation advances the study of the relationship between individual bias and regions by exploring moderators (e.g., cultural difference and time spent between regions), mechanisms (e.g., local cues), and introducing social groups (e.g., Anglo-Francophone, Hispanics) which current working theories on regional prejudice have neither expounded upon nor engaged with.

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