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A Domain-General Perspective on Deviancy: People's Sensitivity to Deviancy and its Social Consequences

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Abstract

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In this dissertation, I propose that people's sensitivity to deviancy is a domain-general phenomenon—an aspect of the individual experience that manifests across distinct domains. Supporting this possibility, across a multi-faceted approach (cross-cultural, developmental, nonconscious processes), I document that people's responses to deviancy—their evaluative and affective responses to distortions in regularities and patterns—overlap across highly divergent domains (e.g., nonsocial stimuli, social actions, physical characteristics, nonvisual stimuli, visual stimuli). Additionally, in line with this broad conceptualization of deviancy, I find that people's domain-general responding towards deviancy is largely negative in affect, emerges at a young age, exists cross-culturally, and may even causally contribute to complex social phenomena, such as prejudice. Collectively, these findings highlight the potential of adopting a broad domain-general conceptual understanding of deviancy to gain new traction on fundamental questions asked in social and cognitive psychology.

A Domain-General Perspective on Deviancy:

People's Sensitivity to Deviancy and its Social Consequences

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DEDICATION

To the many participants who committed their time to completing my studies. Without them, this research would not have been possible.

To my mentors, who saw potential in me and never failed to help me, guide me, and teach me.

To my friends, who provided a positive spirit and taught me a lot about grace, kindness, and respect.

To my advisor, John A. Bargh. I thoroughly enjoyed every meeting we had together and am extremely thankful for your guidance.

To my Mother, Father, Brother, and Partner, I'm forever grateful for your love and support.

I

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An Overview: Deviancy as a Domain General-Phenomenon

1.1 Abstract

In this chapter, I first propose that people's sensitivity to deviancy can be reconceptualized as a broad phenomenon involving people's evaluative and affective responses to the violation of regularities and patterns across highly divergent domains (e.g., nonsocial stimuli, social actions, physical characteristics, nonvisual and visual stimuli). After presenting this hypothesis, I provide a brief overview of the existing scientific literature on the concept of deviancy (both in sociology and psychology), and cover research showing that people generally respond in a negative manner to deviancy. Additionally, I discuss how the proposed domain-general reframing of people's responses to deviancy is supported by past work, can be applied to shed new light on established psychological phenomena and findings, and can further our understanding of the mind from a social-cognitive perspective. Finally, I present a succinct overview of the three Chapters that follow in this dissertation, each of which present evidence supporting the proposed domain-general conceptualization of deviancy and that this conceptualization can inform established psychological phenomena.

1.2 Introduction

1.2.1 Prior Conceptualizations of Deviancy

From a scientific and theoretical standpoint, the study of deviancy has traditionally been constrained to anti-normative behavior. By and large, the founding force of sociology, Émile Durkheim, brought the concept of deviancy to the forefront and defined this construct as behaviors that violate perceived social norms, customs, or rules (Durkheim, 1985). For instance, drug use, theft, and wearing clothes of the opposite gender all fall under the sociological definition of deviancy. Durkheim's interest in the concept of deviancy was largely based on an attempt to categorize actions as "normal" versus "pathological" in a society. Moreover, he proposed the functionality of deviancy to be the creation of a common collective conscience or moral system (by revealing to the populace which actions *deviate* from the norm). Additionally, he suggested that deviancy exists as an effective instigator of change by reducing stagnation in a society (also see Mead, 1918, for a similar functionality argument in terms of punishment).

Illustrating the importance of deviancy as a scientific concept, Durkheim and other sociologists, such as Erik Erikson (1962), argued that deviancy exists in *every society*, no matter how just or egalitarian that society. For instance, Durkheim describes the existence of deviancy in a society of "saints" or perfect exemplary citizens. He writes:

> "Imagine a society of saints, a perfect cloister of exemplary individuals. Crimes, properly so called, will there be unknown; but faults which appear venial to the layman will create there the same scandal that the ordinary offense does in ordinary consciousness. If, then, this society has the power to judge and punish, it will define these acts as criminal and will treat them as such."

As the example illustrates, deviancy is conceptualized as existing in *every* society and group-context. At the same time, the thought experiment additionally reveals an insight regarding deviancy, namely, that deviancy is context-dependent. Simply put, what is considered deviant in one culture or society, may not be considered deviant in an alternate society. For instance, while eating exotic animals (e.g., scorpions) may be considered deviant in many western cultures, it is largely considered acceptable in other cultures (e.g., China). As such, and as highlighted by other theorists and researchers in sociology, the concept of "deviancy" is largely dependent on the standards and perspectives in a specific society, group, or situation (e.g., Becker, 1963; Kitsuse, 1980; Lemert, 1951).

Not only sociology has considered the concept of deviancy. Deviancy, in terms of anti-normative behaviors, has also been studied in psychological research (though researchers have not necessarily used the exact term "deviancy"). In line with work in sociology, researchers studying social norms in psychology have examined deviancy in terms of actions that break descriptive norms (what people actually do) and prospective norms (what people should do; Bicchieri, 2005, Reno, Cialdini, & Kallgren, 1993; Sherif, 1936). And further, several contemporary researchers have explicitly referred to social norm violations as distortions of social regularities or disruptions of patterns of thought and behavior (Mackie, Moneti, Denny, & Shakya, 2015; Morris, Hong, Chiu, & Liu, 2015; Muldoon, Lisciandra, & Hartmann, 2014).

Deviancy has also been considered, both directly and indirectly, in psychological domains aside from social norms. On a broad theoretical level, deviancy was already discussed by early, seminal figures in psychology, such as Kurt Lewin (1947), who noted

that cognitive (and motivational) systems pressure the individual and society towards social regularities and away from irregular, deviant behaviors. Moreover, on a more concrete level, researchers have, for instance, discussed the role of deviancy in extremism and right-wing authoritarianism (e.g., Kruglanski et al., 2017; Mentor & Dorne, 1998), argued that deviancy can involve "positive" psychological constructs (e.g., creativity; Eisenman, 1991; Mertens, Recker, Kohlborn, & Kummer, 2016), and found that whether irregular nonsocial objects are perceived as more or less deviant is dependent on an individual's cultural background (Kim & Markus, 1999).

Researchers examining complex social phenomena that play a major role in social psychology have also considered the role of deviancy. For instance, psychologists have argued that intergroup prejudice (against Black people in the United States) may be based on perceiving minority groups as socially deviant (Katz & Hass, 1988), and that the development of morality, what is perceived as "right" versus "wrong" and "good" versus "bad", may be informed by violations of regularities or standards (Kagan, 1984; Kochanska, Casey, Fukumoto, 1995; Roberts, Gelman, & Ho, 2017). And, these are just several examples of the many references to deviancy that appear in social psychological research.

Finally, work in cognitive psychology has also considered deviancy. For instance, cognitive scientists have examined patterns and patterns distortions (Posner, 1973; Näätänen et al., 1993), non-prototypical stimuli (e.g., Farkas, 2002; Halberstadt & Rhodes, 2000, 2003; Palmer, Schloss, & Sammartino, 2012; Rhodes, 2006), prediction errors (e.g., D'Astolfo & Rief, 2017), mismatch negativity (Garrido, Kilner, Stephan, & Friston, 2009),

expectancy violations (e.g., Olson, Roese, & Zanna, 1996), and contextual deviations in visual presentations (e.g., examining unexpected objects in a scene for longer periods of time; Friedman, 1979). Given the many areas in which deviancy plays a role, then, the current work should have substantial theoretical and applied implications. That is, reframing our understanding of deviancy sensitivity as a domain-general phenomenon should help inform our understanding of numerous past findings and, more generally, numerous diverse and influential topics in psychology.

1.2.2 People Generally Experience an Aversion Towards Deviancy

To begin to examine whether people's sensitivity to deviancy is domain-general, we must first consider how people generally respond to deviancy. Although the jury is technically still out, people—all else being equal—appear to be overwhelmingly averse to deviancy (e.g., Evers, Inbar, & Zeelenberg, 2014, Heintzelman et al., 2013; Okimoto & Gromet, 2016; Winkielman et al., 2006). For one, a large number of areas in psychology have indirectly and directly observed humans' tendency to prefer regularities and repeated forms. On a broad level, for instance, humans are creatures of habit (even when these habits are harmful; e.g., James, 1890; Neal, Wood, & Quinn, 2006), and one of the founders of modern psychology, William James, stressed the importance of behavioral regularities in shaping our lives, referring to habits as the 'enormous fly-wheel of society' (James, 1890). Additionally, societies' general acceptance and adherence to social norms (Sherif, 1936), individuals' arbitrary preference for stimuli they have seen before (mere exposure; Zajonc, 1968), people's resistance to changes in their environments (Jost, 2015), and people's

tendency to conform (Asch, 1952; see Berg & Bass, 1961) indicate that we, as humans, seem to prefer regularities as compared to irregularities and atypicalites.

On top of research documenting people's adherence to regularities, research has also more directly documented people's discomfort with deviancy. For instance, people tend to exhibit prejudice and discriminate against those in society who break regularities (e.g., minorities, social outliers, those with physical disabilities; Goffman, 1963; Gollwitzer, Marshall, Wang, & Bargh, 2017). Relatedly, individuals at the forefront of new movements in the arts and sciences are generally approached with scorn and derision at first (e.g., the avant-garde). Additionally, from a more cognitive perspective, researchers studying prediction errors have suggested that a unifying motivational framework to understanding prediction error is one that focuses on inconsistencies across domains as causing aversive arousal (Proulx, Inzlicht, & Harmon-Jones, 2012).

Other areas of research also suggest that people hold a general aversion to deviancy (as compared to regularities). For instance, research by Heintzelman et al. (2013) found that viewing unreliable patterns (photographs of trees randomly ordered) and incoherent stimuli (incoherent linguistic triads) leads individuals to temporarily report lower meaning in life (as compared to when viewing expected regularities, that is, trees ordered in accordance with the seasons and coherent linguistic triads). Additionally, actions that are common (compared to uncommon) are generally judged as more moral, that is, "good" and "right" (the common is moral heuristic; Lindström, Jangard, Selbing, & Olsson, 2018). Finally, a comparative dislike of irregularities over regularities is exhibited by people's

tendency to conform: People are hesitant to go against majority opinions, even when these opinions are very obviously wrong (Asch, 1952).

From a more cognitive perspective, research on prototypes also supports that people generally feel averse to deviancy. People generally evaluate typical stimuli (stimuli that represent a prototype) positively, and evaluate atypical stimuli (stimuli that deviate from a prototype) negatively (see Palmer, Schloss, & Sammartino, 2012 for one a very brief overview). People prefer prototypical paintings and furniture (Farkas, 2002; Whitfield & Slatter, 1979), dogs, fish, automobiles, and watches (Halberstadt & Rhodes, 2000, 2003), as well as prototypical faces (Rhodes, 2006; Langlois & Roggman, 1990). Further, some researchers looking at category representations have noted that prototypes (the most typical example of a category) are the *best* example of a category and therefore illustrate *goodness* (Murphy, 2003, pg. 28). Collectively, these findings—that people like highly prototypical stimuli and dislike prototype deviations—has been referred to as the beauty-in-averageness effect (e.g., Winkielman, Halberstadt, Fazendeiro, & Catty, 2006). Finally, researchers have argued that people are motivated to and actually do avoid the absence of regularities or patterns (Gilovich, 1991; Shermer, 2008). And in line with this prediction, Whitson and Galinsky (2008) found that people perceive regularities and patterns after experiencing a loss of control even if these regularities do not actually exist, for instance seeing illusory patterns in the stock market.

Collectively, the above research indicates that people generally feel aversion towards deviancy—perceived violations of regularities or patterns. The results I present below, in Chapter 2 through 4, directly align with this claim—I find that people dislike

deviancy across various domains, both in terms of low-level deviancy (e.g., deviancy in patterns of geometric shapes) and higher-order deviancy (e.g., social outliers, non-normative actions). It remains unclear, however, whether people's aversion towards deviancy in the many different domains noted above overlap. That is, does people's aversion towards low-level deviancy (e.g., broken geometric patterns) predict their aversion towards higher-order deviancy (e.g., social outliers)? This broader conceptualization of people's responding to deviancy is exactly what I examine here.

1.2.3 Prior Support for the Domain-Generality of Deviancy

Some past work supports the proposed conceptualization of deviancy sensitivity as a domain-general phenomenon. For one, on a theoretical level, several foundational theories in psychology indirectly speak to examining deviancy from a domain-general perspective. For instance, work by William James, Fritz Heider, and Kurt Lewin on consistency motives and habits suggests that people strive to maintain consistency in their surroundings *across varying domains*. As such, the proposed research aligns with a presupposition of several major figures in psychology and builds on their theorizing (James, 1890; Heider, 1958; Lewin, 1946).

Empirical research also supports the potential existence of a domain-general deviancy system. A body of work, for instance, has documented that constructs that are seemingly independent (but semantically or conceptually related) are actually driven by domain-general processes. For instance, physical and social pain have been shown to overlap (e.g., taking pain killers reduces emotional pain after a breakup; Eisenberger, Jarcho, Lieberman, & Naliboff, 2006), as have physical and social warmth (e.g., people

feel physically warmer when thinking of loved ones; Williams & Bargh, 2008; Inagaki & Eisenberger, 2013). Notably, these nonsocial-social overlaps are paralleled in neural circuitry (Inagaki & Eisenberger, 2013; Eisenberger & Lieberman, 2004). Additionally, research in embodied cognition has also shown that abstract concepts can be founded in low-level physical experiences, such as movement or physical sensation (e.g., Casasanto & Bottini, 2014; Williams, Huang, & Bargh, 2009). Importantly, while these literatures do not directly examine deviancy, they do illustrate that domain-general processes may underlie complex judgments and behaviors, and as such, provide a foundation on which to build the proposed research.

A linguistic overlap further supports the proposed overlap—people use similar terms to refer to deviancy across varying domains. The terms 'weird' and 'strange' are applied to both nonsocial stimuli (e.g., *weird* art) and to social stimuli (e.g., a *weird* person). Additionally, certain expressions about social deviancy allude to nonsocial deviancy in terms of nonsocial deviations from regularities and patterns (e.g., social *outliers*, staying *in-line*, and being a *misfit*). Empirically documenting these linguistic overlaps, children, while not comprehending mental illness per se, apply labels used to refer to deviant objects such as 'weird' and 'strange' when describing adults who manifest psychiatric symptoms (Spitzer & Cameron, 1995).

Two additional empirical phenomena support the domain-generality of people's responses to deviancy. First, and perhaps most directly, judgments about deviant geometric shapes have been linked to certain social judgments. For instance, individuals who report greater differentiation between perfect and imperfect shapes are more politically

conservative and exhibit decreased support for marginalized groups (Okimoto & Gromet, 2016). Second, a largely overlooked study (in Gestalt research) from 1951 observed that individuals who are more sensitive to social deviancy (i.e., exhibit greater prejudice), four weeks after viewing an image of a truncated pyramid (where one side was askew), were more likely to draw the pyramid from memory as having been symmetrical (Fisher, 1951). This study suggests that negative responses to social deviancy are associated with a lower tolerance for deviancy in simple geometric shapes.

Research in other areas of psychology also supports the proposed domain-generality of people's sensitivity to deviancy. Cognitive psychologists, for instance, have found that prediction errors induce responses of aversive arousal and this holds true across various domains, including "lower-level" domains (e.g., word mismatches/Stroop task color) and "higher-order" domains (attitudinal dissonance; Proulx, et al., 2012). And in developmental psychology, researchers have argued that a sensitivity to deviant objects, misplaced, flawed, or broken objects, may be part of a greater "deviancy" system that contributes to the development of morality (what is "right" versus "wrong" and "good" versus "bad"; Kagan, 1984; Kochanska, Casey, Fukumoto, 1995). Finally, work on the effects of visual primes of disorder (e.g., inconsistent patterns in natural and human-made scenes) has shown that such nonsocial disorder primes can influence anti-social actions; for instance, Kotabe, Kardan, & Berman (2016) found that participants who viewed disordered pixelated scenes were more likely to cheat afterwards on a performance task. Collectively, these past studies all suggest that a domain-general sensitivity to deviancy—a sensitivity to distortions in regularities and redundancies—spans across various domains.

That is, individuals' aversive responses to deviancy, say in terms of nonsocial stimuli (e.g., distorted patterns of geometric shapes, inherent linguistic triads), social outliers (e.g., someone with a physical disability), anti-social actions (e.g., theft), norm-violations (e.g., dressing atypically), appearance (e.g., someone with a scar), and beliefs (e.g., innovative ideas) may all be informed by the same deviancy-system and thus overlap substantially.

1.2.4 Conceptual Boundaries

Importantly, deviancy is not the same as ambiguity, and subsequently, an aversion to deviancy is not the same thing as an aversion to ambiguity (e.g., Webster & Kruglanski, 1994; Budner, 1962). Simply put, deviancy is rarely ambiguous; deviancy, as defined here, entails an evident irregularity rather than the potential of an irregularity occurring. Indeed, in the numerous studies I conducted, I have only found weak-to-moderate correlations between people's aversion towards low-level deviancy (e.g., in the form of broken geometric patterns) and variables associated with disliking ambiguity and uncertainty (e.g., intolerance for ambiguity, need for closure). Moreover, I also have observed links between nonsocial deviancy aversion and social phenomena independent of such ambiguity related third-variables (Gollwitzer et al., 2017; Gollwitzer, Marshall, & Bargh, 2019; Gollwitzer & Clark, 2019).

Deviancy aversion should also not be confused with a general sensitivity to negative stimuli. That is, because deviancy is often perceived as negative, measures of deviancy aversion may also pick up on variance in terms of people's sensitivity to negative stimuli more generally. To account for this possibility, a number of different measures of such negativity aversion are included in the studies presented here (as well as

in other studies, see Gollwitzer & Clark, 2019). These include, for instance, measures of neuroticism—people's tendency to respond negatively to threatening stimuli, and more direct measures of negativity aversion, such as people's aversion towards non-deviant but still negative stimuli (e.g., images of poor weather, such as grey skies or rainy scenes).

Finally, deviancy is not the same as novelty, and subsequently, deviancy aversion is not the same as novelty aversion. Stimuli that are novel are not necessarily deviant. For instance, consider a grove of many novel fruits. In this scenario the fruits are novel but not deviant; in the grove, the pattern or regularity is the novel fruits—a common fruit would actually be deviant in this scenario. Similarly, a stranger—someone you have never met before—is likely perceived as novel but not as deviant (since meeting new people does not necessarily deviate from people's regular experiences). Indeed, though deviancy aversion and novelty aversion correlate (both assessed in terms of nonsocial stimuli, for instance, broken patterns of geometric shapes versus Chinese ideographs), this correlation is not particularly strong (rs < -.04 < .29, depending on the study; Gollwitzer & Clark, 2019). Further, multiple studies, some of which I report here, find nonsocial deviancy aversion to relate to social phenomena (e.g., anxious attachment, prejudice) independently of people's nonsocial aversion towards novelty (Gollwitzer et al. 2019; Gollwitzer & Clark, 2019).

1.2.5 Overview of Chapters 2 Through 5

This dissertation involves three concrete claims, all of which entail examining the domain-generality of peoples' responses to deviancy and the consequences of these reactions.

Claim 1: People's domain-general sensitivity to deviancy—their evaluative and affective responses to perceived regularities or patterns being broken or distorted—is largely negative, early-emerging, and cross-cultural.

Claim 2: In support of deviancy being a domain-general phenomenon, people's sensitivity to lower-level deviancy overlaps with their sensitivity to higher-order deviancy. For instance, people's aversion towards deviancy in the form of distorted geometric patterns predicts their degree of aversion towards social deviancy (e.g., prejudice against social outliers, condemnation of moral violations).

Claim 3: People's sensitivity to deviancy informs an interactionist perspective regarding human psychology—people's attitudes and behavior are context-dependent. Particularly, I propose that individuals' domain-general aversion to deviancy (at the individual level) interacts with the regularities of a specific environment (at the situation level) to predict those individuals' attitudes and behaviors in that environment.

While covering these three core claims, and in support of the domain-generality of deviancy, I will place a special emphasis on how people's sensitivity to deviancy emerges at a young age (a developmental perspective), exists across varying societies (a cross-cultural perspective), and appears across implicit and explicit cognition (an automaticity perspective). Additionally, I briefly cover how affective (instead of deliberative) processes may underlie the observed overlap between people's sensitivity to deviancy in different domains (an affective or intuitionist pathway). And finally, I cover how the observed findings can be used to intervene on people's aversion to deviancy to reduce deleterious psychological phenomena, such as prejudice (an interventionist perspective). Taken

together, the proposed project re-conceptualizes the scientific understanding of deviancy, leverages this new understanding to shed fresh light on social phenomena and our social psychology, and finally, provides the groundwork for future research to create autonomous interventions that people can potentially use to heighten beneficial phenomena (e.g., cooperation) and reduce harmful ones (e.g., prejudice).

In this dissertation, three chapters collectively support the proposed domain-generality of deviancy outlined above. Chapter 2 (Gollwitzer, Marshall, Wang, & Bargh, 2017; *Nature Human Behaviour*) examined whether people's responses to low-level deviancy overlap with their responses to higher-order deviancy. Specifically, nine studies (N = 994) and a meta-analysis demonstrate that people's aversion towards nonsocial deviancy (deviancy in everyday scenes, broken patterns of geometric shapes, and a written vignette describing nonsocial deviancy) predicts their aversion towards social deviancy, including prejudice against stigmatized individuals, social norm-breakers, statistically negative and positive societal outliers, and even members of racial minorities—Black individuals in the United States. Notably, these results were observed cross-culturally, across explicit and implicit measures, and even in young children (~age 7). Collectively, these findings provide initial support for deviancy sensitivity as a domain-general phenomenon and suggest that people's low-level sensitivity to deviancy may play an important role in the social phenomena that are stigma and prejudice.

Building on Chapter 2, Chapter 3 (Gollwitzer, Marshall, & Bargh, 2019; *Journal of Experimental Psychology: General*) examined a potential mechanism underlying the observed overlap between nonsocial (lower-level) and social (higher-level) deviancy (in

Chapter 2) as well as tested whether this overlap is causal. Specifically, Chapter 3 examined whether people's degree of nonsocial deviancy aversion can causally impact their prejudice (against social outliers) and whether this potential effect is partially driven by inciting a dislike of statistical minorities. In line with this proposed mechanism, statistical minorities (infrequent people in a population) may be perceived as deviant in that they disrupt the statistical regularities of how people tend to look, think, and act and, in turn, this perception of deviancy should incite others' prejudice. Nine studies (N = 1,821) observed the proposed mediation model: Increasing people's aversion towards nonsocial deviancy (e.g., aversion towards images of violated geometric patterns) heightened their dislike of novel statistical minorities (minorities on an 'alien' planet), which in turn heightened their prejudice towards social outliers (e.g., members of a racial minority, individuals with a physical disability, individuals with atypical physical appearances, individuals engaging in non-majority customs).

Building on Chapters 2 and 3, Chapter 4 (Gollwitzer, Martel, Bargh, & Chang, 2020; *Personality and Individual Differences*) examined whether people's domain-general aversion to deviancy impacts social phenomena aside from prejudice. Given the prominence and rapid growth of the study of morality in psychology (see Haidt & Kesebir, 2010), Chapter 4 examined whether deviancy aversion plays a role in moral judgment. Specifically, because most moral violations deviate from the behavioral regularities in a society, I tested whether people's degree of nonsocial deviancy aversion predicts their degree of condemnation and punishment of moral violations. Supporting this possibility, two studies (N = 404) found that participants' nonsocial deviancy aversion (e.g., aversion

towards broken patterns of geometric shapes) predicted greater moral condemnation and punishment of harm as well as purity violations. Notably, Chapter 4 also found that this relationship was stronger for more intuitive as opposed to deliberative thinkers. These results tentatively suggest that intuitive processes drive people's sensitivity to deviancy—individuals automatically experience negative affect in response to deviancy which then impacts their attitudes and behaviors outside of awareness (i.e., an intuitionist pathway; see Greene & Haidt, 2002; Haidt, 2001; Cushman, Young, & Greene, 2010).

Importantly, in line with past theorizing on the context-dependency of deviancy (e.g., Durkheim, 1985), Chapters 3 and 4 also empirically examined whether people's sensitivity to deviancy has context-dependent outcomes. In Chapter 3, participants' aversion to nonsocial deviancy predicted context-dependent prejudice. Specifically, participants' high in nonsocial deviancy aversion actually exhibited *decreased* prejudice against real-world minority groups when these minorities were presented as the majority in an alternate society. Relatedly, in Chapter 4, nonsocial deviancy aversion predicted context-dependent moral judgment. Participants high in deviancy aversion exhibited a greater shift towards tolerating moral violations when these violations were described as normative behaviors (regular and common actions) in an alternate society. Taken together, these findings may help explain why prejudice and morality often appear to change depending on the surrounding contexts and vary across historical time-periods (e.g., who is perceived as deviant, and in turn prejudiced against, depends on the specific situation and time).

Finally, Chapter 5 will provide an overview of the findings of Chapters 2 through 4 and discuss theoretical and applied implications. Additionally, Chapter 5 will consider the

potential functionality of deviancy aversion (e.g., avoiding danger), and consider the contexts that moderate the observed overlap between low-level and higher-order deviancy (e.g., boredom, cognitive style, security and safety). Finally, Chapter 5 will lay out the limitations of the presented findings (e.g., generalizability), and discuss how these limitations can be addressed in future research.

A Domain-General Sensitivity to Deviancy Predicts Prejudice and Stigma

2.1 Abstract

In this chapter, I present a collection of studies examining whether a domain-general sensitivity to deviancy is linked to social prejudice. Across six studies, aversion towards nonsocial deviancy, for instance, people's aversion towards deviations in patterns of simple geometric shapes, predicted substantial variance in prejudice against stigmatized individuals, social norm-breakers, statistically negative and positive societal outliers (e.g., the very poor, the very rich), and racial minority group members (Black individuals). The observed relationships between nonsocial and social deviancy emerged across explicit and implicit measures, across cultures (United States and China), and was of a moderately large magnitude (meta-analytic effect size: d = .68). Studies 7 and 8 examined developmental differences—older children but not younger children's nonsocial deviancy aversion predicted their dislike of social-norm breakers. Although nonsocial deviancy and social deviancy judgments may seem distinct given their differing domains, I find that aversion towards nonsocial and social deviancy consistently overlap. These findings raise the possibility that a domain-general sensitivity to deviancy may play an important role in the social constructs of stigmatization and prejudice.

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2.2 Introduction

An image of a Muslim woman next to a drag queen in the New York City subway went viral in March 2017. While some people felt little aversion to the scene, others reacted with open hostility. These differential reactions raise psychological questions: What underlies individual differences in people's dislike of societal outliers, and further, why are social outliers stigmatized and discriminated against in the first place?

Two overarching theories identify origins of people's universal aversion towards social deviancy: People are motivated to avoid danger (Stangor & Crandall, 2000) and to uphold group functioning (Neuberg, Smith, & Asher, 2000). Complementary to these motivational and evolutionary origins, however, a basic and potentially more direct explanation of why people feel uncomfortable towards social deviancy aversion may exist. Negative affect in response to social deviancy may simply be predicted by a domain-general propensity to dislike stimuli that deviate from a given pattern or regularity, that is, disliking violations of a repeated form or model irrespective of whether this violation is in a social or nonsocial context. If true, even discomfort towards deviancy in simple nonsocial stimuli (e.g., geometric shapes) should overlap with aversion towards social deviancy, such as disliking physical deviancy (e.g., dwarfism), character deviancy (e.g., addiction), and group-identity deviancy (e.g., minorities in the United States) (Goffman, 1963). Importantly, considering that negative responses to social deviancy play a major role in stigmatization, prejudice, and discrimination (e.g., Allport, 1979; Durkheim, 1985; Katz & Hass, 1988; Major & O'Brien, 2005), an overlap between people's nonsocial deviancy

aversion and social deviancy aversion would raise the possibility that a domain-general sensitivity to deviancy in part contributes to stigmatization, prejudice, and discrimination.

In support of the hypothesized overlap between sensitivity to nonsocial deviancy and social deviancy, bodies of research have observed that nonsocial and social deviancy are potentially linked core components of early development. With respect to nonsocial deviancy, and in line with Gestalt-like principles, 6-month-olds dislike dissonance in auditory stimuli (Trainor & Heinmiller, 1998), 12-month-olds prefer vertical symmetry over asymmetry (Bornstein & Ferdinandsen, 1981), and newborns exhibit a preference for congruent collections of geometric shapes as compared to non-congruent ones (Macchi Cassia et al., 2008). With respect to social deviancy, children around 4-years-old exhibit prejudice against social outliers (Bigler & Liben, 2006; Dunham, Baron, & Benaji, 2008), dislike and punish social norm-violators (Hardecker, Schmidt, Roden, & Tomasello, 2016; Tomasello & Vaish, 2013), and hold a generalized bias against stigmatized individuals (e.g., the obese, the mentally ill; Sigelman, Miller, & Whitworth, 1986, Weiss, 1986). Importantly, tying these two research streams together, researchers studying the development of morality—which is closely linked to the development of prejudice—have argued that children's morality may be informed by violations of regularities or standards. They argue that a sensitivity to deviant objects—misplaced, flawed, or broken—may be part of a greater "deviancy" system that contributes to which actions are perceived as "right" versus "wrong" and which people are considered "good" versus "bad" (Kagan, 1984; Kochanska, Casey, Fukumoto, 1995).

Research on people's preference for prototypicality across nonsocial and social domains additionally supports the proposed overlap between people's responses to nonsocial and social deviancy. For instance, people prefer prototypical paintings and furniture (Farkas & Slatter, 1979; Whitfield & Slatter, 1979) as well as prototypical faces (Langlois & Roggman, 1990; Rhodes, 2006). And additionally, prototype formation processes—which are active even in infants—appear to inform both evaluations of nonsocial stimuli (e.g., geometric shapes) (Bomba & Siqueland, 1983) as well as social stimuli (e.g., faces) (Rubenstein, Kalakanis, & Langlois, 1999).

A linguistic overlap further supports the proposed overlap—people use similar terms to refer to both nonsocial and social deviancy. The terms 'weird' and 'strange' are applied to both nonsocial stimuli (e.g., *weird* art) and to social stimuli (e.g., a *weird* person). Additionally, certain expressions about social deviancy allude to nonsocial deviancy in terms of nonsocial deviations from regularities and patterns (e.g., social *outliers*, staying *in-line*, and being a *misfit*). Empirically documenting these linguistic overlaps, children, while not comprehending mental illness per se, apply labels used to refer to deviant objects such as 'weird' and 'strange' when describing adults who manifest psychiatric symptoms (Spitzer & Cameron, 1995).

Two additional empirical phenomena support the hypothesized overlap between people's aversion towards nonsocial and social deviancy. First, and perhaps most directly, judgments about deviant geometric shapes have been linked to certain social judgments. For instance, individuals who report greater differentiation between perfect and imperfect shapes (i.e., ambiguous shapes) are more politically conservative and exhibit decreased

support for marginalized groups (Okimoto & Gromet, 2016). Second, a largely overlooked study (in Gestalt research) from 1951 observed that individuals high in prejudice, four weeks after viewing an image of a truncated pyramid (where one side was askew), were more likely to draw the pyramid from memory as having been symmetrical compared to individuals low in prejudice (Fisher, 1951). This study suggests that prejudice is associated with a lower tolerance for deviancy in simple geometric shapes.

To begin to explore whether a low-level sensitivity towards deviancy plays a role in people's responses to social deviancy—and potentially, therefore, in prejudice and stigmatization—I examined whether individuals' aversion towards nonsocial deviancy and social deviancy co-vary. To do so, I tested whether people's discomfort towards nonsocial deviations in geometric shapes (in the form of broken patterns of geometric shapes, for instance, a row of triangles with one triangle out of line), predicts their degree of prejudice against various types of social outliers. Importantly, in Chapter 1, I solely examined the correlational relationship between nonsocial and social deviancy—causation was not yet examined (see Chapter 2 for causation). Specifically, I conducted six studies examining the potential overlap between people's aversion towards nonsocial and social deviancy (N = 815), one meta-analysis of these findings (including Supplementary Studies 3 and 4; k = 8; N = 1,114)[1], and three developmental studies (Studies 7a, 7b, and 8) examining children's nonsocial and social deviancy judgments (N = 129).

[1] For supplemental studies see the Supplements of Gollwitzer, Marshall, Wang, & Bargh, 2017).

2.3 Results

Given the format of *Nature Human Behavior*, in which Chapter 1 was published, the results of the eight conducted studies in Chapter 1 and the general discussion are presented prior to a more detailed method section.

2.3.1 Study 1

Participants' aversion towards nonsocial deviancy was assessed via their aversion towards images taken from Buzzfeed.com articles depicting deviancy in nonsocial objects (e.g., one article was titled "Things that will irritate you more than they should."). For example, one image depicted a cake cut at an unusual angle, ruining the circular symmetry of the cake (**see Figure 2.1** for an additional example).[2] Participants reported how uncomfortable, annoyed, and anxious they felt in response to these images and images of socially deviant individuals (i.e., individuals stigmatized in society—someone with a skin condition, someone wearing a bra on their back) (Goffman, 1963).

[2] The included images, such as the incorrectly cut cake, arguably still had some social connotations (e.g., the cake may have been cut incorrectly purposely). To address this concern, the remaining studies used images of geometric shapes to depict nonsocial deviancy.

Figure 2.1. Example of the nonsocial deviancy images included in Study 1.

Study 1 also included theoretically relevant control variables. For instance, people's domain-general sensitivity towards deviancy may be associated with mental rigidity and a strong desire for closure. For this reason, and because these variables have been linked to discomfort towards social deviancy in past research (Roets & Van Hiel, 2011), we included a measure of individuals' mental rigidity and need for closure (Webster & John, 1992). We also assessed participants' degree of neuroticism—people's tendency to respond negatively to threatening stimuli, because individuals may simply perceive deviancy (across nonsocial and social stimuli) as threatening (McCrae & John, 1992). As expected, we found significant but small correlations between individuals' degree of aversion towards nonsocial deviancy (measured using the Buzzfeed images) and their need for closure, $r = .17$, $p = .047$, and neuroticism, $r = .25$, $p = .004$. Aversion towards nonsocial

deviancy, however, did not relate to political orientation, $p = .669$ (this null finding was replicated in the vast majority of studies reported here).

Demonstrating that individuals' sensitivity to nonsocial deviancy relates to their responses to social deviancy, a linear regression revealed that participants' aversion towards the nonsocial deviancy images predicted their aversion towards the images of socially deviant individuals, $\beta = .38, p < .001$. Critically, the relationship between nonsocial deviancy aversion and aversion towards social outliers (i.e., stigmatized individuals) remained (and barely reduced) after controlling for neuroticism, need for closure, and political conservatism, $\beta = .33, p < .001$ (**see Table 2.1**). As such, the observed link between people's sensitivity to nonsocial and social deviancy does not seems to occur via these alternate psychological predictors of negative responding to social deviancy (Okimoto & Gromet, 2016; Roets & Van Hiel, 2011).

Table 2.1. Summary of All Studies in Chapter 1.

Study	*N*	Link Between Nonsocial and Social Deviancy		Nonsocial Deviancy Measure	Social Deviancy Measure	Sample type
		β	*p*			
Study 1°	134	.38 .33	< .001 < .001◆	Buzzfeed Images	Stigmatized Individuals	Adults
Study 2°	98	.53	< .001	Geometric Shapes	Stigmatized Individuals	Adults
		.59	< .001	Written Description	Stigmatized Individuals	Adults
Study 3°	108	.33 .35	< .001 < .001◆	Geometric Shapes	Social Norm-Breakers	Adults
		.25 .21	.008 .025◆	Geometric Shapes	Positive Statistical Outliers	Adults
		.26 .24	.006 .013◆	Geometric Shapes	Negative Statistical Outliers	Adults
Study 4°	140	.25	.003	IAT— Geometric Shapes	IAT—Stigmatized Individuals	Adults
Study 5°	197	.54	< .001	Geometric Shapes	Stigmatized Individuals	Adults (Chinese)
Study 6°	138	.20	.021	Geometric Shapes	Implicit Racial Prejudice	Adults
		.18 .21	.032 .009◆	Geometric Shapes	Explicit Racial Prejudice	Adults
Study 7a	40	–	–	Geometric Shapes (FC)	–	Children
Study 7b	25	–	–	Geometric Shapes	–	Children
Study 8	64	.36	.009*	Geometric Shapes	Social Norm-Breakers	Children

Note. °denotes the study was included in the meta-analysis; *denotes the Age x Nonsocial Deviancy interaction predicting attitudes about social norm-breakers; ◆denotes a correlation for which we controlled for other relevant measures; FC = forced choice.

2.3.2 Study 2

In Study 2, we operationalized nonsocial deviancy via deviations in patterns of static geometric shapes (e.g., circles, triangles)—*static* geometric shapes generally lack social attributes (Okimoto & Gromet, 2016). Specifically, we created patterns of geometric shapes and then distorted these patterns in some manner (e.g., moving a shape out of line, changing the type of shape; **see Figure 2.2**). We then assessed participants' aversion towards each of these broken and unbroken pattern images. Participants' aversion towards nonsocial deviancy was calculated as their aversion towards the broken patterns minus their aversion towards the unbroken patterns.[3] Including aversion to the unbroken patterns in this calculation allowed us to adjust for participants' baseline aversion and to reduce potential acquiescence bias (i.e., participant yay- or nay-saying). Validating our measure, in a separate study, Supplementary Study 1, independent participants rated the broken patterns as more deviant than the unbroken patterns (see Supplements of Gollwitzer et al., 2017 for details).

[3] Calculating a difference score reduces statistical power. Outside of Chapter 1, participants' aversion towards broken patterns functioned as the measure of nonsocial deviancy aversion and aversion towards unbroken patterns was included in our models as a continuous control variable.

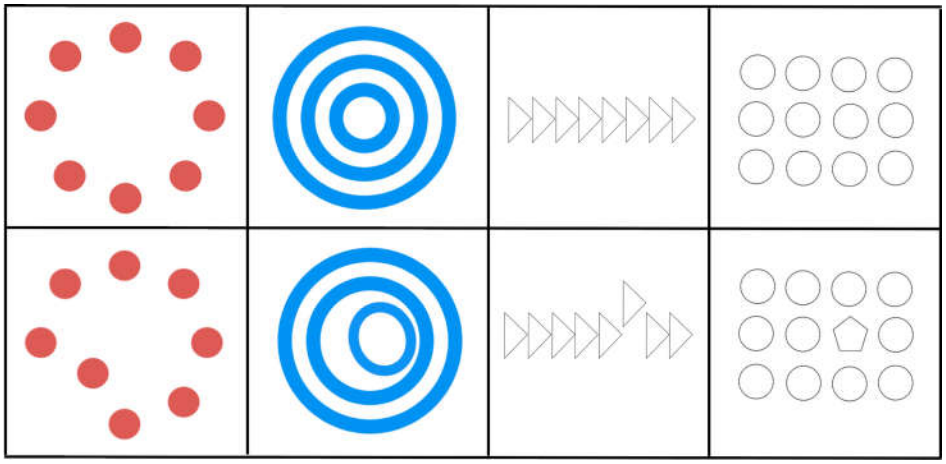

Figure 2.2. Examples of the matched pairs of unbroken and broken pattern images used to measure nonsocial deviancy aversion in Studies 2–6. Each image was presented individually to participants.

Social deviancy aversion, in Study 2, was measured in the same manner as in Study 1 (i.e., images of stigmatized individuals). In a separate study, Supplementary Study 2 (see Supplements of Gollwitzer et al., 2017), independent participants rated the images of stigmatized individuals as more deviant than images of control individuals.

Crucially, participants' aversion towards nonsocial deviancy—in the form of aversion towards broken over unbroken patterns of geometric shapes—predicted their aversion towards stigmatized individuals (e.g., an individual wearing a tail), $r = .53$, $p < .001$. We verified that these results were not due to participants merely imbuing the geometric shapes with social attributes (e.g., anthropomorphism, a mind-perception effect) or from participants' experiencing disgust in response to nonsocial and social deviancy (see Supplementary Study 3 in the Supplements of Gollwitzer et al., 2017). Additionally, in Study 2, nonsocial deviancy aversion also predicted social deviancy aversion when nonsocial deviancy aversion was measured solely via mental-imagery. Participants

reported their aversion towards the following vignette: “Imagine a collection of objects where all the objects are very similar to one-another.... if one very different object is added to the collection then I would feel...”, $r = .59$, $p < .001$.

2.3.3 Study 3

Apart from disliking stigmatized individuals, does people’s sensitivity to nonsocial deviancy also predict disliking other forms of social deviancy? Because norm-breaking constitutes one major form of social deviancy (Durkheim, 1985), in Study 3, we examined whether people’s nonsocial deviancy aversion relates to their dislike of social norm-breakers. Indeed, participants’ aversion towards nonsocial deviancy (assessed via our geometric shapes patterns measure) predicted aversion towards someone in an imaginary society who had violated a social norm, $r = .33$, $p < .001$. We also examined whether nonsocial deviancy aversion predicts disliking individuals who are statistically ‘negatively’ and ‘positively’ deviant in society (e.g., someone very unintelligent, someone very intelligent). Discomfort with nonsocial deviancy indeed predicted aversion towards imagined meetings with people commonly perceived as negatively (e.g., very poor, very unintelligent) and positively deviant (e.g., very rich, very intelligent) in society, $r = .26$, $p = .006$ and $r = .25$, $p = .008$, respectively. These results did not change when controlling for variables that have also been found to predict disliking social deviancy: Belief in a dangerous world (Altemeyer, 1998), threat sensitivity (Carver & White, 1994), intolerance of ambiguity (Budner, 1962), and political conservatism (**Table 2.1**). Finally, in support of nonsocial deviancy aversion being distinct from simply disliking unpredictability and ambiguity, our nonsocial deviancy aversion measure (the geometric shapes measure) did

not relate to intolerance of ambiguity, $r = .13$, $p = .178$ (though, some other studies not discussed here have found a significant but small relationship).

2.3.4 Study 4

Study 4 considered the relationship between individuals' implicit attitudes towards nonsocial and social deviancy (measured using implicit associations tests [IATs]) (Greenwald, McGhee, & Schwartz, 1998). While the expression of explicit attitudes is intentional and conscious, the expression of implicit attitudes is unintentional and occurs outside of awareness (Fazio & Olson, 2003). Extending the generalized influence of nonsocial deviancy to the domain of implicit judgments, participants' implicit dislike of deviations in nonsocial patterns (of geometric shapes) predicted their implicit dislike of stigmatized individuals, $r = .25$, $p = .003$. These results indicate that the overlap between individuals' nonsocial and social deviancy aversion is not limited to explicit judgments and diminish the possibility that the earlier studies were affected by experimental demand effects.

2.3.5 Study 5

Considerable evidence indicates that people respond negatively to social deviancy across cultures (i.e., this negative response may be universal) (4). As such, if a domain-general sensitivity to deviancy truly contributes to people's negative responding to social deviancy, then nonsocial and social deviancy should overlap in varying cultures. Study 5 examined whether nonsocial deviancy aversion (in the form of aversion towards broken over unbroken geometric patterns) predicts aversion towards stigmatized individuals in a

sample of Chinese individuals (i.e., Chinese people residing in China). We chose a Chinese sample because United States and Chinese culture are distinct in numerous ways. For example, while Americans tend to adhere to individualistic values and engage in analytic thinking, Chinese tend to adhere to collectivistic values and engage in holistic thinking (Triandis, 1988; Nisbett, Peng, Choi, & Norenzayan, 2001). Replicating Studies 1 through 4, Chinese people's nonsocial and social deviancy aversion strongly overlapped, $r = .54$, $p < .001$.

2.3.6 Study 6

Because disliking social deviancy predicts prejudice and discrimination (Allport, 1979; Katz & Hass, 1988), people's domain-general sensitivity to deviancy may also relate to these processes. Researchers have pointed out that prejudice (against Black people in the United States) may be based on perceiving minority groups as socially deviant (Katz & Hass, 1988). As such, in Study 6, we hypothesized that people's aversion towards nonsocial deviancy may be associated with racial prejudice. Indeed, we found people's nonsocial deviancy aversion (again, in the form of aversion towards broken over unbroken patterns of geometric shapes) to predict both implicit prejudice (measured using an IAT), $r = .20$, $p = .021$, and explicit prejudice (symbolic racism) against Black people in the United States, $r = .18$, $p = .032$. Additionally, this link remained when controlling for participants' self-reported tendency to discriminate against others, $r = .21$, $p = .009$.

Studies 1 through 6 consistently found people's aversion towards nonsocial deviancy (both in everyday scenes and patterns of geometric shapes) to predict their dislike of social deviancy, including stigmatized individuals, social norm-breakers, statistically

negative as well as positive societal outliers, and members of a racial minority (Black people in the United States). The relationship between nonsocial and social deviancy aversion emerged across explicit and implicit measurement methods as well as across collectivistic (Chinese) and individualistic (United States) cultures.

2.3.7 Meta-Analysis

We conducted a meta-analysis of the findings of Studies 1 through 6 (plus Supplementary Studies 3 and 4; see Supplements of Gollwitzer et al., 2017). This meta-analysis indicated a medium-to-large relationship between people's responses to nonsocial and social deviancy (fixed-effect model: d = .65; random-effects model: d = .68). These results are particularly noteworthy considering that in Studies 2 through 6 we assessed nonsocial deviancy aversion via simple patterns of geometric shapes.

2.3.8 Studies 7 and 8

Even young children react negatively to social deviancy—children as young as 4-years-old exhibit prejudice, dislike social norm-breaking, and dislike stigmatized individuals (Bigler & Liben, 2006; Dunham et al., 2008; Hardecker et al., 2016; Sigelman et al., 1986; Tomasello & Vaish, 2013; Weiss, 1986). Yet, the origins of young children's negative responses to social deviancy remain largely unexplored. As noted earlier, research indicates that in addition to disliking social deviancy, young children dislike nonsocial deviancy (e.g., Bornstein et al., 1981; Trainor & Heinmiller, 1998). Given the overlap we observed between adults' nonsocial and social deviancy responses, young children's

nonsocial and social deviancy aversion may relate as well. We conducted three studies (Studies 7a, 7b, and 8) with children ages 4 through 9 to examine this question.

In Studies 7a and 7b, we investigated whether—parallel to adults (**Table 2.2**)—children between 3- and 6-years-old exhibit an aversion to nonsocial deviancy (in the form of disliking broken over unbroken patterns of geometric shapes; these results replicate past work showing that even newborns prefer congruent over non-congruent collections of geometric shapes; Macchi Cassia et al., 2008). In doing so we also attempted to verify that the nonsocial deviancy stimuli utilized in Studies 2 through 6 (i.e., the broken patterns of geometric shapes) can be used to measure children's nonsocial deviancy aversion. In line with the findings of Studies 2 through 6, and past research indicating that young children dislike dissonant sounds and asymmetry (e.g., Bornstein et al., 1981; Trainor & Heinmiller, 1998), Studies 7a and 7b found that 3- to 6-year-olds dislike nonsocial deviancy in the form of broken patterns of geometric shapes, $p = .003$, $d = .50$, and $p = .035$, $d = .45$, respectively (see Table 2).

Table 2.2. Nonsocial Deviancy Aversion: Participants' Dislike of Broken Over Unbroken Patterns of Geometric Shapes.

Study	***N***	**Sample type**	**Nonsocial Deviancy Aversion**			
			t	CI	*d*	*p*
Study 1	134	Adult	--	--	--	--
Study 2	98	Adult	7.61	[.72, 1.23]	.77	< .001
Study 3	108	Adult	7.24	[.70, 1.24]	.70	< .001
Study 4	140	Adult	24.56	[.70, .82]	2.08	< .001
Study 5	197	Adult	17.75	[1.55, 1.94]	1.26	< .001

Study 6	138	Adult	10.08	[1.01, 1.51]	.86	<.001
Study 7a	40	Children	3.16	[.06, .29]	.50	.003
Study 7b	25	Children	2.24	[.09, 2.19]	.45	.035
Study 8	64	Children	-0.24	[-.34, .44]	.03	.811

Building on these results, Study 8 examined whether children's nonsocial and social deviancy responses overlap. Observing this relationship in even 4-year-olds would suggest that this overlap is early-emerging, likely does not require schooling, and necessitates little explicit understanding of social deviancy. Alternatively, if only older children exhibit an overlap, a more developed understanding of social deviancy may be necessary for nonsocial and social deviancy judgments to relate. We assessed children's dislike of nonsocial deviancy in Study 8 using the broken and unbroken patterns of geometric shapes validated in Studies 7a and 7b. We assessed children's dislike of social deviancy via their dislike of social norm-breakers. We operationalized social deviancy as social norm-breaking because children as young as 3-years-old detect, understand, and object to the breaking of social norms (Bigler & Liben, 2006; Hardecker et al., 2016; Schmidt, Butler, Heinz, & Tomasello, 2016). Indeed, in our study, disliking social norm-breakers did not vary as a function of age (p = .536).

We found that the relationship between children's nonsocial and social deviancy aversion altered depending on age. The nonsocial deviancy aversion of older, but not younger children, predicted their dislike of social norm-breakers, β = .36, p = .009. In line with adults in our previous studies, older children (approximately 7- through 9-year-olds) who disliked (liked) the broken geometric patterns disliked (liked) social norm-breakers, β

= .43, p = .007. This pattern of results was not true for younger children (4- through 6-year-olds), β = -.29, p = .165 (**see Figure 2.2**). These results were not due to younger children failing to understand the instituted, situational social norm (see Supplementary Note in Gollwitzer et al., 2017).

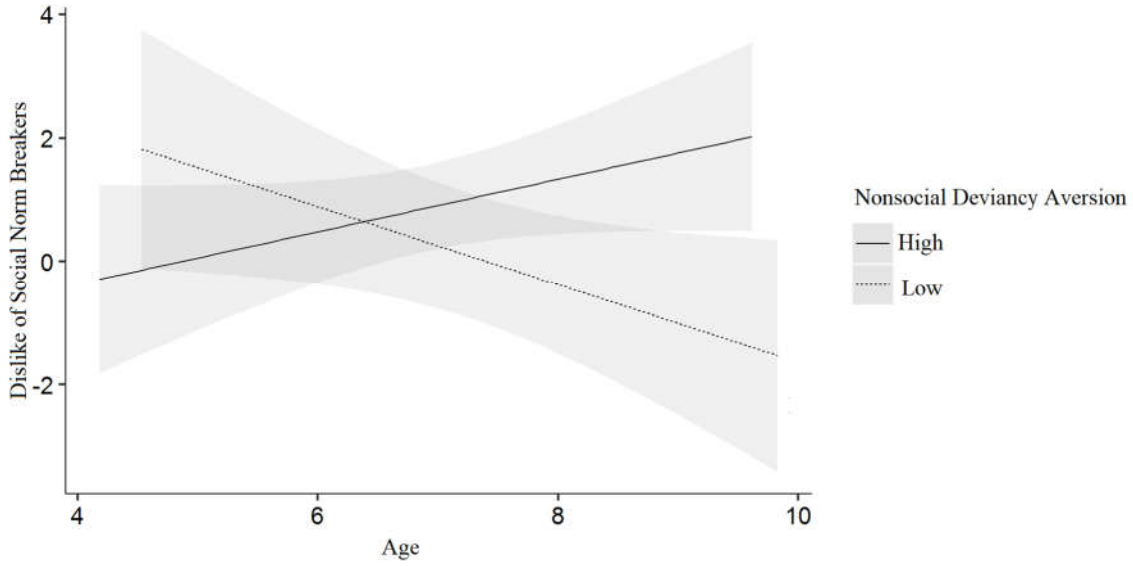

Figure 2.3. Study 8 interaction effect. The interaction between age and nonsocial deviancy aversion predicting disliking social norm-breakers. Nonsocial deviancy aversion predicted disliking social deviancy in older children (+1 SD = 8.56 years old), but not in younger children (-1 SD = 5.5 years old).

It is possible that younger children's nonsocial and social deviancy judgments did not overlap because—though our findings and past research indicate that young children *dislike* social norm-breaking (Hardecker et al., 2016, Tomasello & Vaish, 2013)—young children may not *categorize* social norm-breaking actions or norm-breakers as socially deviant (e.g., 'weird,' 'strange'). Two findings support this possibility. First, children under 7, when asked to describe what they perceive as deviant behavior in their peers, are unlikely to include social norm-breaking actions in their response while older children do so (Coie

& Pennington, 1976). Second, younger children are less likely than older children to infer dispositional attributes from the single action of another individual (Kalish, 2002; Ruble & Dweck, 1995). Therefore, the younger children in our study, even if they did perceive the social norm-breaking *action* as deviant, likely still did not consider the social norm-*breakers* as deviant (we assessed children's dislike of social norm-*breakers*). Given these past findings, the observed interaction effect tentatively suggests that people's nonsocial and social deviancy judgments overlap as they begin to understand and categorize actions and individuals as socially deviant. Future research should examine this possibility as well as whether children's nonsocial deviancy aversion predicts aversion towards other forms of social deviancy than social-norm breaking (e.g., racial prejudice).

Lastly, regarding the presented developmental data, we note two limitations. First, younger children may have struggled with the complexity of the paradigm—future improved methods may be able to detect a relationship where our current methods could not. Second, our study was not longitudinal. While our results indicate developmental differences, they do not indicate a developmental trajectory or a developmental change.

2.4 Discussion

Taken together, the current findings demonstrate a consistent overlap between individuals' sensitivity towards nonsocial and social deviancy. Aversion towards nonsocial deviancy in everyday scenes, broken patterns of geometric shapes, and a written vignette describing nonsocial deviancy predicted participants' negative responses to stigmatized individuals, social norm-breakers, statistically negative and positive societal outliers, and even against racial minorities (Black individuals in the U.S.). These results were observed

across explicit and implicit judgments, across individualistic (United States) and collectivistic (Chinese) cultures, and in children older than 6-years-old. Collectively, our findings suggest that people's sensitivity to deviancy is a domain-general phenomenon that plays a substantial role in the complex social constructs of stigma and prejudice.

2.4.1 Potential Confounds

One may argue that aversion towards nonsocial and social deviancy overlap merely because nonsocial deviancy overlaps with other predictors of social deviancy. Disgust (40), sensitivity towards threat (Schaller & Neuberg, 2012), conservatism (e.g., right-wing authoritarianism, social dominance orientation) (Okimoto & Gromet, 2016; Whitley, 1999), and disliking ambiguity and unpredictability (e.g., need for closure, need for structure) (Webster & Kruglanski, 1994; Neuberg & Newsom, 1993) have all been shown to predict negative responding towards social deviancy (e.g., racial prejudice). Importantly, however, when statistically controlling for these variables, nonsocial deviancy aversion remained an independent and moderate to large predictor of participants' dislike of social deviancy. Sensitivity towards nonsocial deviancy thus entails an additional pathway towards stigmatization and prejudice beyond disgust, sensitivity towards threat, mental rigidity, and dislike of ambiguity and uncertainty.[4]

[4] The control variables we included were disgust, sensitivity towards threat, belief in a dangerous world, neuroticism, political ideology, need for closure, intolerance of ambiguity, and disliking negative but not deviant stimuli (e.g., bad weather) (see Supplementary Note of Gollwitzer et al., 2017).

2.4.2 Nonsocial-Social Overlaps

The observed overlap between individuals' responses to deviancy in the nonsocial domain (i.e., broken patterns of geometric shapes) and in the social domain (i.e., social outliers) is in harmony with a growing body of research observing nonsocial-social overlaps. For example, individual differences in sensitivity to physical pain predict sensitivity to social pain (in the form of social rejection) (Eisenberger, Jarcho, Lieberman, & Naliboff, 2006), and increasing physical warmth heightens individuals' perceived social warmth (feeling connected to other people) and vice versa (Williams & Bargh, 2008; Inagaki & Eisenberger, 2013). Notably, these nonsocial-social overlaps are paralleled in neural circuitry (Inagaki & Eisenberger, 2013; Eisenberger & Lieberman, 2004), tentatively indicating that a common neural basis for people's experiences of nonsocial and social deviancy may exist—that is, a common neural basis that represents people's domain-general responding to deviancy.

2.4.3 Mechanisms

There are several potential mechanisms underlying the observed relationship between nonsocial and social deviancy aversion. For instance, scaffolded mind processes, cognitive fluency, and disliking expectancy violations come to mind. First, people's attitudes towards nonsocial deviancy may guide (i.e., serve as a 'scaffold' for; Williams, Huang, & Bargh, 2009) their evaluation of social deviancy, resulting in an overlap between people's sensitivity to nonsocial and social deviancy. Second, processing fluency—the ease with which information is processed (Reber, Winkielman, & Schwarz, 1998)—may link nonsocial and social deviancy aversion because individuals who dislike disfluent (e.g.,

non-prototypical) nonsocial stimuli (nonsocial deviancy) may also dislike disfluent social stimuli (social deviancy). Third, a sensitivity to expectancy violations or prediction errors (Olson, Roese, & Zanna, 1996) could qualify as a mechanism—the nonsocial deviancy stimuli in our studies may have violated participants' expectations, and certain types of social deviancy may qualify as violations of expectations as well.

2.4.4 Limitations

The presented results are correlational. From them, one cannot draw inferences regarding any causal relationships between nonsocial deviancy and social deviancy. Indeed, a dispositional domain-general sensitivity towards deviancy may operate across nonsocial and social domains without any causal link. If, however, future research were to observe a causal effect of nonsocial deviancy on social deviancy, interventions might be developed that reduce people's levels of prejudice and discrimination by attenuating their nonsocial deviancy aversion.

Though nonsocial deviancy aversion predicted unique variance in social deviancy aversion, nonsocial deviancy aversion likely does not relate to all forms of stigmatization and prejudice. For example, disliking nonsocial deviancy cannot explain the oppression of majority groups by minority group (e.g., apartheid in South Africa where members of the dominant group were the socially deviant ones, that is, the minority). Further, numerous cognitive processes, societal processes, and intergroup motives irrespective of individuals' sensitivity to nonsocial deviancy play a role in stigmatization and prejudice (e.g., stereotyping, intergroup competition; see Nelson, 2009). Consequently, we posit that while

disliking nonsocial deviancy may be sufficient to incite social stigma and prejudice, it is not necessary.

It is worth noting that the methodological paradigms of Studies 1, 2, 3, and 5 may have exaggerated the obtained effect-sizes. These studies explicitly drew participants' attention to deviancy by, for example, presenting participants with broken patterns and making the social deviancy items highly explicit (e.g., participants in Study 3 were reminded numerous times that the social norm-breaker had deviated from the norm). Further, Studies 1 through 5 assessed nonsocial and social deviancy aversion using similar methodologies (e.g., using the same items to measure aversion). Though Study 6 allayed some of these concerns by utilizing different methodologies (i.e., a race IAT and a measure of symbolic racism), future research should examine the generalizability of the observed links regarding different methodologies, more real-world measures of prejudice, and behavioral outcomes of stigmatization and prejudice (i.e., discrimination).

2.4.5 Conclusion

The correlational results presented here provide the basis for future research examining whether a domain-general sensitivity to deviancy in part motivates people's prejudice, and stigma. For instance, a domain-general deviancy system could potentially explain people's prejudices against individuals who are perceived as deviant yet are harmless (e.g., someone with dwarfism, someone who identifies with their non-biological gender). People tend to rationalize such prejudice by claiming, for example, that negatively perceived social outliers (e.g., the mentally ill) are dangerous (Corrigan et al., 2002), and positively perceived social outliers (highly competent people) are cold and untrustworthy

(Rammstedt & John, 2007). The research presented here, however, raises the possibility that a basic aversion to deviancy (instead of such rationalizations) motivates people's prejudice against social outliers.

2.5 Method

2.5.1 Study 1

Participants. The relationship between nonsocial and social deviancy aversion would be psychologically and ecologically relevant if it were of moderate effect-size (r = .30). A power-analysis revealed that we needed 109 participants to have 90% power at a .05 alpha level. We recruited 144 participants via Mechanical Turk (MTurk; 68 female). Participants were living in the United States—the same is true of all remaining studies except Study 5 (age: M = 38.01, SD = 12.45). Ten participants were excluded for failing attention check items. Study 1, and all the other reported studies, were approved by the Human Subjects Committee of Yale University.

Need for closure. We included a validated short-version of the need for closure scale (Webster & Kruglanski, 1994). The scale consisted of 15 items (e.g., "I don't like situations that are uncertain").

Neuroticism. We included a validated 2-item neuroticism scale: "I see myself as someone who…is relaxed, handles stress well" (reverse-coded), and "I see myself as someone who… gets nervous easily" (McCrae & John, 1992; Rammstedt & John, 2007).

Political orientation. Participants answered the following questions on a Likert-Scale ranging from 1 (*extremely liberal*) to 9 (*extremely conservative*): "In terms of

economic issues, how liberal or conservative are you?", "In terms of social and cultural issues, how liberal or conservative are you?" and "Where on the following scale of political orientation would you place yourself?"

Nonsocial deviancy. We assessed participants' aversion in response to five images depicting nonsocial deviancy (**see Figure 2.1**; see Supplements of Gollwitzer et al., 2017 for all images). These images were taken from three popular Buzzfeed.com articles—(1) "Things that will irritate you more than they should," (2) "19 Things that will drive your OCD self insane," and (3) "31 things that will make any neat freak's eye twitch." Underneath each image a prompt read "The above image makes me…" followed by 3 questions assessing participants' discomfort, anxiousness, and annoyance in response to the image ("feel uncomfortable," "feel anxious," and "feel annoyed"). Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*. The images were presented in random order.

Social deviancy. Social deviancy aversion was measured in the same manner as nonsocial deviancy aversion except that the images depicted deviant individuals. These images were validated as depicting socially deviant individuals in Supplementary Study 2 (see Supplements of Gollwitzer et al., 2017 for images and the supplementary study).

Attention check items. We included a direct ("I was focused while filling out this survey") and an indirect attention check item ("People vary in the amount they pay attention to these kinds of surveys... If you have read this question carefully, please write the word yes in the blank box below labeled other." See Supplementary Note of Gollwitzer et al., 2017 for details. The same two attention check items were used as exclusion criteria in Studies 2 through 6.

Procedure. Before beginning the study participants gave their informed consent (the same is true of all reported studies). Participants then completed the need for closure, neuroticism, and political orientation measures in random order. Thereafter, they completed the nonsocial and social deviancy measures in random order. Lastly, participants completed the attention check items and demographics—the same is true of Studies 2 through 6. No consistent demographic effects were found across the reported studies (see Supplementary Note in Gollwitzer et al., 2017 for details).

2.5.2 Study 2

Participants. A power-analysis based on the findings of Study 1 (r = .38) revealed that we needed to recruit 79 participants to have a 95% power. We recruited 106 participants via MTurk (44 female; age: M = 36.18, SD = 12.10). Eight participants were excluded for failing attention check items.

Nonsocial deviancy. The five nonsocial deviancy images in Study 1 were replaced with eight images depicting nonsocial deviancy in the form of broken patterns of geometric shapes. We created these patterns in accordance with conceptualizations of pattern-formation (based on repetition or rules) and pattern distortion (repetition or rule violation) in research on pattern-recognition (Posner, 1973; Näätänen et al., 1993). Specifically, after creating a pattern, we either distorted (i.e., transformed) a shape in the pattern (e.g., type of shape, size, location) or did not alter the pattern. This methodology resulted in four images of patterns that were unbroken (non-deviant; e.g., perfectly in-line geometric shapes, a collection of identical shapes), and four identical images except that the pattern was broken in some way (deviant; e.g., a shape was shifted, a different shape

was inserted; **see Figure 2.2**). We assessed participants' aversion in response to each of the unbroken and broken pattern images. Independent participants rated the broken pattern images as more deviant than the unbroken pattern images in a supplementary study (Study S1; $N = 42$; see Supplements of Gollwitzer et al., 2017).

We also measured participants' nonsocial deviancy aversion via a written vignette. Participants reported their aversion towards the following situation: "Imagine a collection of objects where all the objects are very similar to one-another.... if one very different object is added to the collection then I would feel…"

2.5.3 Study 3

Participants. We recruited 116 participants via MTurk (78 female; mean age: $M = 34.89$, $SD = 10.26$) based on the power-analysis utilized in Study 2. Eight participants were excluded for failing the attention check items.

Belief in a dangerous world. We included the 10-item Belief in a Dangerous World Scale (e.g., "Any day now chaos and anarchy could erupt around us. All signs are pointing to it") (Altemeyer, 1998).

Behavioral inhibition system. We measured individuals' ability to regulate their negative affect in response to threatening stimuli via the 7-item Behavioral Inhibition System Scale (e.g., "Even if something bad is about to happen to me, I rarely experience fear or nervousness") (Carver & White, 1994).

Tolerance of ambiguity. Ambiguity intolerance was measured using a standardized 13-item measure (e.g., "I don't tolerate ambiguous situations well") (Budner, 1962).

Nonsocial deviancy. The nonsocial deviancy measure in Study 3 was that of Study 2.

Social norm-breakers. We measured participants' aversion towards fictional individuals who broke versus followed a social norm. Participants were told to "imagine a world inhabited by people known as Flurps. As long as anyone can remember, all the Flurps have lived in Blue Houses. Living in a Blue house is an important part of Flurp tradition and culture." Thereafter, participants were told, "Imagine you come across a Flurp living in a Green house. Remember, none of the other Flurps live in Green houses, they all live in Blue houses" and "Imagine you come across a Flurp living in a Blue house. Remember, all the Flurps live in Blue houses." Participants then reported their aversion towards the Flurp in each of these two scenarios: "This Flurp makes me feel uncomfortable," "This Flurp makes me feel annoyed," and "This Flurp makes me anxious" on a Likert-scale: 1—*Not at all agree* to 7—*Strongly agree*.

Statistically positive and negative societal outliers. We operationalized statistically positive and negative social deviants as individuals holding attributes that most people aspire to have (i.e., wealth, intelligence, a thin body) and not have (i.e., poverty, unintelligence, being overweight). Specifically, we measured participants' aversion towards meeting someone either statistically above, at the exact level of, or below the average IQ, income, and weight in the United States. For example, regarding IQ, participants read the following information: "The average IQ in the United States ranges from 90 to 100." The presented values were the actual average IQ, income, and weight (of women) in the United States in 2016. Thereafter, participants were told to imagine

meeting a negatively deviant, average, and positively deviant individual: "Please imagine you meet someone with an IQ of (50, 95, or 140, respectively) (remember the average IQ in the United States is around 90 - 100)." Participants then reported their aversion in response to each of these individuals (e.g., "This person makes me feel uncomfortable"). See Supplementary Methods of Gollwitzer et al., 2017 for all materials.

Procedure. Participants completed the measures of ambiguity tolerance, belief in a dangerous world, behavioral inhibition system, nonsocial deviancy aversion, and social deviancy aversion in randomized order.

2.5.4 Study 4

Participants. A power-analysis revealed that we needed 86 participants to have a 95% power (r = .42; averaged effect sizes of Studies 1, 2, and 3). We recruited 194 participants via MTurk (114 female; mean age: M = 33.26, SD = 9.83) to account for participants failing to complete the IAT measures. Twenty-five participants were excluded for failing the attention check items. Twenty-nine additional participants were excluded for not completing either or both IAT measures or for receiving a non-calculable score, as determined by the revised IAT scoring algorithm (Greenwald, Nosek, & Banaji, 2003), on one or both of the IAT measures.

Implicit nonsocial deviancy. An IAT was used to measure how much stronger participants implicitly associate broken patterns (IAT label: "Broken Pattern") with negative words ("Negative") than unbroken patterns ("Unbroken Pattern") with positive words ("Positive"). The negative words were agony, terrible, horrible, nasty, evil, awful,

and failure. The positive words were joy, love, peace, wonderful, pleasure, glorious, and happiness. The broken and unbroken pattern images were those of Studies 2 and 3.

Implicit social deviancy. The social deviancy IAT was identical to the pattern deviancy IAT except that the social deviancy labels were "Stigmatized People" and "Nonstigmatized People." The stigmatized people images were the five social deviancy images included in Studies 1 and 2. The non-stigmatized people images were images of five control individuals who, in a supplementary study (Study S2; $N = 52$), were classified as less deviant than the deviant individuals (see Supplements of Gollwitzer et al., 2017 for details and see Supplementary Figure 2 for an example image).

Procedure. Participants completed the two IAT measures in randomized order.

2.5.5 Study 5

Participants. A power-analysis revealed that we needed 86 participants to have 95% power ($r = .37$; averaged effect-sizes, Studies 1 through 4). To accurately estimate the effect-size of the relationship between nonsocial and social deviancy aversion in a Chinese sample, however, we recruited 212 participants via Sojump, a Chinese data collection program (107 female; age: $M = 33.00$, $SD = 6.46$). Participants were residing in China. Regarding ethnicity, 98.5% identified as Han Chinese, and 1.5% identified as a Chinese minority (non-Han). Fifteen participants were excluded for failing the attention check items.

Nonsocial deviancy. The nonsocial deviancy measure was identical to Study 2 except it had been translated to Mandarin by a native speaker.

Social deviancy. The social deviancy measure was identical to Study 2 except it had been translated to Mandarin and also included the control faces used in Study 4 (see Supplementary Figure 2 in the Supplements of Gollwitzer et al., 2017).

Procedure. Participants completed the nonsocial and social deviancy items in random (preassigned) order. This random order was the same for all participants due to the limitations of the Sojump software..

2.5.6 Study 6

Participants. A power-analysis revealed that we needed 90 participants to have 95% power (r = .36; meta-analytic estimate calculated before the inclusion of this study in the meta-analysis). We recruited 208 participants via MTurk (116 female; age: M = 34.71, SD = 10.63) given the high exclusion rate in Study 4 (which also included an IAT measure). Fifty-three participants were excluded for failing to complete the race IAT or for receiving a non-calculable score (Henry & Sears, 2002). Seventeen additional participants were excluded for failing the attention check items.

Nonsocial deviancy. We measured participants' nonsocial deviancy aversion by assessing their responses towards 10 images depicting broken and unbroken patterns of geometric shapes. Under each broken and unbroken pattern image was a prompt that read, "The above image makes me…" followed by 4 questions ("feel anxious," "feel annoyed," "feel secure," "feel calm") which participants answered on a Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*. We included the secure and calm questions to include reverse coded items to reduce response bias. We also measured participants' attitudes towards the pattern images. Participants responded to each image: "I like the

above image," and "I dislike the above image" and reported how much they liked and disliked the specific geometric shape that was causing the pattern distortion in the broken patterns (and the identical shape in the unbroken patterns). For example, participants responded to the items: "I like the triangle that is three triangles from the right," and "I dislike the triangle that is three triangles from the right." Given that these specific items would have been difficult to create for the spiral and dots pattern images used in Studies 2 through 5, we replaced these images with ones similar to the row of triangles. All images were presented in random order.

Implicit racial prejudice. Participants' implicit negative associations towards Black individuals was measured using an IAT. This IAT was the same as in Study 4 except that it included images of Black and White individuals and that the IAT labels were changed to "Black" and "White".

Explicit racial prejudice. Participants' explicit prejudice towards Black individuals was measured using the symbolic racism scale (Henry & Sears, 2002). The scale consists of 8 items (e.g., "It's really a matter of some people not trying hard enough; if blacks would only try harder they could be just as well off as whites." Likert-scale: 1 = *Strongly disagree* to 4 = *Strongly agree*). Because individuals often self-regulate their explicit racial prejudice, we also included an item measuring participants' self-reported efforts to not discriminate ("I am very careful not to discriminate against other people"). Likert-scale: 1 = *Strongly disagree* to 7 = *Strongly agree*.

Procedure. Participants completed the symbolic racism scale, the nonsocial deviancy measure, and then the race IAT (in that order).

2.5.7 Meta-Analysis

Materials. Eight studies were included in the meta-analysis: Studies 1 through 6, Supplementary Study 3, and Supplementary Study 4—a study that failed to observe a relationship between nonsocial deviancy and social deviancy judgments. We included this null finding in the meta-analysis to provide a more accurate effect-size estimate and to reduce potential 'file-drawer' bias (i.e., the exclusion of null findings from published manuscripts) (Rosenthal, 1979). See Supplements of Gollwitzer et al., 2017 for details.

Meta-analytic approach. We conducted two meta-analyses: A fixed-effect model and a random-effects model (Borenstein, Hedges, Higgins, & Rothstein, 2010). In doing these analyses we followed meta-analytic methods recommended for 'mini' meta-analyses within a single manuscript (Goh, Hall, Rosenthal, 2016). See Supplementary Note of Gollwitzer et al., 2017.

2.5.8 Study 7a

Participants. A stopping rule was used for data collection in Study 7a: The number of 3- and 4-year-olds that visited a developmental psychology laboratory in a northeastern university throughout the summer of 2016. The study included 40 3- and 4-year-olds (20 female; age: $M = 3.95$, $SD = 0.49$).

Nonsocial deviancy. Two matched pairs of broken and unbroken geometric patterns (triangle and circle pairs from Studies 2 through 5) were presented in randomized order and shown to children in a vertical format on a sheet of paper (see Supplementary Figure 3 in Gollwitzer et al., 2017). Which image was located above the other was randomized.

The experimenter read the following for each image: “Here’s a picture—which one do you like more? This one or this one.”

2.5.9 Study 7b

Study 7b was analogous to Study 7a except that it included a continuous measure of nonsocial deviancy aversion and was conducted with 4- to 6-year-olds.

Participants. The stopping rule in Study 7b was the number of children in Junior Kindergarten and Kindergarten whose parents completed informed-consent at a private school in New York City. Participants (N = 25; 12 female) were between 4- and 6-years-old (M = 4.92, SD = 0.58).

Nonsocial deviancy. The nonsocial deviancy measure was that of Study 7a, except for three changes. First, we replaced the unbroken and broken pattern images with those of Studies 2 through 5 that were not used in Study 7a (see Supplementary Figure 4 in Gollwitzer et al., 2017). Second, the images were presented individually rather than in a forced choice format. Third, children’s nonsocial deviancy judgments were assessed using a continuous measure. For each picture, the experimenter asked: “Do you like this picture?” *yes—no*. Children were then asked on a 3-point scale (1 = *A teeny tiny bit*, 2 = *A little bit,* 3 = *A lot*) about how much they liked (did not like) the picture (Supplementary Figure 5 in Gollwitzer et al., 2017).

2.5.10 Study 8

Participants. A power-analysis revealed that we needed approximately 54 participants to have a 95% power. This power-analysis was based on an earlier, incorrect

effect size estimation of the average effect size of Studies 1 through 5 (r = .45). However, as this power-analysis was conducted a-priori, we report the original estimate here. We recruited children ranging from 4- to 10-years-old as we wished to examine developmental differences. Sixty-nine participants (32 female; age: M = 7.03, SD = 1.53) were recruited in a New York City park and at a museum near a northeastern university. Three participants were excluded when their birthdays revealed that they were actually over 10-years-old. Two participants were excluded for failing the comprehension check items (including these participants did not change the results).

Nonsocial deviancy. The nonsocial deviancy measure included the items of Study 7a. These items were presented in the format of Study 7b (i.e., continuous measure).

Social deviancy. The social deviancy measure assessed dislike of social norm-breakers. We chose to assess dislike of social deviancy in this way because even young children express an understanding of and spontaneously infer social norms (Tomasello & Vaish, 2013; Schmidt et al., 2016). Specifically, we chose to examine gender social norms. However, because children's judgments about how boys and girls act differs with age (Blakemore, 2003; Carter & Patterson, 1982; Weinraub et al., 1984), we chose to flip what are considered typical gender norms (e.g., children were told that boys in a school wear pink bows and dance ballet). This manipulation allowed us to measure dislike of situational deviancy (an act labeled as deviant in a specific situation) rather than, as measured in Studies 1 through 6, societal deviance (deviance widely perceived by society) (Falk, 2001). To create the instituted, situational social norm, we relied on a rule-based manipulation—young children follow rule manipulations in social and moral norm

tasks (Rhodes & Chalik, 2013). Our manipulation was successful: Children disliked boys and girls who broke the instituted social norm, that is, they disliked boys who wore blue baseball caps and played football and girls who wore pink bows and danced ballet.

Children were told about an imaginary school: The Tam School. At this school, the teacher—Mrs. Taylor—made the rules and all of the students liked Mrs. Taylor. Mrs. Taylor said that boys should wear pink bows in their hair and do ballet, whereas girls should wear blue baseball caps and play football. We also informed participants that the boys and girls at the Tam School were very happy and that most children followed Mrs. Taylor's rule.

To ensure that all participants understood the flipped gender social norm we included comprehension checks: The experimenter asked children two questions after hearing the story: (1) who at the Tam School plays football and wears blue baseball caps (*girls—boys*), and (2) who dances ballet and wears pink bows (*girls—boys*). These two questions were randomized.

Thereafter, participants were told about four children who go to the Tam School. Two of these children, a girl and a boy, followed the social norm. Two other children, however, again a girl and a boy, did not follow the social norm. Participants were asked whether they liked each of these children (*Yes!—No!*). If they responded yes (no), they were then asked how much they liked (did not like) the child (1 = *A teeny tiny bit*, 2 = *A little bit*, 3 = *A lot*; Supplementary Figure 6 in Gollwitzer et al., 2017).

Procedure. Children completed the nonsocial deviancy measure and then the social deviancy measure.

A Domain-General Sensitivity to Deviancy Predicts Prejudice via a Dislike of Statistical Minorities

3.1 Abstract

Chapter 2 revealed that people's aversion towards nonsocial deviancy predicts their degree of prejudice against individuals who are perceived as societal outliers, for instance, people with a physical disability or members of a racial minority. It is unknown whether these links are causal, however, as well as which processes underlie these associations. In Chapter 3, I examined whether manipulating people's degree of nonsocial deviancy aversion causally impacts their prejudice and whether this potential effect occurs in part by inciting a dislike of statistical minorities. Infrequent people in a population may be perceived as deviant in that they disrupt the statistical regularities of how people tend to look, think, and act in society, and this deviancy should incite others' prejudice. Nine studies (N = 1,821) supported this mediation model. In Studies 1.1 and 1.2, adults' and young children's nonsocial deviancy aversion related to disliking novel statistical minorities, and this dislike predicted prejudice against members of a real-world racial minority (Black individuals in the U.S.). Studies 1.3 and 1.4 replicated this mediation when experimentally manipulating participants' nonsocial deviancy aversion, though, we did not observe a direct causal effect of nonsocial deviancy aversion on racial prejudice. Study-set 2 replicated the observed mediation in terms of prejudice against other commonly stigmatized individuals (e.g., someone with a physical disability). Importantly, we also found nonsocial deviancy aversion to causally affect such prejudice. Finally, Study-set 3 provided additional support for the mediation model. Nonsocial deviancy aversion predicted context-dependent prejudice as a function of group-size, for instance, greater racial prejudice when Black people are the statistical minority, but decreased racial

prejudice when Black people are the statistical majority. Taken together, these findings indicate that people's aversion towards nonsocial deviancy motivates prejudice, and that this influence is in part driven by heightening people's dislike of statistical minorities in society.

3.2 Introduction

From early in the field of psychology (Allport, 1958; Bogardus, 1925; Katz & Braly, 1933) to more recently (see Nelson, 2009), psychologists have attempted to understand prejudice—unfavorable attitudes towards a group or members of a group (Allport, 1958; Duckitt, 1992; Nelson, 2009; Pettigrew & Meertens, 1995). And for good reason. Prejudice, whether implicit or explicit, has detrimental outcomes for societies and the individuals inhabiting them. From Rohingya Muslims in Burma (Myanmar) to Yazidis in parts of the Arab World to Black people in the United States, people are persecuted and disadvantaged, resulting in psychological and physiological harm (e.g., Okazaki, 2009; Pascoe & Smart Richman 2009). As such, it is paramount to discover the factors and processes that underlie prejudice.

In terms of ultimate factors, prejudice may have developed to aid survival. Prejudice can help individuals avoid danger (Schaller, Park, & Faulkner, 2003; Stangor & Crandall, 2000), and can help ingroups uphold cohesion and functioning (Neuberg, Smith, & Asher, 2000). Proximate factors contribute to prejudice as well, either to aid survival or as a byproduct. For instance, on the societal level, competition for resources (Sherif, White, & Harvey, 1955; Sherif, Harvey, Hoyt, Hood, & Sherif, 1961), a preference for unequal social structures and hierarchies (e.g., Whitley, 1999; Sidanius & Pratto, 2001), and threat towards the self and 'group threat' (e.g., Cottrell & Neuberg, 2005, Blalock, 1967; Blumer, 1958; Quillian, 1995, 1996) are just three examples of social factors that incite prejudice. And, on the cognitive level, people's use of simplistic, fast, and efficient decision-making heuristics (stereotypes) contributes to prejudice (e.g.,

Bodenhausen, 1990; Nelson, 2009). Finally, on the emotional level, disgust plays an important role in inciting prejudice (e.g., Hodson & Costello, 2007; Taylor, 2007).

In addition to these causes, researchers have recently proposed that people's domain-general sensitivity towards deviancy may in part contribute to prejudice (**see Chapter 1**). Gollwitzer and colleagues (2017) documented that people's aversion towards nonsocial deviancy (for instance, aversion towards broken pattern of geometric shapes) predicts a substantial portion of variance in people's degree of prejudice against social outliers (d = .68). These findings indicate that people's aversion to deviancy—*the experience of negative affect in response to a perceived regularity or pattern being broken, disrupted, or distorted*—spans across nonsocial and social domains and in turn may contribute to prejudice (Gollwitzer et al., 2017; Gollwitzer & Clark, 2019; Gollwitzer, Martel, Bargh, & Chang, 2020; Gollwitzer, Martel, & Bargh, 2021).

3.2.1 Deviancy Aversion as a Domain-General Phenomenon

A number of psychological phenomena indirectly support the existence of people holding a domain-general aversion towards deviancy. Most notably, people appear to prefer regularities over irregularities across highly divergent domains. For instance, people tend to resist change (Jost, 2015), dislike atypical objects (Palmer, Schloss, & Sammartino, 2013), prefer familiar stimuli (Zajonc, 1968), imitate and mimic others (e.g., Chartrand & Bargh, 1999), and subscribe to habitual thinking and acting (e.g., James, 1890; Neal, Wood, & Quinn, 2006). Past research has also attempted to directly demonstrate that people are deviancy averse by using stimuli that are largely devoid of other connotations and previous associations (e.g., Gollwitzer et al., 2017; Heintzelman,

Trent, & King, 2013). For instance, Gollwitzer and colleagues (2017) measured people's deviancy aversion using broken patterns of geometric shapes and found that people across cultures (the United States and China) as well as children as young as 3 years old exhibit a dislike of such deviancy.[5]

Importantly, deviancy aversion is not the same as a general dislike of ambiguity (e.g., Webster & Kruglanski, 1994; Budner, 1962). Simply put, deviancy is rarely ambiguous; deviancy, as defined here, entails an evident irregularity rather than the potential of an irregularity occurring. Indeed, past research has only found weak-to-moderate correlations between people's aversion towards deviancy (in the form of broken geometric patterns) and variables associated with disliking ambiguity and uncertainty (e.g., intolerance for ambiguity, need for closure). Moreover, such nonsocial deviancy aversion is linked to social phenomena independent of such third-variables (Gollwitzer et al., 2017; Gollwitzer & Clark, 2019; Gollwitzer et al., 2020; Gollwitzer et al., 2021).

Finally, deviancy is not the same as novelty. Stimuli that are novel are not necessarily deviant. For instance, consider a grove of many novel, exotic fruits. In this scenario the fruits are novel but not deviant; in the grove, the pattern or regularity is the exotic, novel fruits—a common fruit would actually be deviant in this scenario.

[5] Though people are averse towards broken patterns, researchers have found European Americans but not Asian Americans (and Asians) to exhibit a *comparative* preference for the *single object* responsible for distorting a pattern, when asked to rank all the shapes in a broken pattern (Kim & Markus, 2008). When asked to judge the entire broken pattern in a non-ranked manner, however, European Americans exhibit a clear aversion towards broken patterns (Gollwitzer et al., 2017).

3.2.2 Deviancy Aversion and Prejudice

Researchers have found people's nonsocial deviancy aversion to predict their degree of prejudice (Gollwitzer et al., 2017). Across 7 studies, Gollwitzer and colleagues (2017) found aversion towards nonsocial deviancy (e.g., aversion towards a row of triangles with one triangle out of line) to predict substantial variance in individuals' prejudice, ~15% to 20%. Prejudice in these studies was represented via participants' dislike of various types of stigmatized individuals (e.g., someone with a skin condition), social-norm breakers, statistically negative and positive deviants (e.g., someone very poor, someone very rich), and racial minority group-members (Black individuals). Nonsocial deviancy aversion predicted prejudice against these groups across explicit and implicit measures, across cultures (United States and Chinese), and in children as young as 8-years-old. And, this overlap remained when controlling for theoretically relevant variables (e.g., political orientation, disgust, sensitivity towards threat, and disliking ambiguity and unpredictability).

That a factor as basic as people's aversion towards deviancy (in terms of regularities and patterns) potentially contributes to prejudice aligns with the universality, early-emergence, and domain-generality of prejudice (see Major & O'Brien, 2005; e.g., Dunham, Baron, & Banaji, 2008; Bigler & Liben, 2006; Sigelman, Miller, & Whitworth, 1986; Weiss, 1986). And, the link between deviancy aversion and prejudice also aligns with the targets of prejudice predominantly being individuals who are perceived as violating physical or social regularities or patterns in society, that is, people who exhibit physical deviancy (e.g., dwarfism), character deviancy (e.g., addiction), or group-identity deviancy

(e.g., minorities in the United States; Goffman, 1963). Furthermore, this link aligns with research indicating that prescriptive judgments (what 'should' be) are informed by descriptive judgments (what 'is'; e.g., Roberts, Gelman, & Ho, 2017). And finally, the findings of Gollwitzer et al. (2017) may help explain why people are prejudiced against individuals who are harmless yet perceived as deviant in society, for instance, individuals with dwarfism or individuals who are transgender (e.g., Lombardi, Wilchins, Priesing, & Malouf, 2002).

3.2.3 Goals of the Current Research

The research of Gollwitzer at al. (2017) is limited in several respects, however. Most importantly, it remains unknown a) which mechanisms underlie the relationship between nonsocial deviancy aversion and prejudice, and b) whether this relationship is causal. Here, we primarily examine these two questions. Additionally, we c) exploratorily consider the developmental trajectory of the proposed mechanism in a children's sample. And d) examine whether a domain-general aversion to deviancy can help explain the context-dependency and flexibility of prejudice; that is, why the targets and strength of prejudice fluctuates with time and context.

3.2.2.1 Mechanism: Proposed Mediation Model

Regarding a potential mechanism, we propose that the link between deviancy aversion and prejudice may in part be mediated by a dislike of statistical minorities—*disliking people who are statistically infrequent in terms of appearance, beliefs, or actions*. Notably, by statistical minorities we mean people who are *proportionally* infrequent; that

is, infrequent in comparison to a majority group. To explicate, deviancy aversion may incite prejudice by heightening negative attitudes towards statistical minorities because such individuals tend to distort the repeated model and form (the regularity or pattern) of how people tend to feel, think, and act in a society or group.

Supporting a link between deviancy aversion and disliking statistical minorities (path A of the proposed mediation; Figure 1), statistical minorities are perceived as atypical. Statistical minorities are numerically anomalous and are thus perceived as distinctive and uncharacteristic (Halberstadt, Sherman, & Sherman, 2011; Mullen, 1991; Mullen & Hu, 1989). Indeed, Moscovici (1985) noted that people who are infrequent and uncommon may be perceived as deviant because they diverge from the way that people 'tend to' look and act in a society (the established pattern in society).

Research also supports the possibility that the statistical infrequency of individuals incites prejudice (path B of the proposed mediation). For instance, research on the illusory correlation bias finds that people dislike minorities because both negative behaviors and infrequent people are distinctive (Chapman, 1967, Chapman & Chapman, 1969; Hamilton & Gifford, 1976). And further, people may claim that negative evolutionary reasons underlie the infrequency of a certain group or type of individual in society (akin to social Darwinism; e.g., Crandall, 2000; pp. 134-135). Finally, mere exposure (people's preference for stimuli they have seen before; e.g., Zajonc, 1968) and cognitive fluency (people's preference for stimuli that are easily processed; Alter & Oppenheimer, 2009) may induce individuals to dislike minorities because minorities are less likely to be encountered in everyday life (Lick & Johnson, 2015).

Finally, in direct support of the entire proposed mediation model, research has found that deviancy aversion predicts prejudice against stigmatized individuals, social-norm breakers, and racial minorities (Gollwitzer et al., 2017)—all proportional minorities in society (Crocker, Major, & Steele, 1998). Furthermore, Gollwitzer and colleagues (2017) found people's deviancy aversion to relate to prejudice against 'positive' statistical minorities as well, individuals who are high in power but are infrequent in society (e.g., the very intelligent, the very rich).

In the current article, we test the proposed mediation model across 9 studies. To ensure that our findings hold correlationally as well as experimentally, we included both correlational as well as experimental studies. And, to ensure that the mediation model conceptually replicates, we examined the model in terms of two different types of prejudice, racial prejudice (against Black individuals) and prejudice against other commonly stigmatized individuals in society (e.g., someone with a physical disability, someone who is a Muslim).

3.2.2.2 Causality

Beyond investigating the proposed mediation model, we also examined whether the relationship between deviancy aversion and prejudice is causal. A causal effect would indicate that the link between deviancy aversion and prejudice is not restricted to individual differences, would reduce the likelihood that this link arises via a confounding third-variable, and would potentially open the door for intervention possibilities. Thus, we tested whether temporarily inducing deviancy aversion causally heightens prejudice (in the

United States) against Black people and against other commonly stigmatized individuals in society (e.g., someone with a physical disability).

3.2.2.3 Early-Emergence of Prejudice

One subordinate aim of the present research was to examine the proposed mediation model from a developmental perspective. A particularly apt way to shed light on prejudice is by examining the development of prejudice. Prejudice is early-emerging—children even as young as four exhibit prejudice against Black people (e.g., Aboud, 1988; Dunham et al., 2008; Bigler & Liben, 2006; Raabe and Beelmann, 2011), as well as against other stigmatized individuals (e.g., people who are obese, people with mental illness; Sigelman et al., 1986; Lerner & Gellert, 1969; Weiss, 1986; Westervelt & Turnbill, 1980). Notably, while these targets of children's prejudice are statistical minorities, how children think and feel about people who are uncommon in a population is largely unknown (see Primi & Agnoli, 2002 for one examination).

Potentially, one reason children come to adopt prejudice against stigmatized individuals is because their deviancy aversion incites negative attitudes towards statistical minorities. That is, deviancy aversion—which has been documented in children as young as 3 (e.g., Gollwitzer et al., 2017)—may predict children's negative evaluation of infrequent individuals, and in turn their prejudice against stigmatized individuals (given the infrequency of such individuals). We investigated this possibility by examining whether the proposed mediation model also exists in children ranging from 4 to 7 years old.

3.2.2.4 Context-Dependent and Flexible Prejudice

A second subordinate aim of the current research is to shed light on why prejudice is both stable and unstable (see Payne, Vuletich, & Lundberg, 2017; Garcia-Marques, Santos, Mackie, Hagá, & Palma, 2017). While prejudice against certain groups has been around for centuries (e.g., against Jewish individuals), prejudice against other groups fluctuates with time and context. Deviancy aversion may contribute to the context-dependency of prejudice and its targets. What is deviant (that which breaks a regularity or pattern) in one situation is not necessarily deviant in another, and thus, who is perceived as deviant and therefore targeted should depend on the surrounding pattern.

With respect to the proposed mediation model, we suggest that deviancy aversion predicts prejudice against whomever the minority might be in a specific context. For instance, paradoxically, people high in deviancy aversion should, absent any other information, exhibit prejudice against Black individuals when Black people are the minority (e.g., in the United States), but exhibit *reduced* prejudice or even a preference for Black people when Black people are the majority (e.g., in countries in Africa).

3.2.4 The Current Research

Across 9 studies (N = 1,821), we investigate whether deviancy aversion impacts people's prejudice against stigmatized individuals, and whether this effect occurs in part via a general dislike of statistical minorities—disliking people who are infrequent in a population (see Table 8 for overview of all studies).

Study-set 1 examined prejudice against Black individuals. Studies 1.1 and 1.2 tested the proposed mediation model in terms of racial prejudice in correlational studies

with adults and children. We examined whether nonsocial deviancy aversion (assessed via aversion towards broken patterns of geometric shapes, as in Gollwitzer et al., 2017) relates to disliking novel statistical minorities—minority aliens on imaginary planets (A Path). We also assessed whether disliking such novel statistical minorities relates to prejudice against Black individuals (B Path), and whether nonsocial deviancy aversion relates to prejudice against Black individuals (C Path; Figure 1). Finally, we examined whether the potential link between nonsocial deviancy aversion and racial prejudice is accounted for by participants' dislike of statistical minorities (Indirect Effect). Studies 1.3 and 1.4 again tested the proposed mediation but in a causal manner; we examined whether experimentally manipulating nonsocial deviancy aversion influences explicit as well as implicit prejudice against Black people, and whether this effect is mediated by a dislike of novel statistical minorities.

In Study-set 2, we extended the proposed mediation model beyond racial prejudice to prejudice against other individuals who are stigmatized in Western society (e.g., someone cross-dressing, someone wearing a Burka). Study 2.1 examined whether the mediation exists in a longitudinal correlational design (nonsocial deviancy aversion assessed at Time 1, disliking statistical minorities at Time 2, prejudice against stigmatized individuals at Time 3). In Studies 2.2 and 2.3, we tested the mediation in a causal manner. And, in line with a causal mediation model, in Study 2.3, we tested whether intervening on the proposed mediator—disliking statistical minorities—eliminates the effect of nonsocial deviancy aversion on prejudice.

Finally, Study-set 3 tested whether deviancy aversion predicts prejudice that is context-dependent in terms of group-size. We examined whether deviancy aversion predicts greater prejudice against Black people (Study 3.1) and Muslims (Study 3.2) when such people are presented as statistical minorities in society, but also predicts *decreased* prejudice against Black people and Muslims when such people are presented as statistical majorities in society. Such results would strongly align with our claim that one way that nonsocial deviancy aversion is linked to prejudice is by inciting a dislike of statistical minorities, and further, would theoretically extend our findings by demonstrating that pattern deviancy aversion is linked to context-dependent, flexible prejudice.

One challenge we encountered was differentiating between minorities in terms of infrequency in a population (Doms, 1984; Latané & Wolf, 1981; Tanford & Penrod, 1984) and low social status or power (Blanz, Mummendey, & Otten, 1995; Moscovici, 1976; Mugny 1982). As argued by Kruglanski and Mackie (1990), in the Western world, statistical minorities are likely seen as underprivileged and disadvantaged.[6] A potential link between nonsocial deviancy aversion and disliking statistical minorities may thus be driven by a dislike of low power individuals rather than a dislike of infrequent people in a population. Indeed, deviancy aversion may predict disliking low status individuals because such people are potentially associated with instability, disorder, and rebellion (Kruglanski & Mackie, 1990). Therefore, we controlled for participants' power ratings—the extent to

[6] Though, see Cao & Banaji, 2017, who found that people (in the United States) perceive small groups as more competent explicitly but not implicitly.

which they judged statistical minorities and majorities as being in charge, in many of the reported studies.[7]

A final challenge is the group membership of our participants. Researchers have noted the importance of recognizing that participants' racial identity may moderate psychological findings, especially in terms of prejudice (Brown, 1995; Henrich, Heine, & Norenzayan, 2010; Nielsen, Haun, Kärtner, & Legare, 2017). To recognize this concern and present inclusive findings, we examined whether our results differed depending on the racial identity of participants.

3.3 Study-set 1: Racial Prejudice

Study-set 1 examined the proposed mediation model in terms of racial prejudice (against Black individuals).

3.3.1 Study 1.1

In Study 1.1, we first tested this mediation in a correlational manner. As noted earlier, because statistical minorities may be perceived as less powerful than majorities (e.g., Kruglanski & Mackie, 1990), we controlled for the extent to which participants judged novel statistical minorities and majorities as being in charge.

3.3.1.1 Method

Participants. A power-analysis based on Study S3 (a pilot study examining the correlation between nonsocial deviancy aversion and racial prejudice; r = .15; see

[7] Though we control for participants' power judgments, we note that statistical minorities are not always subordinate. Statistical minorities have held power in the past (e.g., feudal Europe), and in some cases are currently the dominant group (e.g., White people in South Africa).

Supplements of Gollwitzer, Marshall, & Bargh, 2019)[8], revealed that we needed 346 participants to have 80% power. We aimed to recruit 375 adults on Mechanical Turk (MTurk). We ended up recruiting 377 participants residing in the United States (193 female; M_{age} = 36.48, SD_{age} = 11.29). Nine participants were excluded for failing an attention check. Of the final participants, 35 identified as Asian/Asian American, 45 as Black/African American, 19 as Latino/Hispanic, 262 as White/European American, 3 as Other, and 4 as More than one race. See Supplements of Gollwitzer et al. (2019) for a link to the verbatim methodology and data files of all the presented studies. All the presented studies were conducted in compliance with APA ethical standards.

Nonsocial deviancy aversion. Deviancy aversion was assessed via three measures (presented in random order). The first was an adapted version of the measure validated by Gollwitzer et al. (2017; this identical measure was also used by Gollwitzer et al., 2020). Participants evaluated five pairs of broken and unbroken patterns comprised of geometric shapes: "How much do you like the above image?" (1 = *Not at All* to 7 = *A Lot*; reverse-coded; **see Figure 3.1**).[9] Each image was presented individually and in randomized order. As noted by Gollwitzer et al. (2017), these stimuli were created in line with conceptualizations of pattern distortion and repetition or rule violations in research on pattern-recognition (Näätänen et al., 1993; Posner, 1973).

[8] Before conducting Study 1.1, we conducted Studies S1, S2, and S3. Studies S1 (conducted with adults) and S2 (conducted with children) were correlational studies that examined solely Path A of the proposed mediation. Study S3 was a correlational study that examined the full mediation model but had a smaller sample size than Study 1.1 (see Supplements of Gollwitzer et al. 2019).

[9] The items assessed liking and not disliking of the broken patterns of geometric shapes. However, we refer to participants' responses as deviancy *aversion* because participants reported liking the broken patterns less than the unbroken patterns (see results section below). We also confirmed in the other studies reported here that our findings replicate across item-valence.

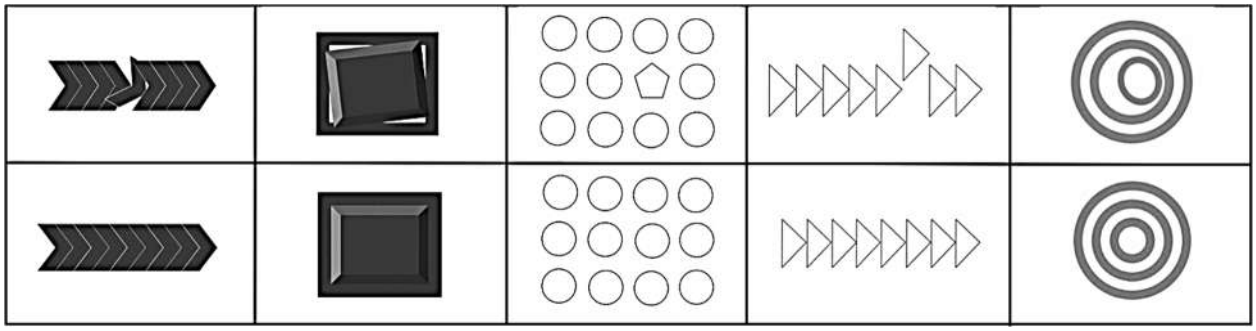

Figure 3.1. Study 1.1: The geometric shapes deviancy aversion measure. Example items of the broken patterns (top row) and their matched unbroken counterparts (bottom row). Each image was presented and evaluated individually.

The two other deviancy aversion measures were non-visual measures validated by Gollwitzer et al. (2017), Gollwitzer & Clark (2019), Gollwitzer et al. (2020), and Gollwitzer et al. (2021). The first assessed participants' attitudes towards 'explicit' deviancy. Participants responded to the following: "People feel differently about things that break a pattern, are out of line, and are disordered. How much do you agree with the following statements? Things that break a pattern, are out of line, and are disordered make me feel…" "Positive," "Happy," and "Content." Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree* (reverse-coded).

The second non-visual measure was one of mental imagery. Participants read: "Imagine a collection of objects where all the objects are very similar to one-another… if an object that is very different from the other objects is added to the collection that would make me feel…" Again, participants responded to 3 items: "Positive," "Happy," and "Content." Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree* (reverse-coded).

Disliking statistical minorities. Participants evaluated novel statistical minorities and majorities on six different planets. The inhabitants of these planets were 50 red (blue) people, and 7 blue (red) people (statistical minority: ~15%; color counter-balanced). We then depicted the minority and the majority individually and assessed two response-items each: Participants' liking, "How much do you like these people?" (1 = *Not at All* to 7 = *A Lot*), and desired identity judgments, "If you lived on this planet, would you want to be this type of person" (1 = *Not at All* to 7 = *Absolutely*; Figure 3).

Power judgments. In response to the minority and in response to the majority (individually presented; randomized), participants read, "How much do you think these people are in charge on the planet" (1 = *Not at All in Charge* to 7 = *Completely in Charge*). Within each planet, the order of the two disliking statistical minorities items and the power item was randomized (**Figure 3.2**).

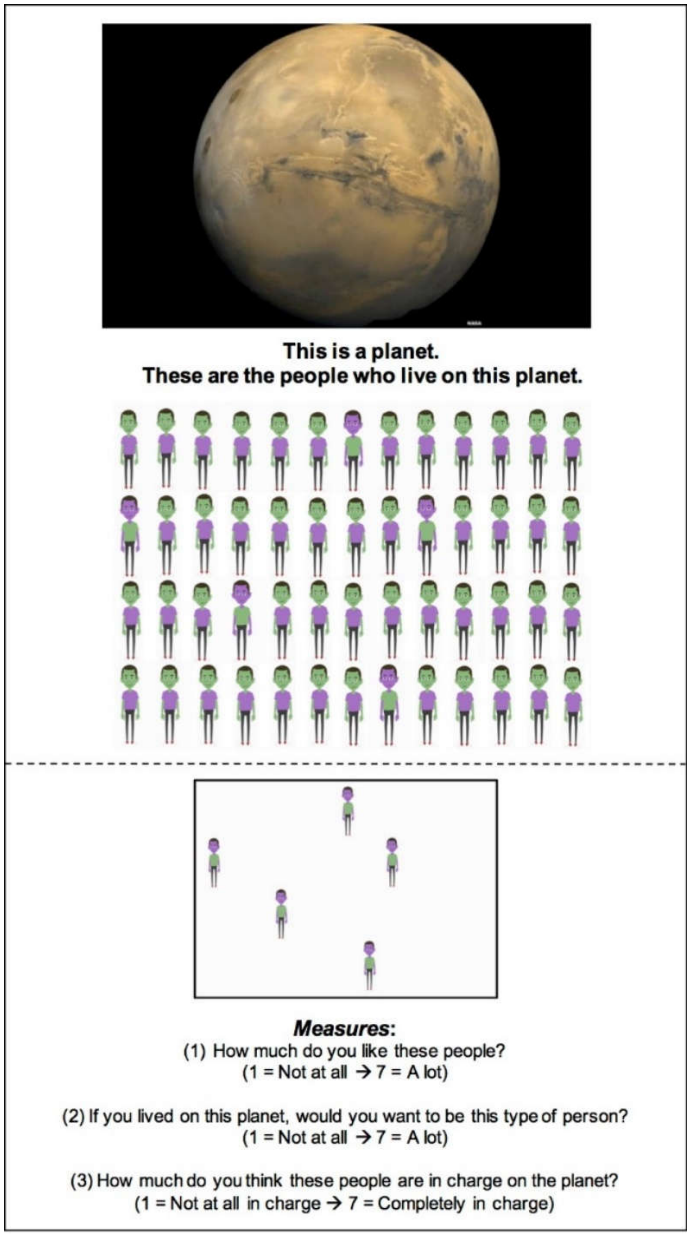

Figure 3.2. Example item of the disliking statistical minorities measure in Study 1.1. The example item is of participants' evaluation of the minority.

Distractor. Before assessing racial prejudice, we presented a distractor task—an unrelated word search task. We did so because participants may feel compelled to match their responses on the racial prejudice measure to their responses on the disliking statistical

minorities measure (i.e., exhibit prejudice if they had previously exhibited a dislike of minorities).

Racial prejudice. We presented 16 images each depicting either a White (8 images) or a Black (8 images) individual. Half of the images were from a race Implicit Associations Test (IAT) measure (Greenwald, McGhee, & Schwartz, 1998). These images have been used in previous research linking nonsocial deviancy aversion to racial prejudice (Gollwitzer et al., 2017), and have been validated in past research examining racial prejudice (see Nosek, Banaji, & Greenwald, 2002 and Xu, Nosek, & Greenwald, 2014). The other half were from the NimStim2 faces dataset (Tottenham et al., 2009); these faces have also been used in past research on racial prejudice (see Donders, Correll, & Wittenbrink, 2008, and Sesko & Biernat, 2010). In response to each image, participants read: "I like this person," "I feel positively about this person," "I would like to be friends with this person" 1 (*Not at all agree*) to 7 (*Strongly agree*). We used positive items to assess prejudice as recommended by past literature; floor effects are often found when assessing prejudice in a negative manner because people do not want to admit being prejudiced (see Maass, Castelli, & Arcuri, 2000).

Procedure. In line with the proposed mediation model, participants completed the nonsocial deviancy aversion measure, then the disliking statistical minorities and power measures (randomized), then the distractor task, and then the racial prejudice measure.

Attention check. Participants completed an indirect attention check (see Supplements of Gollwitzer et al., 2019). This attention check was in all reported studies except Study 1.2 which was with children.

3.3.1.2 Results

We calculated nonsocial deviancy aversion by reverse-coding participants' responses and averaging across the three included measures, $M = 4.72$, $SD = 1.29$; the three measures strongly loaded on a single factor (Eigenvalue of 2.15; Principle Axis Factor Analysis) and exhibited high reliability, $\omega = .81$.[10] Participants' dislike of statistical minorities was calculated by averaging their liking and desired identity responses towards the majority and subtracting their liking and desired identity responses to the minority, difference score: $M = .69$, $SD = 1.70$, $\omega = .94$. Participants' prejudice was calculated by reverse-coding and averaging across the 3-liking-items in response to the eight images of Black individuals, $M = 4.13$, $SD = 1.24$, $\omega = .98$.

Participants exhibited nonsocial deviancy aversion—they preferred the unbroken patterns over the broken patterns, $p < .001$, $d_z = 1.09$. Participants also disliked statistical minorities—they preferred novel statistical majorities over minorities, $p < .001$, $d_z = .41$, and judged the majorities as more in charge than the minorities, $p < .001$, $d_z = .89$. Finally, participants exhibited prejudice—they preferred White over Black individuals, $p = .005$, $d_z = .15$ (Table S4).

Importantly, as predicted, nonsocial deviancy aversion related to disliking novel minorities, $r(366) = .37$, $p < .001$ (path A in the proposed mediation model; **Figure 3.3**). And, disliking novel minorities related to racial prejudice, $r(365) = .23$, $p < .001$ (B path; we controlled for prejudice against White individuals in this analysis via a partial

[10] Participants' dislike of unbroken patterns of geometric shapes was not included in our analyses as a control variable because it correlated negatively with dislike of broken patterns, $r(366) = -.15$, $p = .004$. Doing so did not change any of the results.

correlation). Finally, replicating Gollwitzer and colleagues (2017), nonsocial deviancy aversion related to racial prejudice, $r(365) = .15$, $p = .003$ (C path; we controlled for prejudice against White individuals in this analysis via a partial correlation). The relationship between nonsocial deviancy aversion and disliking statistical minorities remained, $r(365) = .28$, $p < .001$, when controlling for power judgments—participants' judgments of whether novel statistical minorities or majorities are in charge.

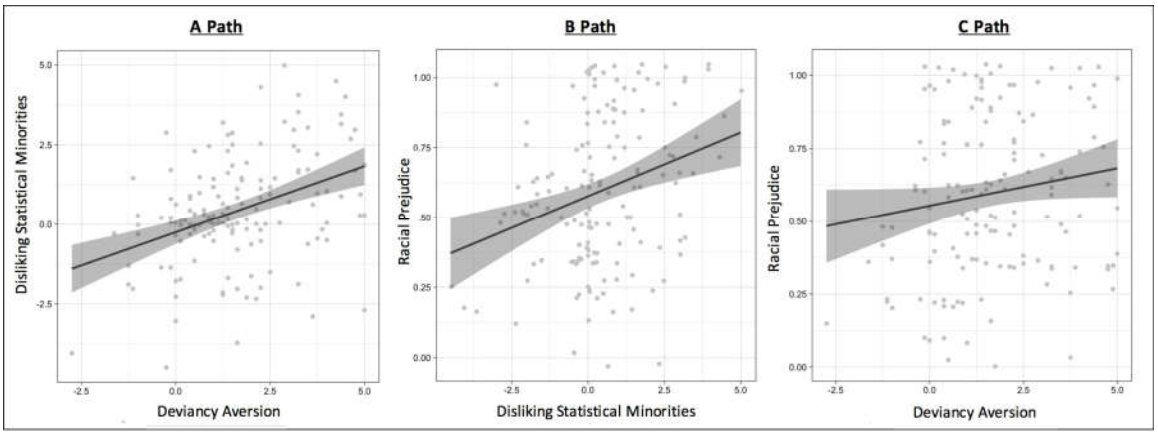

Figure 3.3. Correlations between key variables—pattern deviancy aversion, disliking statistical minorities, and racial prejudice against Black individuals (when controlling for prejudice against White individuals)—in Study 1.1; Error bands: ± 1 *SE*.

We conducted a mediation analysis using SPSS PROCESS macro (Hayes, 2012). Five thousand bootstrap samples were used to create 95% bias-corrected and accelerated (BCa) confidence intervals to test the mediation. Our analysis supported the hypothesized mediation model: The link between nonsocial deviancy aversion and prejudice significantly reduced and was no longer significant after accounting for participants' dislike of statistical minorities. Approximately 50% of the relationship between nonsocial

deviancy aversion and racial prejudice was accounted for by a general dislike of statistical minorities—dislike of people who are proportionally infrequent in a population. As such, these results also indicate that mediators aside from disliking statistical minorities likely exist given the 50% unexplained variance. Importantly, the observed indirect relationship remained when controlling for participants' power judgments (**Table 3.1**). These results should be approached cautiously, however, given the correlational nature of the study.

Table 3.1. Mediation Analyses in Study 1.1 (Adults). The Relationship Between Pattern Deviancy Aversion and Racial Prejudice was Mediated by Disliking Statistical Minorities.

	Predictor Variable	Mediator	Dependent Variable
Study 1.1 (N = 368)	Nonsocial Deviancy Aversion	Disliking Statistical Minorities	Racial Prejudice
Total Effect	β = .098, SE = .033, t = 2.97, p = .003, 95% CI: [0.033, 0.163]* β = .090, SE = .033, t = 2.73, p = .007, 95% CI: [0.025, 0.154]*,[c]		
Direct Effect	β = .051, SE = .035, t = 1.45, p = .147 95% CI: [-0.018, 0.119] β = .053, SE = .034, t = 1.56, p = .119, 95% CI: [-0.014, 0.119][c]		
Indirect Effect	β = .047, SE = .014, 95% CI: [0.022, 0.078]* β = .037, SE = .012, 95% CI: [0.017, 0.062]*,[c]		

Note. * = $p < .05$ [c] = controlling for participants' power judgments. β = standardized estimate. SE = Standard Error. CI = Confidence Interval.

Initially we had planned to examine whether the results in each of our studies are moderated by participants' racial identity. However, given the small number of minority participants in Study 1.1 (and the subsequent studies), we collapsed across the presented studies and report these analyses directly before the General Discussion of Chapter 3.

3.3.2 Study 1.2

Study 1.2 provided an exploratory and preliminary test of whether the observed mediation in Study 1.1 holds true in children (4- through 7-year-olds). By doing so, we tentatively examine whether deviancy aversion plays a role in the development of prejudice (e.g., Dunham et al., 2008; Bigler & Liben, 2006; Sigelman et al., 1986; Weiss, 1986). Specifically, children in the United States may develop prejudice against Black individuals

because their domain-general sensitivity towards deviancy incites them to dislike people who are infrequent in a population.

We recruited children aged between 4 and 7. We chose this age range because studies documenting prejudice in children have largely been conducted with children as young as 4 but not younger (e.g., Sigelman et al., 1986; Dunham et al., 2008). Further, our study materials are unlikely to have been suitable for children younger than 4 years old. Regarding the upper age-range, we chose to recruit 7-year-olds but not older children because Dunham and colleagues (2008) have documented that older children in the United States begin to regulate their explicit prejudice against Black people (respond in a more egalitarian manner).

3.3.2.1 Method

Design. The design was largely as in Study 1.1, but did not include the distractor task.

Participants. Given the difficulty of collecting large samples of children, our power analysis was based on the relationship between nonsocial deviancy aversion and disliking statistical minorities (Study S3, $r = .39$; a similar correlation was found in Study 1.1, $r = .37$). That is, we had 90% power to detect at least this relationship in children (though, we had poor power, ~20%, to detect, for instance, the relationship between nonsocial deviancy aversion and racial prejudice, $r = .15$; Study 1.1) [11]. We recruited 67 children ranging from

[11] We did not collect more children in this study because of resource constraints. We realize that 20% power is problematic. However, this was solely the power to observe the link between pattern deviancy aversion and racial prejudice. For instance, as noted earlier, we had around 90% power to observe the link

4- to 7-years-old; at least 15 per age group. Participants (37 female; M_{age} = 5.83, SD_{age} = 1.18) were recruited at a laboratory (n = 29) and local museum (n = 38) in the Northeast of the United States. The experimenters were the second author of the manuscript and two lab research assistants. Experimenters read all the materials orally while the children responded on a tablet. Four children were excluded because their ages later revealed that they were 3-years-old. Five additional participants were excluded, three for failing an attention check (described in the materials below), and two for not paying attention (including these participants did not change the results; final N = 58). Of the final participants, 1 was Asian/Asian American, 6 were Black/African American, 5 were Latino/Hispanic, 45 were White/European American, and 1 was Other.

Nonsocial deviancy aversion. We utilized a binary version of the geometric shapes deviancy aversion measure of Study 1.1 (young children may find it easier to respond to these items on binary scales; see Study S2). Children were presented with the pairs of broken and unbroken patterns of geometric shapes (randomized order; screen-side randomized) and asked for each pair of images: "Which picture do you like more?"

Disliking statistical minorities. We utilized a binary version of the minority dislike measure of Study 1.1. Again, the two response-items were, preference: "Who do you like more—These people or these people" and group-identity: "If you lived on this planet, which type of person would you want to be—These people or these people." 0 = *Minority*, 1 = *Majority*.

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between nonsocial deviancy aversion and disliking minorities (based on Study S2 and Study 1.1), and indeed, we did observe this link (see results).

Power judgments. We adapted the power item of Study 1.1 to measure children's power judgments: "Who do you think is in charge on the planet—These people or these people." 0 = *Minority*, 1 = *Majority*. This item has been validated in previous developmental research (Gülgöz & Gelman, 2017).

Racial prejudice. We utilized a binary version of the racial prejudice measure of Study 1.1. Eight items each depicting a pair of the White and Black individuals included in Study 1.1 were presented (screen-side randomized). Participants read: "Which picture do you like more?" 0 = *Black individual*, 1 = *White individual*.

Attention Check Items. We included an attention check that involved children identifying one minority member, one majority member, and acknowledging that the minority and majority looked different.

Procedure. The procedure was as in Study 1.1.

3.3.2.2 Results

Like adults in Study 1.1, children exhibited nonsocial deviancy aversion, $p < .001$, $d_z = .49$. In line with past research (e.g., Primi & Agnoli, 2002), children also disliked statistical minorities—they preferred the novel majorities over minorities, $p = .022$, $d_z = .31$. Unlike adults, children did not judge majorities as more in charge than minorities, $p = .433$, $d_z = 0.10$. Finally, replicating past research (e.g., Aboud, 1988; Dunham et al., 2008), children exhibited prejudice—they preferred White over Black individuals, $p < .001$, $d_z = .49$ (though, the internal reliability of the prejudice measure was low, $\alpha = .50$, see Supplements of Gollwitzer et al. 2019 for a discussion of this; Table S4).

As predicted, children's nonsocial deviancy aversion related to disliking novel minorities, $r(56) = .28$, $p = .035$ (A path). And, children's dislike of novel minorities related to their racial prejudice, $r(56) = .27$, $p = .038$ (B path). Children's nonsocial deviancy aversion did *not*, however, relate to their racial prejudice, $r(56) = -.12$, $p = .374$ (C path). Perhaps, this null relationship was observed because of low statistical power; indeed, based on the relationship between nonsocial deviancy aversion and racial prejudice observed in Study 1.1 ($r = .15$), we had approximately 20% power to find this relationship in Study 1.2. Alternatively, or additionally, we did not observe this relationship because of the low internal-consistency of the prejudice measure in children (which was high in adults). Unlike in adults (Study 1.1), the relationship between nonsocial deviancy aversion and disliking statistical minorities in children did not remain when controlling for power judgments, though, it remained in the predicted direction, $r(55) = .16$, $p = .236$. None of the findings were moderated by age, $.314 < ps < .970$, $.001 < \eta p^2 < .019$ (age applied as a continuous variable), though, this null effect should be approached with caution given the small sample size.

The predicted mediation was significant using a quasi-Bayesian Monte Carlo simulation, $p = .03$ (see Mediation package in R; Tingley, Yamamoto, Hirose, Keele, & Imai, 2014), and marginally significant when using bootstrapping, $p = .06$ (**Table 3.2**).[12] To summarize, though we did not find a link between nonsocial deviancy aversion and

[12] Originally, we had analyzed these data using SPSS (version ~18). When using this version of SPSS, we found a significant mediation when using bootstrapping. However, after updating SPSS to SPSS 22-25 during the revision of this article, this identical mediation was only marginally significant. The mediation was significant, however, when we applied Monte Carlo simulations in R. Potentially earlier versions of SPSS Process used a slightly different analysis as compared to more recent version. We report both the Bootstrapping results and the Monte Carlo results here to provide full transparency.

racial prejudice, we did tentatively observe an indirect link between nonsocial deviancy aversion and racial prejudice via disliking statistical minorities. Observing significant mediations and nonsignificant total effects is not uncommon; total effects are typically smaller (and thus require greater power to observe) than indirect effects (see Kenny & Judd, 2014). Similarly, though still in the predicted direction, the mediation was no longer significant when controlling for children's power judgments (Table 2). Potentially, this occurred because children did not reflect in a meaningful way on the difference between the disliking minorities and power prompts.

Table 3.2. Mediation Analyses in Study 1.2 (Children): The Relationship Between Children's Pattern Deviancy Aversion and Racial Prejudice is Tentatively Mediated by Disliking Statistical Minorities.

	Predictor Variable	Mediator	Dependent Variable
Study 1.2 (Children; $N = 58$)	Nonsocial Deviancy Aversion	Disliking Statistical Minorities	Racial Prejudice
Total Effect	β = -.119, SE = .133, t = -0.90, p = .375, 95% CI: [-0.385, 0.147]		
	β = -.200, SE = .137, t = -1.46, p = .149, 95% CI: [-0.475, 0.074][c]		
Direct Effect	β = -.211, SE = .132, t = -1.60, p = .115, 95% CI: [-0.476, 0.053]		
	β = -.242, SE = .136, t = -1.79, p = .080, 95% CI: [-0.514, 0.030][c]		
Indirect Effect	β = .090, 95% CI: [0.002, 0.226]*[,a]		
	β = .092, 95% CI: [-0.005, 0.190][b]		
	β = .040, 95% CI: [-0.026, 0.151][c]		

Note. * = $p < .05$ [a] = when using a quasi-Bayesian Monte Carlo simulation to calculate the indirect effect (1000 simulations). [b] = when using bootstrapping to calculate the indirect effect (5000 bootstraps). [c] = Monte Carlo simulation while controlling for participants' power judgments (1000 simulations). β = standardized estimate. CI = Confidence Interval. *SE*s are not reported for the indirect effects because the Mediation package in R does not provide them.

3.3.3 Discussion: Studies 1.1 & 1.2

In Studies 1.1 and 1.2, both adults' and children's nonsocial deviancy aversion related to disliking novel statistical minorities—evaluating minorities as less positive than majorities on imaginary alien planets (Path A). We also found that adults' and children's dislike of novel statistical minorities related to prejudice against Black individuals—a finding that, at least to our knowledge, is novel (Path B). Further, while a total effect of nonsocial deviancy aversion on racial prejudice was observed in adults, this link was not found in children (Path C). Finally, Studies 1.1 and 1.2 observed the hypothesized mediation in adults and tentatively in children 4 to 7 years old, albeit, in a correlational manner.

Notably, the developmental findings (Study 1.2), are largely exploratory and limited given the small sample size; the results should be considered with caution and are predominantly reported here to encourage future research. Possibilities for future research include examining how the exposure of children to the targets of prejudice being tested moderates the potential link between pattern deviancy aversion and prejudice and, how this link relates to other studied predictors of prejudice in children, such as essentialism.

3.3.4 Studies 1.3 and 1.4: Experimental Mediation Analyses—Racial Prejudice

Researchers have noted the risks of deriving process/mediation models based on correlational data (e.g., Bullock, Green, & Ha, 2010; Fiedler, Schott, & Meiser, 2011). Therefore, in Studies 1.3 and 1.4, we conducted causal experiments. Specifically, we experimentally manipulated nonsocial deviancy aversion and examined the proposed mediation model in terms of explicit (Study 1.3) and implicit (Study 1.4) racial prejudice.

3.3.4.1 Method

Design. Participants were prompted to generate either negative or positive aspects of nonsocial deviancy (between-subjects: high versus low nonsocial deviancy aversion). We then assessed participants' dislike of novel statistical minorities (mediator), and thereafter their prejudice against Black people (dependent variable).

Participants. A power-analysis (correlation between pattern deviancy aversion and racial prejudice in Gollwitzer and colleagues [2017]; approximately $r = .20$) revealed that we needed approximately 192 participants to achieve 80% power. We recruited 268 participants in Study 1.3, and 199 participants in Study 1.4. Of the total participants (Study

1.3: 161 Female; M_{age} = 36.21, SD_{age} = 12.41; Study 1.4: 120 Female; M_{age} = 37.30, SD_{age} = 11.78), 19 participants (Study 1.3) and 8 participants (Study 1.4) were excluded for failing one or more of the attention check items. In Study 1.3, an additional response was excluded because a participant took the experiment twice. Of the final participants in Study 1.3, 12 identified as Asian/Asian American, 12 as Black/African American, 12 as Latino/Hispanic, 201 as White/European American, 3 as Other, and 8 as More than one race. Of the final participants in Study 1.4, 9 identified as Asian/Asian American, 13 as Black/African American, 7 as Latino/Hispanic, 157 as White/European American, 2 as Other, and 3 as More than one race.

Deviancy manipulation. Participants were either assigned to generate and reflect on negative (high deviancy aversion) or positive (low deviancy aversion) attributes of nonsocial deviancy. Participants read and responded to the following prompt:

> "Think of things/objects that break a pattern, are out of line, and create disorder. What are three negative (*positive*) attributes of such things/objects? For instance, what is something negative (*positive*) about a few objects that are different in a collection of objects that are all the same? For example, what is something negative (*positive*) about a few blueberries in a bowl of many strawberries, or what is something negative (*positive*) about the images below?"

The images presented to participants depicted two of the broken patterns of geometric shapes included in Studies 1.1 and 1.2 (see Figure S4). Participants thereafter were prompted to imagine and reflect on the negative (*positive*) attributes of nonsocial deviancy that they had come up with (depending on condition). In all of the studies, participants were reminded of their response to the manipulation before they completed each of the disliking statistical minorities, racial prejudice, and nonsocial deviancy

manipulation check measures (see Supplements of Gollwitzer et al., 2019 for complete materials).[13]

Disliking statistical minorities and power judgments. Participants' dislike of statistical minorities and power judgments were assessed as in Study 1.1.

Racial prejudice. In Study 1.3, the racial prejudice measure was that of Study 1.1.[14] In Study 1.4, racial prejudice was assessed via a race IAT (Greenwald et al., 1998). Participants' IAT scores were reverse-coded so that higher scores indicated greater prejudice (see Supplements of Gollwitzer et al., 2019 for details).

Manipulation check: Nonsocial deviancy aversion. The nonsocial deviancy aversion manipulation check in Studies 1.3 and 1.4 was a shortened version of the geometric nonsocial deviancy aversion measure from Study 1.1.

Attention checks. Participants completed three attention checks (see Supplements of Gollwitzer et al., 2019).

Procedure. In each study, participants were first randomly assigned to the high or low nonsocial deviancy aversion condition. Participants then completed the dislike of statistical minorities and power measures, thereafter the racial prejudice measure, and finally, the nonsocial deviancy aversion manipulation check.

[13] Repeatedly reminding participants of their response to the manipulation prompt may have heightened demand effects. In Study-set 2, we dealt with this issue by removing these reminder prompts.
[14] We also included a stereotype item in Study 1.3: "This person is unlikely to be a criminal" for exploratory purposes. We found no effect of deviancy aversion on this item (see Supplements of Gollwitzer et al., 2019).

3.3.4.2 Results

In both studies, the deviancy aversion manipulation successfully altered participants' deviancy aversion, *p*s < .001. Further, in each study, participants in the high (versus low) deviancy aversion condition reported greater dislike of novel statistical minorities, *p*s < .001 (A path). This effect remained when controlling for participants' power judgments, *p*s < .001 (Table 3). Additionally, in each study, disliking novel statistical minorities related to racial prejudice (B path); Study 1.3: $r(245) = .20$, $p = .002$ (explicit racial prejudice); Study 1.4: $r(184) = .20$, $p = .006$ (implicit racial prejudice).

We did not, however, find a total effect of deviancy aversion on racial prejudice in either of the two studies (C path; **Table 3.3**). Given these inconclusive results, we conducted an *exploratory* meta-analysis of the findings of Studies 1.3 and 1.4 (and two supplemental studies, Studies S4 and S5, which also examined the effect of nonsocial deviancy aversion on racial prejudice; see Supplements of Gollwitzer et al., 2019 for details). We did not observe a convincing total effect collapsed across these studies; our meta-analysis indicated that if a total effect of deviancy aversion on racial prejudice does exist, this effect is exceedingly small ($r \sim .06$; see Supplements of Gollwitzer et al., 2019).

Table 3.3. Studies 1.3 and 1.4. Effects of Deviancy Aversion Manipulation on Disliking Novel Statistical Minorities and Racial Prejudice (Prejudice Against Black Individuals).

	High Deviancy Aversion (*M* and *SD)*	Low Deviancy Aversion (*M* and *SD)*	Significance Test
Study 1.3	$n = 129$	$n = 119$	
Manipulation check			
Nonsocial Deviancy Aversion	2.91, 2.03	0.64, 1.89	$F(1, 246) = 82.75$, $p < .001$, $\eta p^2 = .252$
Mechanism			
Disliking Statistical Minorities	0.65, 1.89	-0.53, 1.68	$F(1, 246) = 27.21$, $p < .001$, $\eta p^2 = .100$
Disliking Statistical Minorities [c]	0.57, 1.76	-0.45, 1.76	$F(1, 245) = 20.28$, $p < .001$, $\eta p^2 = .076$
Dependent Variable			
Racial Prejudice (Continuous)	4.11, 1.17	3.84, 1.21	$F(1, 245) = 2.89$, $p = .090$, $\eta p^2 = .012$
Study 1.4	$n = 102$	$n = 89$	
Manipulation check			
Nonsocial Deviancy Aversion	2.91, 1.95	0.27, 1.84	$F(1, 189) = 92.26$, $p < .001$, $\eta p^2 = .328$
Mechanism			
Disliking Statistical Minorities	0.59, 1.87	-0.48, 1.49	$F(1, 189) = 18.82$, $p < .001$, $\eta p^2 = .091$
Disliking Statistical Minorities [c]	0.56, 1.67	-0.44, 1.68	$F(1, 188) = 16.79$, $p < .001$, $\eta p^2 = .082$
Dependent Variable			
Racial Prejudice (Implicit)	0.30, 0.36	0.32, 0.40	$F(1, 184) = 0.16$, $p = .687$, $\eta p^2 = .001$

Note. [c] = controlling for participants' power judgments.

Hypothesized mediation model. Despite not observing a significant total effect, the proposed mediation was found in both studies: The link between deviancy aversion and racial prejudice was mediated by disliking novel statistical minorities. These mediation analyses remained significant when controlling for participants' power judgments (**Table 3.4**), and further, a moderated mediation—with power judgments as the moderator—was not found. In both studies, the mediation model was also not

moderated by participants' political orientation, age, or sex (see Supplements of Gollwitzer et al., 2019).

Table 3.4. Mediation Effects in Studies 1.3 and 1.4: Deviancy Aversion's Effect on Racial Prejudice was Mediated by Disliking Statistical Minorities.

	Predictor Variable	Mediator	Dependent Variable
Study 1.3 (n = 248)	Deviancy Aversion	Disliking Statistical Minorities	Racial Prejudice (Explicit)
Total Effect	β = .118, SE = .070, t = 1.70, p = .090, 95% CI: [-0.019, 0.255] β = .145, SE = .071, t = 2.06, p = .041, 95% CI: [0.006, 0.284]*,c		
Direct Effect	β = .056, SE = .072, t = 0.77, p = .442, 95% CI: [-0.087, 0.198] β = .079, SE = .072, t = 1.10, p = .271, 95% CI: [-0.062, 0.220]c		
Indirect Effect	β = .063, SE = .026, 95% CI: [0.019, 0.119]* β = .066, SE = .025, 95% CI: [0.024, 0.121]*,c		
Study 1.4 (n = 186)	Deviancy Aversion	Disliking Statistical Minorities	Racial Prejudice (Implicit)
Total Effect	β = -.060, SE = .147, t = -0.40, p = .687, 95% CI: [-0.350, 0.231] β = -.031, SE = .148, t = -0.21, p = .835, 95% CI: [-0.323, 0.261]c		
Direct Effect	β = -.200, SE = .151, t = -1.32, p = .189, 95% CI: [-0.498, 0.099] β = -.178, SE = .150, t = -1.18, p = .238, 95% CI: [-0.474, 0.119]c		
Indirect Effect	β = .140, SE = .053, 95% CI: [0.043, 0.247]* β = .147, SE = .052, 95% CI: [0.053, 0.256]*,c		

Note. * = $p < .05$ c = controlling for participants' power judgments. β = standardized estimate. SE = Standard Error. CI = Confidence Interval.

3.3.5 Discussion: Studies 1.3 & 1.4

Studies 1.3 and 1.4 provide experimental evidence for the proposed mediation model. Participants induced with high deviancy aversion compared to those induced with low deviancy aversion exhibited a greater dislike of novel statistical minorities, and this dislike predicted their degree of racial prejudice. This mediation was found across

explicit (Study 1.3) and implicit (Study 1.4) measures of racial prejudice. And, the mediation remained when controlling for participants' power judgments—participants' judgments of who was likely to be in charge in a population (novel minorities versus novel majorities). Furthermore, the mediation was not moderated by participants' power judgments, political orientation, age, or biological sex in either of the presented studies. And, a supplemental study confirmed that the observed mediation holds across binary and continuous measures of racial prejudice (Study S4; see Supplements of Gollwitzer et al., 2019).

Though we observed the proposed mediation model in Studies 1.3 and 1.4, and observed a significant correlation between deviancy aversion and racial prejudice in Study 1.1, we did *not* find a total effect of deviancy aversion on racial prejudice. Observing significant mediations and nonsignificant total effects is not uncommon; total effects are typically smaller (and thus require greater power to observe) than indirect effects (Kenny & Judd, 2014). These results indicate that while deviancy aversion is indirectly linked to racial prejudice, temporarily manipulating deviancy aversion (in a nonsocial manner) does not seem to meaningfully impact racial prejudice.

Possibly, a total effect of deviancy aversion on racial prejudice was not observed because this causal link develops over time and is difficult to induce in a state manner. Alternatively, or additionally, this total effect was not observed because of the societal and historical complexity of prejudice against Black individuals in the United States. That is, other social and societal variables may take precedence. Variables such as group-threat, dominance motives, institutional factors, resource competition, histories of

oppression, dehumanization, systemic oppression, and egalitarianism (see Nelson, 2009) may eliminate or suppress any effects of deviancy aversion on racial prejudice. We discuss this possibility in greater depth in the general discussion.

Finally, we note some limitations of Studies 1.3 and 1.4. First, the studies did not include a no-treatment control (the same is true of all the experimental studies reported here). As such, it remains unclear whether increasing deviancy aversion heightens prejudice or decreasing deviancy aversion reduces prejudice. Second, Studies 1.3 and 1.4 only examined prejudice against Black individuals; these studies did not examine prejudice against other target groups. We address this issue in Study-set 2.

3.4 Study-set 2: Prejudice Against Stigmatized Individuals

Given the results of Study-set 1, Study-set 2 ($k = 3$; $N = 602$) had three main goals. First, we wished to examine whether the mediation model observed in Study-set 1 extends beyond prejudice against Black individuals; does the observed mediation hold true for other groups of stigmatized people in Western society (e.g., someone with dwarfism, someone wearing a Burka; someone with a skin condition)? To examine this possibility, Study 2.1 tested the proposed mediation model in terms of prejudice against various groups of stigmatized individuals in a longitudinal, correlational manner, and Studies 2.2 and 2.3 tested this mediation model in an experimental manner.

Second, we examined whether deviancy aversion, while it largely did not directly affect prejudice towards Black people in Studies 1.3 and 1.4, does have an effect on prejudice against other types of stigmatized individuals (Studies 2.2 and 2.3). Supporting this possibility, deviancy aversion has been found to correlate more strongly with

prejudice towards various types of stigmatized individuals than with specifically prejudice towards Black individuals (Gollwitzer et al., 2017).

Third, we sought to establish a *causal* pathway in terms of the proposed mediation. Study 2.3 examined whether intervening at the level of the mediator, disliking statistical minorities, reduces or eliminates the effect of deviancy aversion on prejudice. Such an effect would support a causal pathway (e.g., Kendler & Campbell, 2009; Spencer, Zanna, & Fong, 2005) from deviancy aversion to prejudice via a dislike of statistical minorities.

3.4.1 Study 2.1

Study 2.1 was a longitudinal, correlational study. Deviancy aversion was assessed at Time 1, disliking novel statistical minorities at Time 2 (2 days later), and prejudice against stigmatized individuals at Time 3 (6 days later). This design was adopted for two reasons. First, we sought to reduce the possibility that demand bias drives our findings; the earlier studies were all conducted in a single setting and the measures all shared connotations of 'deviancy.' Second, mediation models suggest a time-course in terms of longitudinal progression. If the proposed mediation model is valid, then the mediation should be observed even when the variables of interest are assessed in a longitudinal manner.[15] In Study 2.1, we also assessed participants' aversion towards novel stimuli

[15] Of course, the longitudinal design reported here is not the classic way to test a mediation model longitudinally, which would include measuring each of the relevant variables at each time point. We did not do so because our main goal was to reduce demand/response bias and presenting the three relevant variables at each time point would have defeated this purpose.

(their novelty aversion) to exclude the possibility that our findings are simply driven by a dislike of novelty.

3.4.1.1 Method

Design. The design of Study 2.1 was correlational and longitudinal. We assessed nonsocial deviancy aversion at Time 1, dislike of novel statistical minorities at Time 2 (2 days after Time 1), and prejudice against stigmatized individuals at Time 3 (6 days after Time 1). We also assessed participants' novelty aversion—their aversion towards nonsocial examples of novelty (Time 1).

Participants. A power-analysis based on the findings of Gollwitzer et al. (2017; r = .32) revealed that we needed 98 participants to have 90% power. However, we aimed to collect 400 participants to account for participants dropping out after Time 1 and Time 2, and to account for smaller effect sizes given the longitudinal nature of the study. The number of recruited participants was 404 (MTurk; 213 female; M_{age} = 38.99, SD_{age} = 12.67). Of the 404 participants, 140 were excluded because they did not complete all three parts of the survey. Six additional participants were excluded for failing an attention check. Of the final participants (N = 258), 21 identified as Asian/Asian American, 22 as Black/African American, 12 as Latino/Hispanic, 197 as White/European American, 2 as other, and 4 as more than one race.

Time 1: Deviancy aversion. We assessed the three measures of nonsocial pattern deviancy aversion from Study 1.1.

Time 1: Novelty aversion. We assessed participants' dislike of novelty via a face-valid 3-item measure (see Gollwitzer & Clark, 2019). Participants read: "People feel differently about things that are new, novel, and original. How uncomfortable do the following things make you feel?" and responded to three items: "New Things," "Novel Things," and "Original Things" 1 = *Not at all uncomfortable* to 7 = *Extremely uncomfortable*.

Time 2: Disliking statistical minorities. We assessed disliking statistical minorities using the measure of Studies 1.1, 1.3, and 1.4. We also added a second, face-valid minority dislike measure to increase the generalizability of our findings, and to ensure that our findings are not constrained to visual measures. Participants read: "How do you feel about statistical minorities in society, that is, how do you feel about individuals who are statistically anomalous in society in terms of their appearance, actions, and attitudes…" and then responded to three items: "I want to be friends with such people," "I like such people," and "I feel warmly towards such people" 1 = *Not at all agree* to 7 = *Strongly agree* (responses were reverse-coded to represent dislike). We averaged across these two measures to create a single disliking statistical minorities score for each participant.

Time 3: Prejudice against stigmatized individuals. Participants evaluated 20 images each depicting a different person. Ten of these images depicted 'normative' individuals, and the other 10 depicted individuals commonly stigmatized in society (e.g., someone with a physical disability, someone with a skin condition, someone crossdressing, someone wearing a Burka; randomized order; similar images were included in Gollwitzer et al.,

2017). In response to each image, participants responded to: 1 = *I do not like this person* to 7 = *I like this person* (see Verbatim Methodology files for images).

To extend the generalizability of our findings, we also assessed prejudice against stigmatized individuals using a non-visual and arguably more standardized measure: Participants' general evaluation of varying types of people (see Cottrell & Neuberg, 2005; Johnson, Rowatt, & LaBouff, 2010). Participants reported how much they like someone transgender, a highly committed Muslim, someone with mental illness, and someone homeless, 1 = *I do not like this person* to 7 = *I like this person* (reverse-coded; randomized; see Supplements of Gollwitzer et al., 2019). Again, we used positive response items because floor effects are often found when assessing prejudice in a negative manner (due to egalitarian concerns; Maass, Castelli, & Arcuri, 2000). We averaged across the visual and non-visual prejudice measures to create a single prejudice score for each participant.

Prejudice against women. Participants reported how much they like someone who is a woman, 1 = *I do not like this person* to 7 = *I like this person* (reverse-coded). Notably, deviancy aversion should *not* necessarily relate to prejudice against women given that women are not a statistical minority in society (at least generally) and are largely not perceived as socially deviant.

Procedure. At Time 1, participants completed the nonsocial deviancy and novelty aversion measures in random order. These measures were separated by a distractor task to reduce demand bias (the distractor task of Study 1.1) At Time 2, participants completed the two minority dislike measures (random order). At Time 3, participants completed the

two prejudice measures (random order). Demographics and an attention check (see Study 1.1) were assessed at Time 1.[16]

3.4.1.2 Results

As predicted, deviancy aversion (Time 1) related to disliking novel minorities (Time 2), $r(256) = .27$, $p < .001$ (Path A; see Supplements of Gollwitzer et al., 2019 for descriptive statistics). And, disliking novel minorities (Time 2) related to prejudice (Time 3), $r(256) = .48$, $p < .001$ (B path). Finally, deviancy aversion (Time 1) related to prejudice (Time 3), $r(256) = .24$, $p < .001$ (C path; **Figure 3.4**). These relationships all remained when controlling for participants' aversion towards novelty, rs > .22, ps < .001.[17,18] Deviancy aversion also significantly predicted the *individual* disliking statistical minorities and prejudice measures, ps < .002; for instance, deviancy aversion predicted prejudice on both the visual prejudice measure, $r(256) = .20$, $p = .001$, and the face-valid non-visual measure, $r(256) = .21$, $p = .001$. Finally, in line with our hypotheses, while deviancy aversion predicted prejudice against stigmatized individuals who are statistically infrequent in society, it did not predict prejudice against women, $r(256) = -.10$, $p = .108$.[19]

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[16] Three items related to a different line of research were included at the end of Time 2 and the end of Time 3. The results of these items are not reported as they are not relevant to the presented results.

[17] Nonsocial deviancy and novelty aversion correlated marginally, $r(256) = .12$, $p = .063$

[18] As in Study 1.1, we did not control for participants' aversion towards the unbroken patterns because such aversion correlated negatively with aversion towards broken patterns, $r(256) = -.23$, $p < .001$.

[19] We also assessed deviancy aversion at Time 3 (at the very end of the study) and examined the temporal stability of such aversion. Participants' deviancy aversion at Time 1 strongly related to their deviancy aversion at Time 3, $r(256) = .71$, $p < .001$.

The proposed mediation was observed. As was the case for racial prejudice, the relationship between deviancy aversion and prejudice reduced when accounting for participants' dislike of statistical minorities. Nearly identically to Study 1.1, approximately 50% of the relationship between deviancy aversion and prejudice was accounted for by participants' dislike of statistical minorities. Again, these results also indicate that mediators aside from disliking statistical minorities likely exist—indeed, in Study 2.1, the direct effect, though reduced, remained significant after accounting for disliking statistical minorities. Importantly, the observed indirect relationship remained when controlling for participants' novelty aversion (**see Table 3.5**).

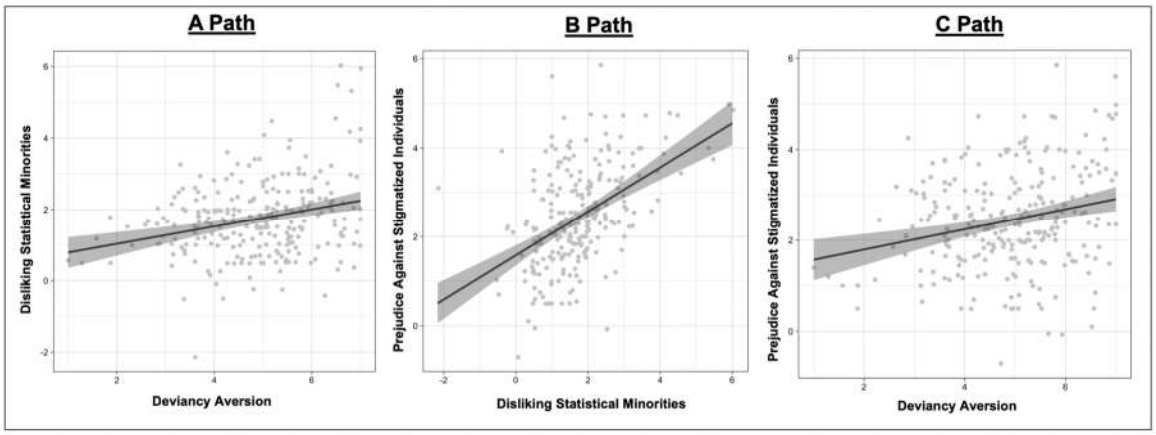

Figure 3.4. Study 2.1: Correlations between key variables—deviancy aversion, disliking statistical minorities, and prejudice against stigmatized individuals. Study 2.1 was longitudinal. Error bands: ± 1 *SE*.

Table 3.5. Mediation Effects in Study 2.1: The Link Between Deviancy Aversion and Prejudice Against Stigmatized Individuals was Mediated by Disliking Statistical Minorities.

Note. * = $p < .05$ β = standardized coefficients. *SE* = Standard Error. CI = Confidence Interval.

3.4.2 Study 2.2

Study 2.2 causally tested the mediation observed in Study 2.1. We also tested whether deviancy aversion—though it only indirectly affected racial prejudice in Studies 1.3 and 1.4—does have a total effect on prejudice against various other groups of stigmatized individuals.

3.4.2.1 Method

Participants. The power-analysis for Study 2.2 was as in Studies 1.3 and 1.4. We recruited 217 participants in Study 2.2 (107 female; M_{age} = 34.14, SD_{age} = 9.84). Of the total participants, 95 were excluded for failing one or more attention check items or taking the study more than once.[20] Of the final participants, 13 identified as Asian/Asian American, 5 as Black/African American, 8 as Latino/Hispanic, 93 as White/European American, 1 as other, and 2 as more than one race.

Deviancy manipulation. Unlike Studies 1.3 and 1.4, in which we manipulated deviancy aversion in a descriptive manner, in Study 2.1, we manipulated deviancy aversion

Correlation:	**Predictor Variable Time 1**	**Mediator Time 2**	**Outcome Variable Time 3**
Study 2.1 (N = 258)	Deviancy Aversion	Disliking Statistical Minorities	Prejudice (Stigmatized)
Total Effect	β = .243, *SE* = .061, t = 4.00, $p < .001$, 95% CI: [0.123, 0.362]*		
Direct Effect	β = .121, *SE* = .057, t = 2.13, p = .034, 95% CI: [0.009, 0.232]*		
Indirect Effect	β = .122, *SE* = .032, 95% CI: [0.062, 0.190]*		

[20] The higher exclusion rate compared to Studies 1.3 and 1.4 was likely due to the additional attention check items and due to a decrease in the quality of MTurk responses documented in the Summer of 2018.

in a motivational manner.[21] Specifically, for participants in the high deviancy aversion condition, we induced participants with the goal to evaluate deviancy as negative and a lack of deviancy as positive. In contrast, for participants in the low deviancy aversion condition, we induced participants with the goal to evaluate deviancy as positive and a lack of deviancy as negative (the specific manipulation prompts are presented below). Importantly, while these goals were active—before goal-attainment had occurred—participants completed the disliking statistical minorities and racial prejudice measures. Goals generally remain active and intrude on current tasks and judgments until goal-attainment is achieved (e.g., Förster, Liberman, & Friedman, 2007; Förster, Liberman, & Higgins, 2005; Klinger, 1975; Martin & Tesser, 1989; Masicampo & Baumeister, 2011).

High deviancy aversion. Participants in the high deviancy aversion condition read and responded to the following prompt:

"This survey includes a task or 'game' in which you have to come up with negative attributes about things/objects that break a pattern, are out of line, and create disorder, and positive attributes about things/objects that follow a pattern, are in line, and create order. Later in this survey you will have to report what you have come up with. If you come up with 75% more negative aspects of things that break a pattern, are out of line, and create disorder, and positive aspects of things that follow a pattern, are in line, and create order than the other participants in this survey you will be entered into a raffle to win a prize."

[21] Given the shift from a descriptive manipulation to a motivational manipulation between Study-set 2 and 3, we conducted Study S5. In Study S5, we tested racial prejudice using the motivational manipulation utilized in Studies 2.2 and 2.3. This study did not find the shift in manipulation to impact the results.

Low deviancy aversion. Participants in the low deviancy aversion condition read the identical prompts as those in the high deviancy aversion condition except the word 'positive' was replaced with the word 'negative' and the word 'negative' was replaced with the word 'positive.'

Attention check and motivation items. Before continuing, all participants completed two attention check items (see Study S5 in the Supplements of Gollwitzer et al., 2019 for details), and a self-report motivational item, depending on condition: "I feel motivated to come up with negative (*positive*) attributes about things that break a pattern, and positive (*negative*) attributes about things that follow a pattern" Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*. Finally, participants were told that they would have to report the attributes they came up with directly after answering 3 question-sets and thus, should come up with these attributes while completing the 3 question-sets. Before beginning these 3 question-sets, participants were told, depending on condition, to "start thinking of negative (*positive*) words that are associated with things that break a pattern (e.g., disruptive [*exciting*]), and positive (*negative*) words that are associated with things that follow a pattern (e.g., organized [*boring*])." For all prompts and detailed materials, see Study S5 and the Supplements of Studies 2.2 and 2.3 in the Supplements of Gollwitzer et al., 2019.

Disliking statistical minorities. We adapted the disliking statistical minority measure of Study-set 1 to a binary format. Participants saw three planets and the minority and majority inhabitants on these planets and were asked: "Which people do you consider more negative" 0 = *Majority*, 1 = *Minority*. Unlike Study-set 1, we assessed participants' *negative* evaluation to ensure that our findings replicate across valence.

Prejudice against stigmatized individuals. Prejudice was assessed as in the visual measure in Study 2.1 and as in Gollwitzer and colleagues (2017). Participants evaluated images of commonly stigmatized people versus images of 'normal' people.

Procedure. The procedure was as in Studies 1.3 and 1.4.

3.4.2.2 Results

The manipulation successfully altered participants' deviancy aversion—participants in the high (versus low) deviancy aversion condition exhibited greater nonsocial deviancy aversion on the manipulation check items, $p < .001$. Additionally, and replicating Studies 1.3 and 1.4, participants in the high (versus low) deviancy aversion condition exhibited an increased dislike of novel statistical minorities, $p = .013$ (Path A; see **Table 3.6** and Figure S5). Disliking novel minorities also related to prejudice against stigmatized individuals—disliking stigmatized individuals as compared to 'normative' individuals, $r(120) = .30$, $p = .001$ (Path B). Finally, an effect of deviancy aversion on prejudice against stigmatized individuals was found, $p = .030$ (Path C; see Table 6 and Figure S6).

Table 3.6. Study-set 2: Studies 2.2 and 2.3. Effects of the Deviancy Aversion Manipulation on Disliking Statistical Minorities and Prejudice Against Stigmatized Individuals.

	High Deviancy Aversion (*M* and *SD)*	Low Deviancy Aversion (*M* and *SD)*	High DA + Mediator Intervention (*M* and *SD)*	Significance Test
Study 2.2	$n = 67$	$n = 55$		
Manipulation check:				
Nonsocial Deviancy Aversion	2.68, 1.74	0.15, 3.03	-	$F(1, 120) = 33.58$, $p < .001$, $\eta p^2 = .219$
Mechanism:				
Disliking Statistical Minorities	0.73, 0.39	0.53, 0.46	-	$F(1, 120) = 6.30$, $p = .013$, $\eta p^2 = .050$
Dependent Variable:				
Prejudice (Stigmatized)	1.70, 1.74	1.02, 1.68	-	$F(1, 120) = 4.80$, $p = .030$, $\eta p^2 = .038$
Study 2.3	$n = 71$	$n = 70$	$n = 61$	
Manipulation check:				
Nonsocial Deviancy Aversion	2.38, 1.92	0.46, 2.70	2.41, 1.60	$F(2, 199) = 18.54$, $p < .001$, $\eta p^2 = .157$
	◊	◊		$t(139) = 5.30$, $p < .001$, $d = .90$
	◊		◊	$t(130) = 0.07$, $p = .940$, $d = .01$
		◊	◊	$t(129) = 5.18$, $p < .001$, $d = .91$
Mechanism:				
Disliking Statistical Minorities	0.76, 0.38	0.57, 0.43	0.61, 0.45	$F(2, 199) = 3.99$, $p = .020$, $\eta p^2 = .039$
	◊	◊		$t(139) = 2.66$, $p = .008$, $d = .45$
	◊		◊	$t(130) = 2.08$, $p = .037$, $d = .36$
		◊	◊	$t(129) = 0.47$, $p = .634$, $d = .08$
Dependent Variable:				
Prejudice (Stigmatized)	1.67, 1.40	0.95, 1.48	1.25, 1.24	$F(2, 199) = 4.80$, $p = .009$, $\eta p^2 = .046$
	◊	◊		$t(140) = 3.09$, $p = .002$, $d = .52$
	◊		◊	$t(131) = 1.73$, $p = .084$, $d = .30$
		◊	◊	$t(130) = 1.24$, $p = .217$, $d = .22$

Note. ◊ signifies inclusion in a pairwise comparison. DA = Deviancy aversion.

Conceptually replicating the findings of Studies 1.3 and 1.4, we observed the hypothesized mediation model in Studies 2.2 and 2.3: The effect of deviancy aversion on prejudice against stigmatized individuals was mediated by disliking statistical minorities

(**Table 3.7**). More specifically, the effect of deviancy aversion on prejudice decreased by approximately 30% when accounting for participants' dislike of statistical minorities. Finally, the observed mediation was not moderated by participants' political orientation, age, or biological sex (see Supplements of Gollwitzer et al., 2019).

Table 3.7. Mediation Effects in Studies 2.2 and 2.3: The Link Between Deviancy Aversion and Prejudice Against Stigmatized Individuals was Mediated by Disliking Statistical Minorities.

Experiments:	**Independent Variable**	**Mediator**	**Dependent Variable**
Study 2.2 (N = 122)	Deviancy Aversion	Disliking Statistical Minorities	Prejudice (Stigmatized)
Total Effect	β = .393, SE = .179, t = 2.19, p = .030, 95% CI: [0.038, 0.747]*		
Direct Effect	β = .274, SE = .178, t = 1.54, p = .126, 95% CI: [-0.078, 0.627]		
Indirect Effect	B = .118, SE = .062, 95% CI: [0.014, 0.257]*		
Study 2.3 (N = 202)	Deviancy Aversion	Disliking Statistical Minorities	Prejudice (Stigmatized)
Relative Effect: High (coded: 1) Versus Low Deviancy Aversion (coded: 0)			
Total Effect	β = .510, SE = .165, t = 3.08, p = .002, 95% CI: [0.184, 0.836]*		
Direct Effect	β = .378, SE = .161, t = 2.35, p = .020, 95% CI: [0.060, 0.695]*		
Indirect Effect	β = .133, SE = .059, 95% CI: [0.031, 0.263]*		
Relative Effect: High (coded: 1) Versus High DA Plus Mediator Intervention (coded: 0)			
Total Effect	β = .297, SE = .171, t = 1.73, p = .084, 95% CI: [-0.041, 0.635]		
Direct Effect	β = .189, SE = .166, t = 1.14, p = .255, 95% CI: [-0.137, 0.516]		
Indirect Effect	β = .108, SE = .057, 95% CI: [0.007, 0.231]*		
Relative Effect: Low (coded: 1) Versus High DA Plus Mediator Intervention (coded: 0)			
Total Effect	β = -.213, SE = .172, t = -1.24, p = .217, 95% CI: [-0.552, 0.126]		
Direct Effect	β = -.188, SE = .165, t = -1.14, p = .254, 95% CI: [-0.513, 0.136]		
Indirect Effect	β = -.025, SE = .056, 95% CI: [-.139, 0.085]		

Note. * = $p < .05$ β = standardized coefficients. SE = Standard Error. CI = Confidence Interval.

3.4.3 Study 2.3

Study 2.3 was identical to Study 2.2, except, we sought to establish a *causal* pathway in terms of the proposed mediation. We examined whether intervening at the level of the mediator reduces or eliminates the effect of deviancy aversion on prejudice. Such an effect would support a causal pathway (e.g., Kendler & Campbell, 2009; Spencer, Zanna, & Fong, 2005) from deviancy aversion to prejudice via a dislike of statistical minorities.

3.4.3.1 Method

Participants. The power-analysis was based on the findings of Study 2.2 (total effect: $f = .20$). We needed 237 participants to have 80% power. Given the high exclusion rate in Study 2.2, we recruited 353 participants (193 female; $M_{age} = 34.63$, $SD_{age} = 9.98$). 151 participants were excluded for failing one or more attention check items or taking the study more than once. Of the final participants, 16 identified as Asian/Asian American, 11 as Black/African American, 13 as Latino/Hispanic, 157 as White/European American, 1 as other, and 4 as more than one race. The materials and design of Study 2.3 were identical to Study 2.2, except for the additional mediator-intervention condition.

Deviancy manipulation. We added a third between-subjects condition in which we intervened on the proposed mediator (high DA plus intervention condition). In this new condition, we induced deviancy aversion as in the high deviancy aversion condition, and thereafter, prompted participants to reflect and report on the positive aspects of minorities (before the disliking novel minorities and prejudice measures):

> "Important: Before you continue, please imagine the positive aspects of minority groups. That is, please think about the positive attributes of small groups of people that deviate from the majority in a society (e.g., unique, special, exciting). Really try to think of the positive attributes of minority groups and their members and how you feel warmly towards such groups and their members."

3.4.3.2 Results

The manipulation successfully altered participants' deviancy aversion, $p < .001$. Replicating Study 2.2, a main effect of deviancy aversion on disliking novel statistical minorities was observed, $p = .020$ (Path A; Figure S7), and participants' dislike of statistical minorities predicted their prejudice against stigmatized individuals, $r(202) = .33$, $p < .001$ (Path B). Finally, deviancy aversion again influenced prejudice against stigmatized individuals, $p = .009$ (Path C; see **Table 3.6** and Figure S8).

We examined pairwise comparisons. Suggesting a successful intervention at the level of the mediator, participants in the high deviancy aversion condition exhibited greater dislike of novel statistical minorities compared to participants in the low deviancy aversion and high DA plus intervention conditions. Participants in the high deviancy aversion condition also exhibited higher prejudice than those in the low deviancy aversion condition, and marginally higher prejudice than those in the high DA plus intervention condition. Finally, participants in the low deviancy aversion condition did not differ from those in the high DA plus intervention condition in terms of disliking statistical minorities and prejudice (**Table 3.6**).

Notably, despite participants in the high deviancy aversion condition exhibiting a greater dislike of minorities and marginally greater prejudice than those in the high DA plus intervention condition, the two conditions did not differ in terms of deviancy aversion

(**Table 3.6**). That is, intervening at the mediator did *not* eliminate the effect of the manipulation on pattern deviancy aversion. This finding supports the directionality of the proposed mediation model.

Mediation. The results of Study 2.3 supported a successful intervention at the level of the mediator. First, the effect of the high deviancy aversion condition versus the low deviancy aversion on prejudice was mediated by disliking statistical minorities; the effect of deviancy aversion on prejudice decreased by approximately 25% when accounting for participants' dislike of statistical minorities. Second, the effect of the high deviancy aversion condition versus the high DA plus intervention condition was also mediated by disliking statistical minorities; the effect of deviancy aversion on prejudice decreased by approximately 35% when accounting for participants' dislike of statistical minorities. Third, a mediation was *not* found when comparing the low deviancy aversion condition to the high DA plus intervention condition (**Table 3.7**). Again, none of the calculated indirect effects were moderated by participants' political orientation, age, or biological sex (see Supplements of Gollwitzer et al., 2019).

Finally, in Studies 2.2 and 2.3, participants' self-reported motivation to generate positive (negative) aspects of deviancy and negative (positive) aspects of a lack of deviancy (i.e., unbroken patterns/regularities) within each of the conditions neither related to participants' dislike of novel statistical minorities nor their level of prejudice, *p*s > .134. These findings reduce the likelihood that our findings are driven by demand effects.

3.4.4 Discussion: Study-Set 2

In Study-set 2, we replicated and extended the mediation model observed in Study-set 1. We observed a link between deviancy aversion and prejudice against various groups of stigmatized individuals, and found this link to be mediated by participants' dislike of novel statistical minorities. In Study 2.1, we observed the proposed mediation model in a longitudinal correlational study. These are the first results indicating that deviancy aversion relates to prejudice in a stable, long-term manner. In Studies 2.2 and 2.3, we documented this mediation experimentally, and further, found that manipulating deviancy aversion causally impacts people's prejudice against various commonly stigmatized individuals in society (e.g., someone cross-dressing, someone wearing a Burka). These results are the first to document that deviancy aversion has a causal effect on prejudice. Furthermore, in Study 2.3, intervening at the level of the mediator—by prompting participants to directly reflect on the positive attributes of minorities—eliminated the effect of deviancy aversion on prejudice. These findings support the validity of the proposed mediation model in terms of a causal-pathway.

3.5 Studies 3.1 and 3.2: Deviancy Aversion Predicts Group-Size Dependent Prejudice

We have argued that deviancy aversion is in part linked to prejudice via a dislike of statistically infrequent individuals in society. These results suggest that deviancy aversion may no longer predict prejudice if individuals who are the targets of prejudice become more populous in society. For instance, making Black people the statistical majority (versus minority) should lead individuals high in deviancy aversion to exhibit less

prejudice towards Black people. Put another way, deviancy aversion should relate to comparatively lower prejudice towards Black people when Black people are the majority as compared to when they are the minority.

Study-set 3 tested—as the proposed statistical deviancy line of argument would suggest—whether deviancy aversion predicts such group-size dependent prejudice. We examined this question in terms of prejudice against Black individuals (Study 3.1) and in terms of prejudice against Muslims (Study 3.2). Specifically, we assessed whether the link between deviancy aversion and prejudice against Black people and Muslims varies as a function of whether these groups are statistical minorities versus majorities in a given context.[22]

3.5.1 Study 3.1

In Study 3.1, we examined whether deviancy aversion predicts group-size dependent prejudice against Black individuals.

3.5.1.1 Method

Participants and Design. A power-analysis based on the average of the relationships observed in Study 1.1 (r = .25) indicated that we needed approximately 123 participants to have 80% power. We aimed to recruit 150 adults on MTurk. We ended up recruiting 142 participants (78 female; age: M = 34.77, SD = 11.42). Four participants were excluded because they failed the attention check items. Two further responses were

[22] We chose Muslims as the stigmatized group in Study 3.2 because deviancy aversion predicted and heightened prejudice against such individuals in Study-set 2.

excluded because participants completed the survey twice (identified via IP address). One further response was excluded for leaving more than half of the survey blank. Of the final participants (N = 135), 12 identified as Asian/Asian American, 6 as Black/African American, 9 as Latino/Hispanic, 106 as White/European American, and 3 as More than one race.

Deviancy aversion. Nonsocial deviancy aversion was assessed as in Study 1.1 (the geometric shapes measure, the face-valid measure, and the mental imagery measure), except, the response items were changed to: "Uncomfortable," "Annoyed," and "Happy." This was done to replicate our findings across negatively valenced items (Study 1.1 only included positively valenced items).

Group-size dependent racial prejudice. Participants were presented with images of groups of people (approximately 50 individuals per group) in which the percentage of Black and White individuals varied. In 3 of the images, Black people were the majority and White people were the minority. In the three other images, Black people were the minority and White people were the majority. The percentage of Black and White people in these images were based on racial demographics of actual countries in the western world (United States [12% Black], France [6% Black], Canada [2% Black]), and in Africa (South Africa [10% White], Namibia [6% White], Botswana [3% White]). That the percentage of Black and White people echoed those of real countries was not shared with participants. The following prompt was above each image: "These are the people living in a country." In response to each minority and majority in each country, participants responded to two

binary-choice items: “Which group do you like more?” and “If you lived in this country, which group would you want to be a part of?” (**see Figure 3.5**).

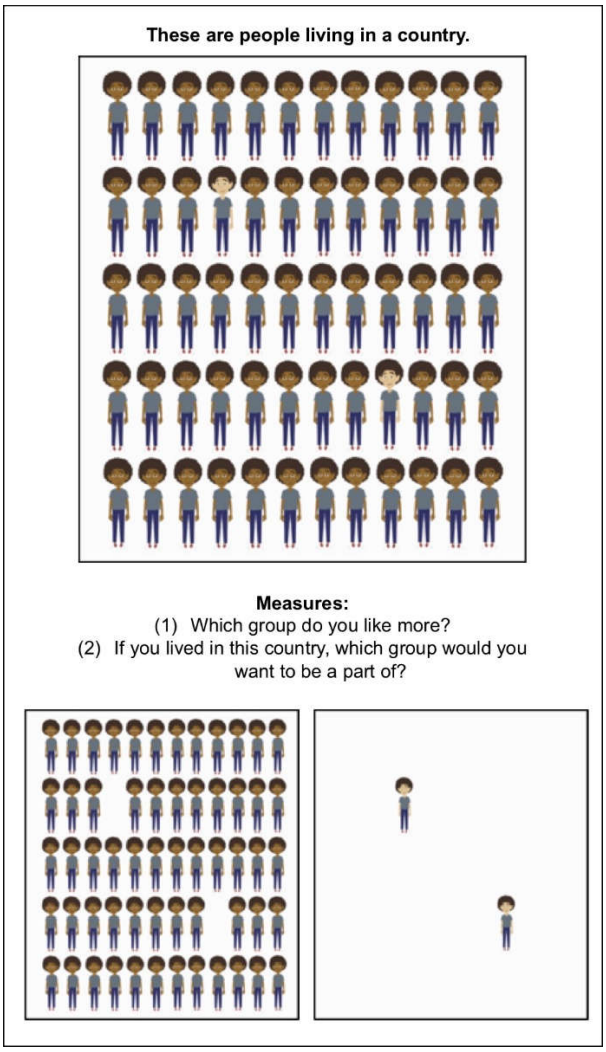

Figure 3.5. An example item from the group-size dependent racial prejudice measure in Study 3.1. In this example, Black people are the majority group and White people are the minority group.

Social desirability. The study included a measure of social desirability (Haghighat, 2007) to account for one form of response bias—participants’ tendency to engage in self-

presentational/socially desirable responding (e.g., Maccoby & Maccoby, 1954; Fisher, 1993).

Attention Check. The study included two attention checks. The first was the attention check in Study 1.1. The second was an attention check that asked how someone whose name is Anton would respond to the following question: "What is your name?" ("Anton," "Ben," or "Jasmine").

Procedure. Participants completed the deviancy aversion measure, the group-size dependent racial prejudice measure, the attention checks, demographics, and the social desirability measure (in that order).

3.5.1.2 Results

Conceptually replicating Path A of the proposed mediation, nonsocial deviancy aversion predicted participants' dislike of minority groups across all the countries/races, $r(133) = .204$, $p = .017$. This relationship remained when controlling for participants' level of social desirability, $r(132) = .173$, $p = .046$. Importantly, as predicted, deviancy aversion also predicted racial prejudice depending on group size. Deviancy aversion related to greater racial prejudice against Black people when Black people were presented as the minority, $r(133) = .25$, $p = .004$, but related to comparatively less racial prejudice against Black people when Black people were presented as the majority, $r(133) = -.12$, $p = .186$, interaction term: $F(1, 133) = 5.76$, $p = .018$, $\eta p^2 = .042$. Said another way, participants high in deviancy aversion (+1.5 *SD*) exhibited greater prejudice when Black people were presented as the minority, $M = .80$, $SE = .060$, and lower racial prejudice when Black people were presented as the majority, $M = .34$, $SE = .064$, $F(1, 133) =$

17.95, $p < .001$, $\eta p^2 = .119$. Importantly, this was not true of participants low in deviancy aversion (-1.5 *SD*)—they evaluated Black people similarly irrespective of group-size, minority: $M = .51$, $SE = .060$, majority: $M = .48$, $SE = .064$, $p = .815$ (**Figure 3.6**). For additional descriptive statistics, see the Supplements of Gollwitzer et al. (2019).

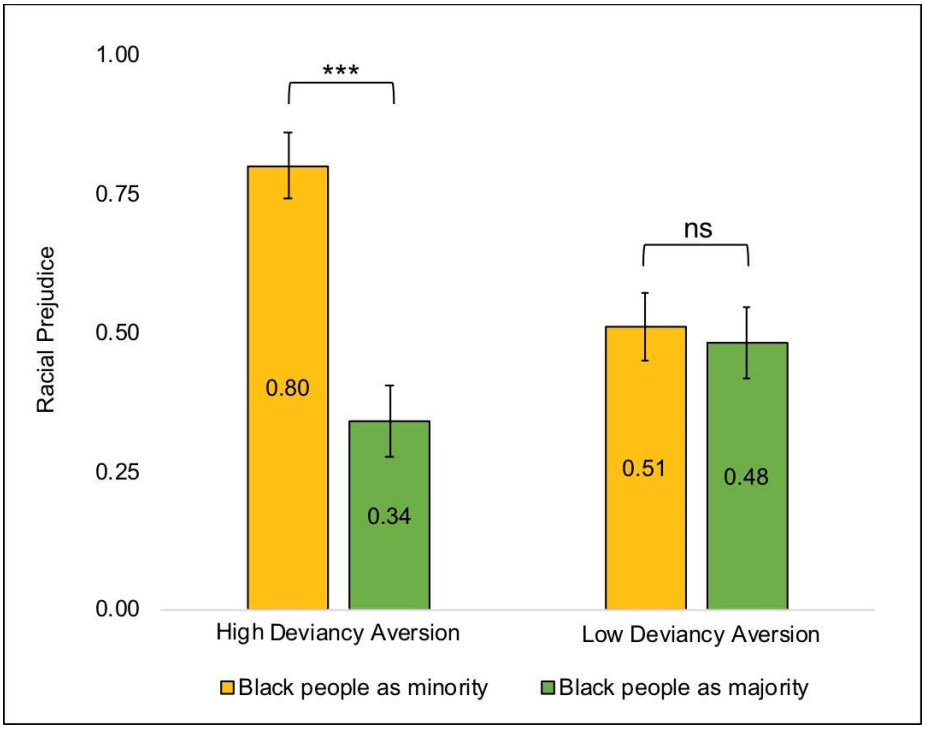

Figure 3.6. Study 3.1: Deviancy aversion predicted group-size dependent racial prejudice. Participants high in deviancy aversion (left bars; +1.5 *SD*) exhibited prejudice against Black people when Black people were presented as the statistical minority. This prejudice reduced (and even flipped to preference), however, when Black people were presented as the statistical majority. The prejudice of participants low in deviancy aversion, however, did not depend on group-size (right bars; -1.5 *SD*). Error bars: +/- 1 *SE*.

3.5.2 Study 3.2

Study 3.2 was largely identical to Study 3.1, except, instead of prejudice against Black individuals we examined group-size prejudice against Muslims (represented in Study 3.1 as people wearing Burkas; of course, not all Muslim women wear Burkas,

however, Burkas qualified as a widely recognized cue of being a member of the Muslim faith).[23] We chose Muslims because deviancy aversion predicted and heightened prejudice against Muslims in Study-set 2, and because of the rise of anti-Muslim prejudice in the United States (Ogan, Willnat, Pennington, & Bashir, 2014).

3.5.2.1 Method

Participants and Design. A power-analysis based on Study 3.1 (ηp^2 = .042) indicated that we needed approximately 190 participants to have 90% power. We aimed to recruit 250 adults on MTurk. We ended up recruiting 250 participants (125 female; age: *M* = 39.69, *SD* = 13.12). Four participants were excluded because they failed the attention check items. Two further responses were excluded because participants completed the survey twice (identified via IP address; final *N* = 244). Of the final participants, 29 identified as Asian/Asian American, 18 as Black/African American, 20 as Latino/Hispanic, 176 as White/European American, and 7 as More than one race. Study 3.2 was identical to Study 3.1, except we assessed participants' prejudice against people wearing Burkas as a function of group-size instead of their prejudice against Black people as a function of group-size. We also added a description of the minority/majority to ensure that participants understood that the people depicted were wearing Burkas (see Figure 8).

[23] It is unclear whether the findings of Study 3.2 extend to Muslims more generally, that is, extends above and beyond Muslims who—at least given the cue of wearing a Burka—more strongly adhere to their faith.

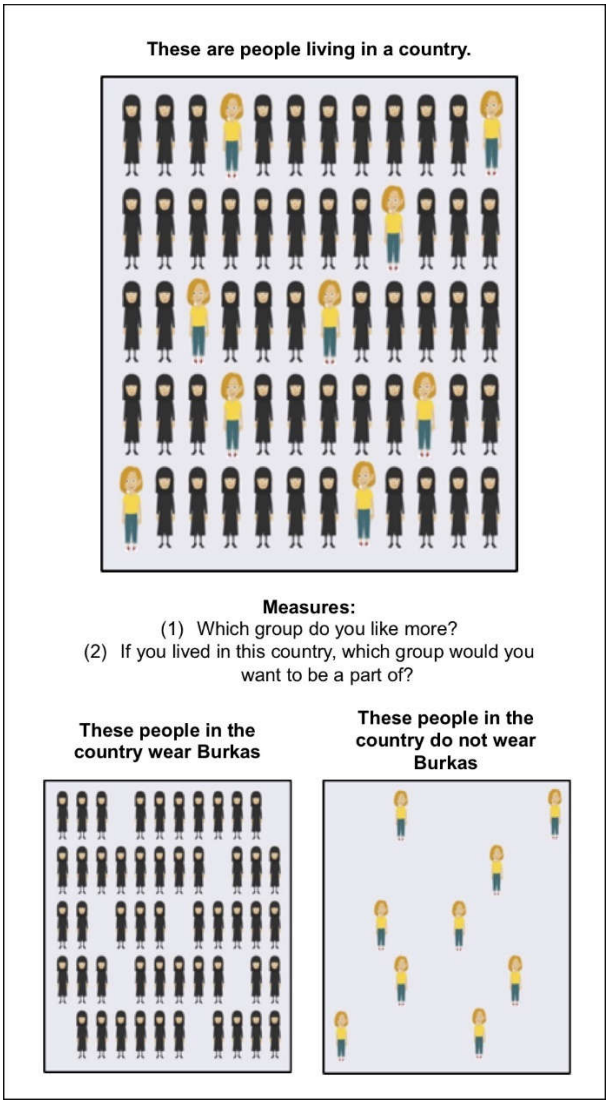

Figure 3.7. An example item from the group-size dependent prejudice measure in Study 3.2. In this example, people wearing Burkas are the majority group and people not wearing Burkas are the minority group.

3.5.2.2 Results

Again, deviancy aversion predicted participants' dislike of minority groups across all the countries, $r(242) = .25$, $p < .001$, and this relationship remained when controlling for participants' level of social desirability, $r(241) = .25$, $p < .001$. Importantly, as in Study 3.1, deviancy aversion predicted prejudice depending on group size. Deviancy

aversion related to greater prejudice against people wearing Burkas when such people were presented as the minority, $r(242) = .24$, $p < .001$, but related to comparatively less prejudice against people wearing Burkas when such people were presented as the majority, $r(242) = -.10$, $p = .117$, interaction term: $F(1, 242) = 15.45$, $p < .001$, $\eta p^2 = .060$. Said another way, participants high in deviancy aversion (+1.5 *SD*) exhibited greater prejudice when people wearing Burkas were presented as the minority, $M = 0.96$, $SE = .038$, and comparatively lower prejudice when people wearing Burkas were presented as the majority, $M = .70$, $SE = .046$, $F(1, 242) = 22.81$, $p < .001$, $\eta p^2 = .086$. Participants low in deviancy aversion did not exhibit this trend—they evaluated people wearing Burkas more similarly across presentation format: minority, $M = .73$, $SE = .038$, and majority, $M = .82$, $SE = .046$, $F(1, 242) = 3.14$, $p = .078$, $\eta p^2 = .013$ (see Figure 9). For additional descriptive statistics see the Supplements of Gollwitzer et al. (2019).

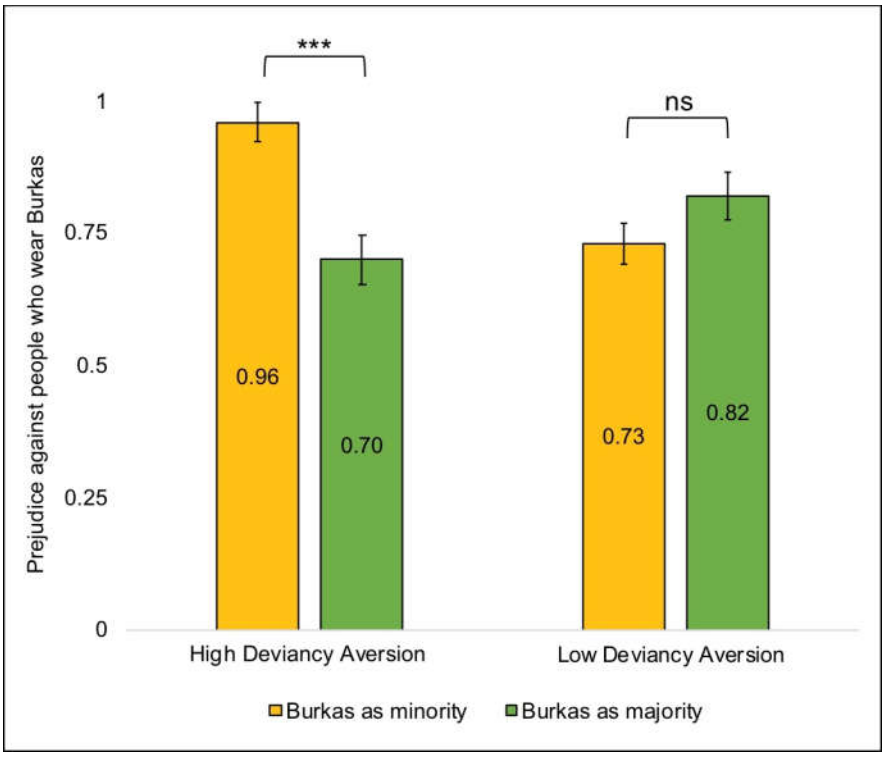

Figure 3.8. Study 3.2: Deviancy aversion predicted group-size dependent prejudice against stigmatized individuals. Participants high in deviancy aversion (left bars; +1.5 *SD*) exhibited prejudice against Muslims (people wearing Burkas) when such people were presented as the statistical minority. This prejudice reduced, however, when Muslims were presented as the statistical majority. No such effect was observed for participants low in deviancy aversion (right bars; +1.5 *SD*). Error bars: +/- 1 *SE*.

3.5.3 Study 3.2

Study-set 3 found deviancy aversion to predict group-size dependent prejudice. Participants high in deviancy aversion were more prejudiced against Black people and Muslims (individuals wearing Burkas) in contexts in which Black people and Muslims were the minority (e.g., countries in the Western world). However, they favored Black people and indicated that they would want to be Black in contexts in which Black people are the majority (Study 3.1). And, further, they exhibited reduced dislike of Muslims and

were more likely to select to wear a Burka in contexts in which the majority of people wear Burkas (Study 3.2). In contrast, the prejudice of participants low in deviancy aversion largely did not depend on group-size. These findings support the proposed mediation model by indicating that deviancy aversion is linked to prejudice against stigmatized people in society in part because such people are numerically/statistically infrequent (at least in the United States).

The findings of Study-set 3 also suggest that deviancy aversion promotes prejudice that is attuned to the surrounding context/environment. That is, deviancy aversion may contribute to the contextual and flexible nature of prejudice and its targets (see Payne et al., 2017). Finally, we note that our findings align with the argument that race and stigma categories are often inherently meaningless. For instance, it is not 'Blackness' that results in prejudice against Black individuals, instead it is the superficial features associated with Black people that incite prejudice (e.g., Katz & Braly, 1933; Brown, 1995), including potentially, at least in the United States, an aversion towards proportionally small groups.

3.6 Participants' Racial Identity Across the Reported Studies

It is important to consider that participants' racial identity may moderate psychological findings, especially in terms of prejudice (Brown, 1995; Henrich et al., 2010; Nielsen et al., 2017). Unfortunately, our individual studies only included a small number of participants of minority racial identity (e.g., Black, Asian). Therefore, we collapsed across the reported studies, including Studies S3, S4, and S5, but excluding Study-set 3 (see Supplements of Gollwitzer et al., 2019 for more details), and then examined whether participants' racial identity moderated any of the reported results.

When collapsing across all the studies, we did not find participants' minority racial identity (participants who responded Asian, Black, Hispanic, other, or more than one race; $n = 478$) versus majority racial identity (White; $n = 1544$) to moderate any of the paths of our mediation model. Path A: $p = .609$, Path B: $p = .642$, Path C: $p = .426$. We also did not find minority versus majority racial identity to impact specifically the correlational (Studies 1.1, 2.1, and S3; minority [$n = 199$]; majority [$n = 577$]) or experimental (Studies 1.3, 1.4, 2.2, 2.3 S4, and S5; minority [$n = 279$]; majority [$n = 967$]) results, ps > .227. Or, to impact specifically the studies examining racial prejudice (Study-set 1, Studies S3, S4, and S5; minority [$n = 356$]; majority [$n = 1145$]) or the studies examining prejudice against various other groups of stigmatized individuals (Study-set 2; minority [$n = 122$]; majority [$n = 399$]), ps > .453.

We recognize, however, that comparing racial minority to majority participants is a heavy-handed approach to examining potential inter-racial differences. Therefore, we re-conducted the analysis collapsed across all studies solely with Black participants (including those of mixed race; $n = 164$) versus White participants ($n = 1544$). Again, we found no effects of participants' race for any of the three examined paths, ps > .082. This .082 significance value pertained to the link between deviancy aversion and prejudice; the data appeared to trend towards a greater link between deviancy aversion and prejudice for Black participants as compared to White participants, rather than indicating that Path C does not exist for Black participants.

Finally, we re-examined these analyses only for the studies that included racial prejudice as the dependent variable (Study-set 1 and Studies S3, S4, and S5; Black

participants, $n = 122$; White participants, $n = 1145$). Participants' race (Black versus White) did not moderate any of our findings, ps > .281. To examine the strength of these final null findings—given the small sample-to-moderate sample size of Black participants—we conducted Bayesian model comparisons using the JASP software (JASP Team, 2018). We found that the best model (a model including solely main effects) was ~5.8 times (Path A), ~9.2 times (Path B), and ~4.3 times (Path C) more explanatory than a model including an interaction of participants' racial identity (Black versus White). Nonetheless, these analyses should still be approached with caution given the small-to-moderate sample size of Black participants, and because we were unable to examine the impact of participants' racial identity in each of the individual studies.

3.7 General Discussion

In 9 studies ($N = 1,821$), we examined whether deviancy aversion causally impacts prejudice, and whether this effect is partially driven by a general dislike of statistical minorities—disliking people who are statistically infrequent in a population (**see Table 3.8** for overview). Studies 1.1 and 1.2 tested the proposed mediation model in a correlational manner. In these studies, adults' and 4- to 7-year-olds' deviancy aversion (assessed via nonsocial stimuli, for instance, aversion towards broken patterns of geometric shapes) related to their dislike of novel statistical minorities (compared to novel majorities; Path A), their dislike of statistical minorities predicted their racial prejudice against Black individuals (Path B), and deviancy aversion predicted such racial prejudice (in adults but not in children; Path C). Finally, the proposed mediation was observed both in adults and children.

Table 3.8. Overview of All Presented Studies in Chapter 3.

	Design	Sample Type	*N*	Predictor	Mediator	Outcome	Path A	Path B	Path C*	Indirect
Study-set 1										
Study 1.1	Correlational	Adult	368	PDA	Dislike of Statistical Minorities	Racial Prejudice	✓	✓	✓	✓
Study 1.2	Correlational	Children	58	PDA	Dislike of Statistical Minorities	Racial Prejudice	✓	✓	×	✓
Study 1.3	Experimental (Descriptive)	Adult	248	PDA	Dislike of Statistical Minorities	Racial Prejudice (Continuous)	✓	✓	×*	✓
Study 1.4	Experimental (Descriptive)	Adult	186	PDA	Dislike of Statistical Minorities	Racial Prejudice (Implicit - IAT)	✓	✓	×	✓
Study S1	*Correlational*	*Adult*	*81*	*PDA*	*Dislike of Statistical Minorities*	--	✓	--	--	--
Study S2	*Correlational*	*Children*	*86*	*PDA*	*Dislike of Statistical Minorities*	--	✓	--	--	--
Study S3	*Correlational*	*Adult*	*150*	*PDA*	*Dislike of Statistical Minorities*	*Racial Prejudice*	✓	✓	×*	✓
Study S4	*Experimental (Descriptive)*	*Adult*	*345*	*PDA*	*Dislike of Statistical Minorities*	*Racial Prejudice (Binary)*	✓	✓	×	✓
Study S5	*Experimental (Motivational)*	*Adult*	*199*	*PDA*	*Dislike of Statistical Minorities*	*Racial Prejudice (Binary)*	✓	✓	×	✓
Study-set 2										
Study 2.1	Correlational (Longitudinal)	Adult	258	PDA	Dislike of Statistical Minorities	Prejudice Against Various Stigmatized Individuals	✓	✓	✓	✓
Study 2.2	Experimental (Motivational)	Adult	122	PDA	Dislike of Statistical Minorities	Prejudice Against Various Stigmatized Individuals	✓	✓	✓	✓
Study 2.3	Experimental (Motivational)	Adult	202	PDA	Dislike of Statistical Minorities	Prejudice Against Various Stigmatized Individuals	✓	✓	✓	✓
Study-set 3										
Study 3.1	Correlational	Adult	135	PDA	Dislike of Statistical Minorities	Group-Size Dependent Racial Prejudice	✓	--	--	--
Study 3.2	Correlational	Adult	244	PDA	Dislike of Statistical Minorities	Group-Size Dependent Prejudice Against Muslims	✓	--	--	--

Note. DA = Deviancy aversion. ✓ indicates $p < .05$. ×* indicates $.05 < p < .10$. × indicates $p > .10$. Path C* = The total effect, not the direct effect.

Studies 1.3 and 1.4 extended these findings causally. Participants prompted to come up with negative (versus positive) aspects of nonsocial deviancy exhibited a greater dislike of novel statistical minorities (compared to majorities; Path A), and this dislike predicted their racial prejudice (Path B). Though we observed the proposed mediation (i.e., indirect effect) across these studies, a total effect of deviancy aversion on racial prejudice was not found (Path C). A meta-analysis of Studies 1.3, 1.4, and two supplemental studies (Studies S4 and S5; see Supplements of Gollwitzer et al., 2019) did not indicate a meaningful total effect of deviancy aversion on racial prejudice.

In Study-set 2, we extended the proposed mediation model beyond prejudice against Black individuals to prejudice against other groups of stigmatized individuals in Western society (e.g., someone crossdressing; someone wearing a Burka). In Study 2.1—a longitudinal correlational study—nonsocial deviancy aversion (at Time 1) predicted disliking statistical minorities (at Time 2; Path A), and this dislike predicted prejudice against stigmatized individuals (at Time 3; Path B). A relationship between deviancy aversion and prejudice against stigmatized individuals was also observed (Path C), and this relationship was, as predicted, mediated by participants' general dislike of novel statistical minorities.

Importantly, Study 2.1 also provided an important constraint on the link between deviancy aversion and prejudice; in line with the proposed mediation model, deviancy aversion did not relate to prejudice against women, a group that suffers from prejudice despite not being a statistical minority. These results demonstrate that deviancy aversion does not predict bigotry per se; instead, it seems to specifically predict prejudice against

groups or individuals that are perceived as deviant in society, for instance, people who are perceived as deviant due to being statistical minorities.

Studies 2.2 and 2.3 built on these findings by experimentally manipulating deviancy aversion and documenting the mediation observed in Study 2.1 in a causal manner. Notably, unlike in Studies 1.3 and 1.4, in which deviancy aversion did not have a meaningful total effect on prejudice against Black individuals, deviancy aversion did have a moderately-sized total effect on prejudice against other types of stigmatized individuals. Finally, in Study 2.3, we observed that intervening on the mediator—by having participants reflect on the positive attributes of statistical minorities—eliminated the effect of deviancy aversion on prejudice against stigmatized individuals. These results support the existence of a *causal* pathway from deviancy aversion to prejudice via disliking statistical minorities (e.g., Kendler & Campbell, 2009; Spencer, Zanna, & Fong, 2005).

Finally, in Study-set 3, we collected further evidence supporting the proposed mediation model, and zeroed in on the *type* of prejudice deviancy aversion influences. To do so, we demonstrated that the link between deviancy aversion and prejudice depends on the size of groups in the surrounding environment. In Study 3.1, participants' deviancy aversion predicted greater racial prejudice in contexts in which Black people were depicted as the statistical minority, but reduced racial prejudice in contexts in which Black people were depicted as the statistical majority. And, in Study 3.2, participants' deviancy aversion predicted greater prejudice against Muslims (people wearing Burkas) in contexts in which such people were depicted as the statistical minority, but reduced prejudice against Muslims in contexts in which such people were depicted as the statistical majority.

Together, these findings provide strong support for the proposed mediation model, and further, demonstrate that deviancy aversion predicts prejudice that is highly context-dependent on one's surrounding social regularities.

The four most central contributions of our findings are: (1) A replication and extension of the recent findings of Gollwitzer and colleagues (2017) by consistently demonstrating that a dislike of statistical minorities in part drives the link between deviancy aversion and prejudice. (2) The first demonstration that deviancy aversion can causally impact prejudice (at least in terms of prejudice against stigmatized individuals other than Black individuals). This finding indicates that the link between deviancy aversion and prejudice is not restricted to individual differences, reduces the likelihood that the relationship between deviancy aversion and prejudice arises via a confounding third-variable, and opens the door for intervention possibilities. (3) The elucidation of two important boundary conditions on the influence of deviancy aversion on prejudice. First, while deviancy aversion substantially influenced prejudice against various types of stigmatized individuals, it did *not* meaningfully influence specifically prejudice against Black individuals. Second, while deviancy aversion related to prejudice against groups that are infrequent in society, it did not relate to generalized prejudice per se; for instance, deviancy aversion did not relate to prejudice against women. (4) Finally, our findings help elucidate which type of prejudice deviancy aversion specifically impacts: Deviancy aversion predicts prejudice towards people who are perceived as socially deviant in a specific context, for instance, towards individuals who are statistical infrequent in terms of their current environment or surroundings.

3.7.1 Early-Emergence

Beyond these four primary contributions, we also shed light on the development of prejudice. Our findings not only replicate children's explicit prejudice against Black individuals (e.g., Aboud, 1988; Dunham et al., 2008), but also very tentatively suggest one potential pathway via which children become prejudiced. Children's deviancy aversion may heighten their dislike of people who are infrequent in a population (compared to those who are frequent), in turn, potentially increasing their racial prejudice against Black individuals (at least in the United States where Black people are a minority). Notably, however, our developmental findings were solely correlational and the prejudice measure of Study 1.2 was arguably a poor measure of prejudice ("Which picture do you like more?"). Further, given the small sample size of Study 1.2, our results should be approached cautiously. Future research should consider this developmental pathway with a larger sample size, in a causal manner, with an improved measure of prejudice, and with respect to prejudice beyond racial prejudice.

The current findings also are among the first to directly address how children think about people depending on their statistical frequency (e.g., Johnston & Jacobs, 2003; Primi & Agnoli, 2002). Empirically verifying the prediction of Bilger and Liben (2006), children in our studies overall disfavored novel minorities over majorities (Study 1.2). And additionally, we found children's dislike of novel minorities over majorities to predict their level of prejudice against Black individuals (a statistical minority in the United States). These latter findings raise the interesting possibility that the target of

children's prejudice is in part determined by the statistical infrequency of types of people in a society (see Roberts et al., 2017).

3.7.2 Context-Dependency

The current findings also suggest that deviancy aversion may contribute to the flexible and contextual nature of prejudice and its targets (Payne et al., 2017; Garcia-Marques et al., 2017). In Study-set 3, deviancy aversion predicted greater prejudice against Black people and Muslims (individuals wearing Burkas) when these groups were depicted as statistical minorities as compared to when they were depicted as statistical majorities. We conclude that deviancy aversion seems to predict prejudice that is strongly attuned to the surrounding environment; these findings may help explain why the targets of prejudice vary across time and context. For instance, on an applied level, these results suggest that deviancy aversion may drive people to become less prejudiced against minorities as these minorities become more populous. Research has indicated that minorities (as a collective) will soon become the majority in terms of population in the United States (see Craig & Richeson, 2014; Craig, Rucker, & Richeson, 2018); potentially, people's deviancy aversion may reduce people's prejudice against these groups when this change occurs (though, of course, other factors may outweigh any impact of deviancy aversion, for instance, status threat).

3.7.3 Extension of Past Literature

The current results also extend previous research in demonstrating that the link between deviancy aversion and prejudice observed by Gollwitzer et al. (2017) exists even

when these variables are measured longitudinally. In Study 2.1, participants' deviancy aversion predicted their degree of prejudice assessed 6 days later. These findings indicate a stable temporal link between people's sensitivity to deviancy and their degree of prejudice.

Our findings also indicate that people are unaware that their deviancy aversion influences their dislike of novel minorities and prejudice against stigmatized individuals. Though deviancy aversion influenced participants' dislike of minorities and prejudice in Studies 2.2 and 2.3 (and Study S5), participants' self-reported *motivation* to generate negative aspects of deviancy (e.g., disruptive) versus positive aspects of deviancy (e.g., exciting) neither related to their dislike of minorities nor their prejudice. These results suggest that the effects of deviancy aversion on disliking minorities and prejudice occur largely outside of awareness (see Bargh, 2007; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Bargh & Morsella, 2008). Indeed, prejudices can be activated non-consciously (e.g., Banaji, 2001; Bargh, 1999; Devine, 1989; Greenwald & Banaji, 1995). In line with this claim, researchers have found that people create 'type-rationalizations'—fallacious justifications for their prejudice (e.g., Jewish people are greedy, Gay individuals threaten family values; LaPiere, 1936).

Finally, we tentatively found that participants' racial identity does not influence the link between deviancy aversion, disliking statistical minorities, and prejudice. This finding, dishearteningly, suggests that racial minorities in the United States perceive themselves as breaking the social regularities and assumed 'patterns' around them in society (i.e., they perceive of themselves as socially 'deviant'). If true, deviancy aversion

may be one factor motivating internalized prejudice/racism—members of disadvantaged groups holding prejudice against their own group (Pyke, 2010). Future research should examine this possibility.

3.7.4 Types of Prejudice

As noted earlier, our findings reveal an important constraint on the effect of deviancy aversion on prejudice. Deviancy aversion did not conclusively influence racial prejudice against Black individuals, but did meaningfully impact prejudice against other groups of stigmatized individuals. And, this difference was not driven by manipulating deviancy aversion differently in Studies 1.3 and 1.4 versus Study-set 2 (in Study S5, we manipulated deviancy aversion in a motivational manner but still did not observe a significant total effect of deviancy aversion on racial prejudice). So, why does deviancy aversion causally influence prejudice against various stigmatized individuals but not against Black people? For one, numerous historical (e.g., segregation; Amir, 1969), social (e.g., group-threat, dominance motives, group-position, resource competition; e.g., Sherif et al., 1961), and large-scale societal and structural (e.g., Blauner, 1972; Bonacich, 1972) factors contribute to the force of racial prejudice against Black individuals in the United States (see Quillian, 2006). These factors likely override or suppress any total effect of deviancy aversion on racial prejudice.

Additionally, or alternatively, people may simply judge Black individuals as less socially deviant than other groups of stigmatized individuals. Confirming this possibility, in a supplemental study (Study S6; $N = 92$; see Supplements of Gollwitzer et al., 2019), participants explicitly judged various stigmatized individuals (compared to 'normative'

individuals) as three times more deviant in society ("more likely to break a pattern and be out of line") than Black individuals (compared to White individuals). What explains participants' perception of Black individuals as less socially deviant than other groups of stigmatized individuals, however? Potentially, the integration of Black people in mass media and American culture (e.g., in music, in sports), and the increased awareness of the contribution of Black people in American society (e.g., Black history month), may lead people to perceive Black individuals as more normative. And this may be a recent development; researchers in 1988 explicitly argued that Black people in the United States are discriminated against because they are perceived as deviant in society (Katz & Hass, 1988).

Given these results, we posit that deviancy aversion particularly motivates prejudice against groups and individuals who are perceived as socially deviant. Supporting this claim, in Study 2.1, we observed that deviancy aversion does not relate to prejudice against women, a group that is statistically normative; these results strongly align with our proposed mediation model given that women are not a statistical minority in the United States (examining this relationship in contexts where women are a minority would be an interesting extension of the current work). And, in Study-set 3, deviancy aversion predicted reduced prejudice against Black and Muslim people when such people were presented as the non-deviant statistical majority in a society. We therefore propose that deviancy aversion particularly predicts prejudice against individuals that break the regularities in a specific context—deviancy aversion does not seem to be related to generalized prejudice or bigotry per se.

As such, prejudice driven by people's sensitivity to deviancy seems to diverge from prejudice driven by social factors, such as resource-competition (e.g., Sherif et al., 1961), threat (e.g., Cottrell & Neuberg, 2005, Blalock, 1967; Blumer, 1958; Quillian, 1995, 1996), and social identity (Tajfel, Turner, Austin, & Worchel 1979). Prejudice driven by deviancy aversion is directed specifically towards social deviancy, is unrelated to conservatism (see Gollwitzer et al., 2017), is flexible and fluctuates with regard to the specific context (see Study-set 3), and does not seem to be driven by ingroup biases (see the racial identity results directly before the general discussion). Prejudice in the service of social factors, on the other hand, is largely directed towards competitive or disadvantaged outgroups, and is commonly driven by in-group bias (e.g., Riek, Mania, & Gaertner, 2006). Future research should directly examine how deviancy aversion differentially impacts prejudice compared to other causes of prejudice (e.g., threat; Cottrell & Neuberg, 2005), especially in terms of the resulting targets of prejudice and the processes involved.

3.7.5 Mediation Model: Methodological Considerations

Correlational mediation analyses and even experimental mediation analyses have certain pitfalls (Bullock et al., 2010; Fiedler et al., 2011). For instance, significant mediations can be driven by spurious mediators. To begin to combat this possibility, we included one such possible third variable in our analyses: Participants' judgments of whether statistical minorities or majorities hold power. Controlling for these judgments did not reduce the observed mediation effects (except in Study 1.2). Further, deviancy aversion has been shown to predict prejudice independently of political orientation,

disgust, need for closure, disliking ambiguity, negativity bias, threat sensitivity, social dominance orientation, right-wing authoritarianism, a self-reported desire to be egalitarian, and a tendency to anthropomorphize (Gollwitzer et al., 2017; Gollwitzer & Clark, 2019). These variables, thus, are unlikely to qualify as third-variables leading to spurious mediation effects.

Further in support of a genuine mediation, we conceptually replicated the mediation model numerous times (Bullock et al., 2010). We observed the model across different manipulations of deviancy aversion (descriptive as well as motivational), different measures of prejudice (binary and continuous; explicit and implicit), different types of prejudice (racial prejudice, prejudice against stigmatized individuals), different measurement items (e.g., liking and group-identity, positive and negative items), and across time (when the variables were measured longitudinally).

As suggested by Bullock and colleagues (2010), we also tested whether the observed mediation holds for different subgroups relevant to the theoretical model. We did not find participants' racial identity (minority versus majority; Black versus White), power judgments, political orientation, age, or sex to moderate the observed mediation effect. Importantly, we also successfully intervened on the proposed mediator—disliking statistical minorities—in Study 2.3. This finding provides causal support for the B pathway of the mediation model. That is, disliking statistical minorities causally impacts prejudice. This causal-interventionist test supports a causal pathway model (e.g., Kendler & Campbell, 2009; Spencer, Zanna, & Fong, 2005).

3.7.6 Limitations and Caveats

A number of limitations and caveats should be addressed. First, in the experimental studies, we did not include a no-treatment control condition. Therefore, it is unclear whether heightening deviancy aversion raises prejudice or reducing deviancy aversion attenuates prejudice (or both). We thus cannot conclude that decreasing people's deviancy aversion reduces their prejudice, a finding which could have applied interventionist value. Relatedly, we did not consider which factors may lead certain individuals to be more responsive to our deviancy aversion induction and its potential effect on prejudice. And, we did not examine whether mechanisms aside from disliking statistical minorities exist; across the reported studies (in which we observed a significant total effect) approximately 40% of the variance of the link between deviancy aversion and prejudice was explained by disliking statistical minorities, suggesting the existence of additional mechanisms. Future research should examine these questions.

Second, the reported studies did not examine real-world behavioral expressions of prejudice (e.g., hiring practices). Therefore, the generalizability of the present research is limited. Future research should examine whether inducing deviancy aversion leads individuals to exhibit prejudice against social deviants in more real-world contexts.

Third, some conceptual clarifications are in order. Though we often use the term disliking statistical minorities to represent the proposed mediator, such dislike was operationalized as a comparative preference for statistical majorities over minorities (Study-set 1 and Study 2.1), and a comparative dislike of statistical minorities over majorities (Studies 2.2 and 2.3). Therefore, it is unclear whether participants' responses

truly communicated disliking minorities rather than a comparative preference for majorities and a comparative dislike of minorities. Similarly, while we use the term prejudice throughout the article, it is unclear whether participants' responses entailed a comparative liking for White people (Study-set 1) and 'normative' people (Study-set 2) or a comparative dislike of Black people (Study-set 1) and stigmatized people (Study-set 2; see Greenwald & Pettigrew, 2014). These conceptual caveats should be kept in mind when considering the observed findings.

Fourth, one might argue that demand effects account for our findings. A number of points argue against demand, however. First, we found the predicted results in Study 1.1 despite including a distractor task. Second, Study 2.1 was a longitudinal study, and we still observed the predicted results. Third, in Study-set 2, we removed the reminder prompts included in Studies 1.3 and 1.4 (that kept the manipulation salient throughout the studies) and still observed the hypothesized mediation. Fourth, Study 1.4 assessed participants' *implicit* racial prejudice and still observed the hypothesized mediation. Fifth, in Studies 2.2 and 2.3 (and Study S5), participants' self-reported motivation to come up with positive (versus negative) attributes of deviancy neither impacted participants' dislike of statistical minorities nor their prejudice. Past research indicates that demand effects are highly unlikely when participants' self-reported motivations to follow a manipulation do not align with their responding on dependent variables (e.g., Gollwitzer, Schwörer, Stern, Gollwitzer, & Bargh, 2017).

Fifth, aside from controlling for participants' power judgments, we did not consider factors related to functionality; the presented findings may be moderated by

participants' goals. Indeed, motivational causes of prejudice often override simple cognitive determinants (e.g., see Blanchard, Adelman, & Cook, 1975). And further, in line with the lack of a meaningful effect of deviancy aversion on racial prejudice (Studies 1.3 and 1.4), motivational factors underlying racial prejudice (e.g., dominance motives; resource competition; institutional factors; Blauner, 1972; Bonacich, 1972; Sherif et al., 1961) may override the influence of deviancy aversion on racial prejudice.

Sixth, we did not consider a number of constructs conceptually related to deviancy aversion in the present research. For instance, we did not consider whether people's response to expectation violations play a role in our findings, and similarly, whether the literature on prediction error and conflict is relevant for the current results (e.g., Proulx, Inzlicht, & Harmon-Jones, 2012). Relatedly, we did not examine whether creativity plays a role in our findings—a liking for deviancy may relate to creative thinking and reduced prejudice has been linked to creative 'out of the box' thinking (Gocłowska & Crisp, 2013).

Seventh, we explicitly note some limitations of the individual studies and analyses. First, Study 1.2 (the children's sample), had a very small sample size (n = 58). Therefore, the results of this individual study should be interpreted cautiously and future research needs to be conducted before strong conclusions are drawn. Second, our analysis of whether participants' racial identity moderated our results is similarly limited. Only a small number of Black participants were observed across our studies (total n = 164), making it difficult to conclude whether participants' race impacted the results of any of

the individually reported studies. Future studies should continue to examine both these questions.

Eight, the observed findings may extend to contexts apart from the societal or population level. For instance, deviancy aversion may lead individuals to dislike statistical minorities in specific contexts (e.g., band Geeks in a high school) aside from disliking minorities in the general population. Building on Study-set 3, future research should continue to examine whether deviancy aversion dynamically influences prejudice depending on the frequency/infrequency of different types of people in a specific environment.

Finally, assumably, there are varying subtypes of deviancy. For instance, pattern deviancy, which entails deviations from a contextual regularity or pattern (Palmer, Schloss, & Sammartino, 2013), may differ from prototype deviancy, which entails deviations from people's stable representations of a category. For instance, most leaves on a tree are prototypically deviant in that they deviate from the prototype of a 'perfect' leaf; however, these leaves are not pattern deviant as they do not break a repetition or redundancy (a pattern) in that specific context. Similarly, functional deviancy—deviancy in terms diverging from an assumed functionality (i.e., a chair with 3 legs)—may differ from prototype and pattern deviancy. Though we acknowledge that different subtypes of deviancy may exist, we did not examine these different subtypes here (predominantly because we do not see a clear reason why these subtypes would produce divergent results). Future research should consider these potentially differing subtypes, however.

3.7.7 Conclusion

Perhaps it is no coincidence that those who are the targets of prejudice in society are described as "not fitting in." We demonstrated a causal link between people's aversion towards deviancy—distortions of regularities or repeated forms and models—and their degree of prejudice against stigmatized individuals. And further, it may be no coincidence that the targets of prejudice tend to be statistical minorities in society. We observed that deviancy aversion influences prejudice by contributing to people's dislike of statistical minorities—disliking people who are proportionally infrequent in a population. Taken together, our results elucidate how a simple domain-general sensitivity to deviancy may contribute to the complex social construct that is prejudice. In doing so, our findings may help explain one pathway via which people become prejudiced against individuals in society.

Aversion Towards Domain-General Deviancy Predicts Moral Judgment

4.1 Abstract

Chapter 4 was largely motivated by two questions. (1) Does deviancy play a role in social phenomena other than prejudice? And (2), to what extent can simple, domain-general factors inform moral judgment? Given these questions, in Chapter 4, I examined whether a domain-general sensitivity to deviancy is linked to people's moral psychology. Given that most moral transgressions break assumed regularities of behavior in society, deviancy aversion may predict heightened moral sensitivity. Supporting this possibility, in Study 1, participants' nonsocial deviancy aversion (e.g., aversion towards broken patterns of geometric shapes) predicted greater moral condemnation of harm and purity violations. This link was stronger for intuitive thinkers, suggesting that this link occurs via an intuitive rather than analytical pathway. Extending these results, in Study 2, deviancy aversion predicted greater punishment of harm and purity violations. Finally, in Study 3, in line with deviancy aversion predicting context-dependent prejudice (Chapter 3) and predicting moral condemnation because moral violations break the regularities of behavior in society, deviancy aversion predicted context-dependent moral judgments. Participants higher in deviancy aversion exhibited a greater shift towards tolerating moral violations when these violations were described as the regular pattern of behavior in an alternate society. Collectively, these results suggest that something as basic as people's domain-general sensitivity to deviancy is linked to moral judgment.

4.2 Introduction

Numerous psychological phenomena suggest that people are averse to deviancy—the distortion of regularities or repeated forms or models (e.g., Gollwitzer et al., 2017; Gollwitzer et al., 2019). For instance, researchers have noted that people dislike atypical stimuli (see Palmer, Schloss, & Sammartino, 2013), resist change (Jost, 2015), prefer familiar and fluent stimuli (Zajonc, 1968; Reber, Winkielman, & Schwarz, 1998), avoid and attempt to reduce contradictions (Heidegger, 1953/1996; Heider, 1958), and experience inconsistencies as threatening to their sense of meaning (Heine, Proulx, & Vohs, 2006; Heintzelman, Trent, & King, 2013). Further, more directly, people are motivated to see regularities, patterns, and order in the world (Gilovich, 1991; Shermer, 2008; Whitson & Galinsky, 2008). Foreshadowing much of this work, one of the founders of modern social psychology, Kurt Lewin (1946), noted that cognitive and motivational systems pressure the individual and society towards order and predictability, and away from irregularities and inconsistencies.

That people are averse to deviancy is also suggested outside of the lab. Numerous online media blogposts and articles reference people's irritation towards images depicting such deviancy, for instance, asymmetrical objects or distorted images (e.g., a cake cut at an angle ruining the symmetry of the cake; e.g. Buzzfeed: "45 photos that will annoy you more than they should"; Jewell, 2014). Moreover, people colloquially, although inappropriately, use the expression "I'm so OCD" to refer to their tendency to embrace order and dislike irregular, deviant stimuli.

Though the above research and lay examples suggest that people are largely averse to deviancy—the distortion of regularities or repeated forms or models—they do not directly demonstrate this claim. To do so, Gollwitzer and colleagues (2017) created deviant stimuli stripped down to their basic form. They created patterns of nonsocial geometric shapes in line with redundancy (see Garner, 1970) and distorted these patterns in accordance with research on regularities and pattern recognition and distortion (see Näätänen et al., 1993; Posner, 1973; **see Figure 4.1**). American and Chinese adults, as well as children as young as 3-years-old, exhibited a strong aversion towards such nonsocial deviancy (Gollwitzer et al., 2017; Gollwitzer et al., 2019). These results, along with other studies assessing attitudes towards nonsocial deviancy (e.g., in geometric shapes, linguistic triads, basic objects), demonstrate that people are generally averse towards deviancy (e.g., Evers, Inbar, & Zeelenberg, 2014, Heintzelman et al., 2013; Okimoto & Gromet, 2016; Winkielman et al., 2006).[24,25] From an evolutionary standpoint, people may hold this aversion in the service of survival. Deviations from regularities, redundancies, and repetition may signal danger (Shermer, 2008) and inconsistent care (Gollwitzer & Clark, 2019). Further, deviancy aversion, as it has been linked to derogating deviant behaviors (Gollwitzer et al., 2017), may encourage group survival by heightening group cohesion.

[24] Though people are averse towards broken patterns of geometric shapes, researchers have found European Americans (but not Asian Americans and Asians) to exhibit a comparative preference for the *single object* responsible for distorting a pattern when asked to rank all the shapes in a broken pattern (Kim & Markus, 1999). When asked to judge the entire broken pattern in a non-ranked manner, however, European Americans exhibit a clear aversion towards broken patterns (Gollwitzer et al., 2017).

[25] Exceptions to this heuristic of course exist. For instance, people's deliberative embracement of abstract art or people's desire for change in deleterious or boring contexts.

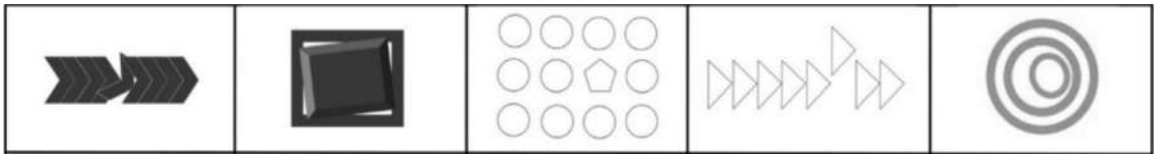

Figure 4.1. Example images included in the nonsocial deviancy measure used by Gollwitzer et al., 2017. Each image was presented separately.

Past research has linked people's deviancy aversion to social psychological phenomena. For instance, Gollwitzer and Clark (2019) found anxious attachment to relate and lead to higher deviancy aversion. And Gollwitzer et al. (2017) and Gollwitzer et al. (2019) found that deviancy aversion predicts greater prejudice against social deviancy, including prejudice against stigmatized individuals, social-norm breakers, statistically negative and positive deviants (e.g., someone very poor and someone very rich), and racial minority group members. These findings may help explain why prejudice is largely directed towards people in society who deviate from the social regularities around them, whether it be in terms of physical appearance (e.g., dwarfism), character (e.g., addiction), or group-identity (e.g., minorities in the United States; Goffman, 1963). Collectively, these findings relating deviancy aversion to social phenomena suggest that a number of major psychological phenomena may potentially be reframed in terms of regularities and deviations from these regularities.

Before turning to the hypotheses of this article, we provide two clarifications. First, by deviancy aversion, we do not mean individuals' dislike of uncertainty and ambiguity (e.g., Webster & Kruglanski, 1994; Budner, 1962). Simply put, deviations from clear regularities are not uncertain or ambiguous; they entail an evident irregularity rather than

the potential of an irregularity occurring. Indeed, past research has found that deviancy aversion and variables capturing a dislike of uncertainty and ambiguity only correlate weakly to moderately (Gollwitzer et al., 2017).

Second, deviancy aversion is not the same as novelty aversion. For instance, consider a grove of many novel, exotic fruits. In this scenario the fruits are novel but not deviant or irregular; in the grove, the pattern or regularity is the exotic, novel fruits—a common fruit would actually be deviant in this scenario. Indeed, though deviancy aversion and novelty aversion (both assessed in terms of nonsocial stimuli—broken patterns of geometric shapes versus Chinese ideographs) correlate, this correlation is not particularly strong (rs < -.04 < .29, depending on the study; Gollwitzer & Clark, 2019). Further, multiple studies have found nonsocial deviancy aversion to relate to social phenomena (e.g., anxious attachment, prejudice) independently of people's nonsocial aversion towards novelty (Gollwitzer et al. 2019; Gollwitzer & Clark, 2019).

4.2.1 Hypotheses

Here, I examine whether people's deviancy aversion—people's aversion towards a perceived regularity or pattern being broken, disrupted, or distorted—plays a role in the domain of morality. From an evolutionary account, morality exists to facilitate human cooperation (Harms & Skyrms, 2008; Nowak, 2006), for instance, via direct and indirect reciprocity (Tomasello & Vaish, 2013), and punishment (Fehr & Fischbacher, 2004). And, certain proximate processes, perhaps in the service of such ultimate motivations, play a role in morality. For example, moral judgment is informed by reason and deliberation (careful reflection of what is wrong and right; e.g., Bloom, 2010; Kohlberg, 1971) as well

as emotions (rapid automatic intuitions; Greene & Haidt, 2002; Haidt, 2001; Cushman, Young, & Greene, 2010). Heightened threat-sensitivity has also been shown to inform moral judgment (Wright & Baril, 2013), as has people's empathic tendencies (Decety & Cowell, 2014). Despite this past research, however, it remains largely unclear whether simple, low-level domain-general factors predict our moral judgment.

We hypothesize that a simple cognitive-affective factor, people's domain-general sensitivity towards deviancy, predicts variance in people's moral judgments. Specifically, people's aversion towards deviancy should predict judging moral violations as more wrong (moral condemnation) and punishing these actions to a greater extent (punishment). This is because immoral actions are generally abnormal and atypical behaviors in society. Such actions are not only novel but—importantly for our hypothesis—they break the typical pattern of behavior (e.g., Mende-Siedlecki, Baron, & Todorov, 2013). For instance, moral transgressions such as harm violations (e.g., physically harming someone) and purity violations (e.g., sexual contact with a sibling) are behaviors that deviate from the regularities of how humans should and do behave in society—these violations break behavioral redundancies. Additionally, purity violations have been characterized as weird and unusual (Gray & Keeney, 2015), and colloquially, people refer to immoral actions as 'deviant' and 'out of line.' Finally, developmental psychologists have noted that morality (considerations of what is "wrong" and "right") may in part emerge from a system concerned with standards and deviations from those standards, including negative responding towards flawed or out of place physical objects (Kagan, 1981, 1984, 1987; Kochanska, Casey, Fukumoto, 1995). Notably, given the severity of moral violations and

the stability of moral judgment (e.g., Smetana, 1981; Turiel, 1983), it would be remarkable if people's basic aversion towards domain-general deviancy predicts their moral judgment. And, in terms of a theoretical contribution, elucidating that something as "low-level" as people's aversion towards deviancy relates to moral judgment would demonstrate that our moral judgments are at least in part influenced by simple domain-general factors.

Several empirical findings support the proposed link. For one, deviancy aversion and moral judgment both overlap with certain phenomena. For instance, aversion towards deviancy (assessed via nonsocial examples of deviancy) relates to discomfort towards social-norm violations (Gollwitzer et al, 2017), and such violations at least partially overlap with moral violations (e.g., Haidt, Koller, & Dias, 1993). Importantly though, given that norm violations and moral violations differ in important ways (e.g., stability; Smetana, 1981), the current studies remain an important extension of this previous work. Additionally, deviancy aversion has been shown to relate and lead to prejudice (Gollwitzer et al., 2017; Gollwitzer et al., 2019), and the processes underlying the development of prejudice and moral beliefs are linked (Rutland, Killen, & Abrams, 2010). Finally, deviancy aversion has been found to heighten people's desire for society to have rigid social-norms (Gollwitzer, Martel, & Bargh, 2021; see Gelfand, 2012; Pelto, 1968), and in such communities, people are more likely to be morally righteous, including endorsing greater punishment of wrongdoers (Gelfand et al., 2011).

In additional support of our hypothesis, people's moral judgment is influenced by the commonness of the behavior being judged. For instance, both altruistic and selfish behaviors are judged as more moral and punished less when the behaviors are more

common (the common is moral heuristic; Lindström, Jangard, Selbing, & Olsson, 2018). These findings indicate that uncommon actions—actions which tend to deviate from behavioral regularities and patterns in society—are more likely to be evaluated as immoral. As such, deviancy aversion may be one variable underlying the 'common is moral' heuristic: People may perceive altruistic and selfish behaviors as more moral when these actions are common because common behaviors tend to follow behavioral regularities and people value and prefer such "patterned" actions. Finally, in terms of face-validity, consider that the term *moralization* comes from the Latin root *moralis*, meaning "proper behavior of a person in society," and researchers have observed that what is deemed proper (what "should" be) is substantially influenced by what actually *is*, namely, the actual regularities and pattern of behavior in society (i.e., descriptive regularities; e.g., Roberts, Gelman, & Ho, 2017).

Finally, I propose that the potential link between deviancy aversion and moral judgment occurs via intuitive rather than deliberative processes. As noted earlier, past research has found moral judgment to be informed both by rapid automatic intuitions (Greene & Haidt, 2002; Haidt, 2001; Cushman et al., 2010), and deliberation and refection (careful reflection of what is wrong and right; e.g., Bloom, 2010; Kohlberg, 1971). Because deviancy *aversion* captures an affective response and is a basic domain-general factor, we hypothesized that deviancy aversion and moral judgment are likely linked via intuitive processes—trusting one's gut feelings (e.g., Damasio, 1994; Haidt et al., 1993). Specifically, people's deviancy aversion should incite feelings of discomfort in response to moral violations and in turn greater moral condemnation. If true, people who trust their

intuitions should exhibit a stronger link between their sensitivity towards deviancy and their moral condemnation. Examining this question should inform research on the variables driving the intuitionist-pathway to moral judgment; though researchers have noted that rapid, intuitive processes inform morality (Greene & Haidt, 2002; Haidt, 2001), it remains unclear where these intuitions originate from.

4.2.2 Current Studies

Across three studies, we investigated whether people's sensitivity to deviancy predicts moral judgment. In Study 1, we examined whether deviancy aversion—assessed via aversion towards nonsocial examples of deviancy, for instance, broken patterns of geometric shapes—relates to judging harm and purity moral violations as more morally wrong. Importantly, we also tested whether this link is stronger for more intuitive thinkers than analytical ones (in line with an intuitionist-pathway to moral judgment). In Study 2, we examined whether the potential link between deviancy aversion and moral judgment extends to a more applied context by testing whether deviancy aversion relates to self-reported punishment of others' moral transgressions. Finally, in Study 3, we examined whether—in line with immoral actions breaking behavioral regularities in society—deviancy aversion predicts a greater shift towards *tolerating* moral violations when these violations are the pattern of behavior in an alternate society (when these violations are described as common and accepted in an alternate society). Such findings would indicate that deviancy aversion predicts context-dependent, flexible moral judgment. Collectively, the three presented studies are theoretically important because they may (1) elucidate that even a basic cognitive-affective factor can be associated with the stable and complex social

judgments entailed in morality, (2) illuminate one potential factor underlying the intuitionist-pathway to moral judgment (Haidt et al., 1993), and (3) help explain the malleability of certain moral judgments, that is, why moral judgments depend on the surrounding regularities (Bloom, 2010; Lindström et al., 2018).

4.3 Study 1: Moral Condemnation

We first examined whether deviancy aversion relates to judging harm and purity violations as more morally wrong. In these studies, we considered both harm and purity moral violations because these are potentially two distinct moral domains (Haidt & Graham, 2007; though, other researchers argue that harm underlies both purity and harm, Gray & Keeney, 2015). Additionally, in line with the proposed intuitionist pathway to moral judgement, we examined whether the potential link between deviancy aversion and moral judgment is stronger for intuitive thinkers than for deliberative thinkers. Critically, we also controlled for alternate factors that past research has linked to types of moral judgment (e.g., purity concerns), including disgust sensitivity (e.g., Horberg et al., 2009; Rozin, 1999; Schnall et al., 2008) and conservatism (e.g., Graham, Haidt, & Nosek, 2009; Haidt & Graham, 2007). Additionally, we also controlled for variables capturing method variance and demand bias—participants' aversion towards a lack of deviancy (in the form of aversion towards *un*broken patterns of geometric shapes)[26] and their degree of socially desirable responding (e.g., Maccoby & Maccoby, 1954; Fisher, 1993).

[26] We controlled for participants' aversion towards a lack of deviancy (i.e., unbroken patterns) because such aversion related positively to aversion towards deviancy (this was not the case in a number of past studies; see Chapters 2 and 3). Importantly, controlling for aversion towards a lack of deviancy should account for

4.3.1 Method

Participants. We applied a power analysis based on past findings relating deviancy aversion to a social construct (prejudice; r = .30; Gollwitzer et al., 2017). This power analysis revealed that we needed 138 participants to have 95% (1 - β) power (.05 alpha level). However, to account for participant exclusion and potential differences in the size of these relationships, we aimed to recruit 200 participants. We ended up recruiting 203 participants (119 Female; M_{age} = 35.64, SD_{age} = 10.83) on Mechanical Turk (MTurk). Seven participants were excluded (see Supplements of Gollwitzer, Martel, Bargh, & Chang, 2020). The datasets, analyses, and verbatim materials of the presented studies are available open-access (see Supplements of Gollwitzer et al., 2020: Data Availability).

Deviancy aversion. We included three measures of nonsocial deviancy aversion. The first measure, validated by Gollwitzer et al. (2017), included five images of broken patterns comprised of geometric shapes (and their unbroken counterparts as control items). For each image, participants responded to: "How much do you like the above image?" Likert-scale: 1 = *Not at all* to 7 = *A lot* (**Figure 4.1**). We used positively-valenced dependent variables to reduce response-bias in the form of yea and nay-saying. That is, negatively valenced items could lead to a superficial correlation between nonsocial deviancy aversion and moral judgment by participants responding on the left or right side of both scales (the morality measures, see below, had the following scale endpoints: 1 = *not at all wrong*, 5 = *extremely wrong*).

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participant response bias in the form of yea- or nay-saying as well as participants' general tendency to endorse items measuring aversion (e.g., discomfort, annoyance).

The second measure was a nonvisual, face-valid deviancy measure validated by Gollwitzer et al. (2019). Participants read: "People feel differently about things that break a pattern, are out of line, and are disordered. How much do you agree with the following statements? Things that break a pattern, are out of line, and are disordered make me feel…" and responded to 3 items: "'Positive,' 'Happy,' and 'Content.' Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*.

The third measure validated by Gollwitzer et al. (2017, 2019) was a mental imagery deviancy measure. Participants read: "Imagine a collection of objects where all the objects are very similar to one-another… if an object that is very different from the other objects is added to the collection that would make me feel…" 'Positive,' 'Happy,' and 'Content.' Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*.

Moral judgment. We assessed moral condemnation of two different types of moral violations—harm and purity violations—via 3 validated measures: The MFVQ (Clifford, Iyengar, Cabeza, & Sinnott-Armstrong, 2015), and two moral violations vignettes measures (see Chakroff, Russell, Piazza, & Young, 2017 and Dungan, Chakroff, & Young, 2017). Participants judged the moral wrongness of different harm (e.g., "You see a man deprive a boy of food for 2 days") and purity (e.g., "You see a boy pour urine on his lap") violations ("How morally wrong is this behavior?"). Likert-scale: 1 = *not at all wrong*, 2 = *not too wrong*, 3 = *somewhat wrong*, 4 = *very wrong*, 5 = *extremely wrong*.

Intuitive thinking. To assess participants' tendency to engage in intuitive versus deliberative thinking we assessed their performance on the cognitive reflection test (CRT)—lower scores indicate greater intuitive thinking and higher scores greater

deliberative, analytical thinking (Frederick, 2005; see Supplements of Gollwitzer et al., 2020). [27]

Alternate predictors of moral judgment. We assessed two variables previously associated with moral judgment as control variables: Disgust propensity and sensitivity (van Overveld, de Jong, Peters, Cavanagh, & Davey, 2006), and political orientation (see Supplements of Gollwitzer et al., 2020 for details).

Attention check item. We indirectly assessed participants' attention via the following item: "People vary in the amount they pay attention to these kinds of surveys. Some take them seriously and read each question, whereas others go very quickly and barely read the questions at all. If you have read this question carefully, please write the word yes in the blank box below labeled other. There is no need for you to respond to the scale below." Participants who failed to write "yes" were excluded from the analyses.

Demographics. Participants reported their biological sex, age, race, and level of education.

Social desirability. To account for demand effects, we included a scale assessing participants' tendency to respond in a socially desirable manner (Haghighat, 2007).

Procedure. Participants completed the nonsocial deviancy aversion, moral condemnation, and cognitive reflection measures in random order. Thereafter, they

[27] We also assessed participants' self-reported—rather than behavioral—reliance on intuitive thinking. Analyses testing whether these responses moderated the relationship between nonsocial deviancy aversion and moral judgment revealed inconclusive results. These analyses can be found in the Supplements of Gollwitzer et al. (2020).

completed the disgust, attention check, political orientation, demographics, and social desirability measures (in that order).

4.3.2 Results

We averaged across the three deviancy aversion measures because they strongly loaded onto a single factor (Eigenvalue of 2.03; Principal Axis Factor Analysis with Promax as the rotation method) and exhibited high inter-measure reliability, $\alpha = .86$. Raw correlations between the individual measures: Geometric shapes and face-valid measures, $r = .69$, geometric shapes and mental imagery measures, $r = .62$, face-valid and mental imagery measures, $r = .71$. These results indicate that a latent construct—deviancy aversion—underlies these three measures, and further, that measuring deviancy aversion more or less explicitly does not seem to greatly alter participants' responses.

We averaged across the three moral judgment measures in terms of harm and purity violations, respectively, as they exhibited high inter-measure reliability (harm: $\alpha = .86$ and purity: $\alpha = .88$; see Table S1 for descriptive statistics).

As hypothesized, deviancy aversion predicted greater moral condemnation of harm, $r(194) = .22$, $p = .002$, 95% CI[.08, .35], and purity violations, $r(194) = .20$, $p = .005$, 95% CI[.06, .33] (**Figure 4.2**). These results remained, $r(190) = .24$, $p = .001$, and $r(190) = .25$, $p = .001$, when controlling for participants' disgust sensitivity, political orientation, aversion towards a lack of deviancy (i.e., *un*broken geometric patterns), and social

desirability.

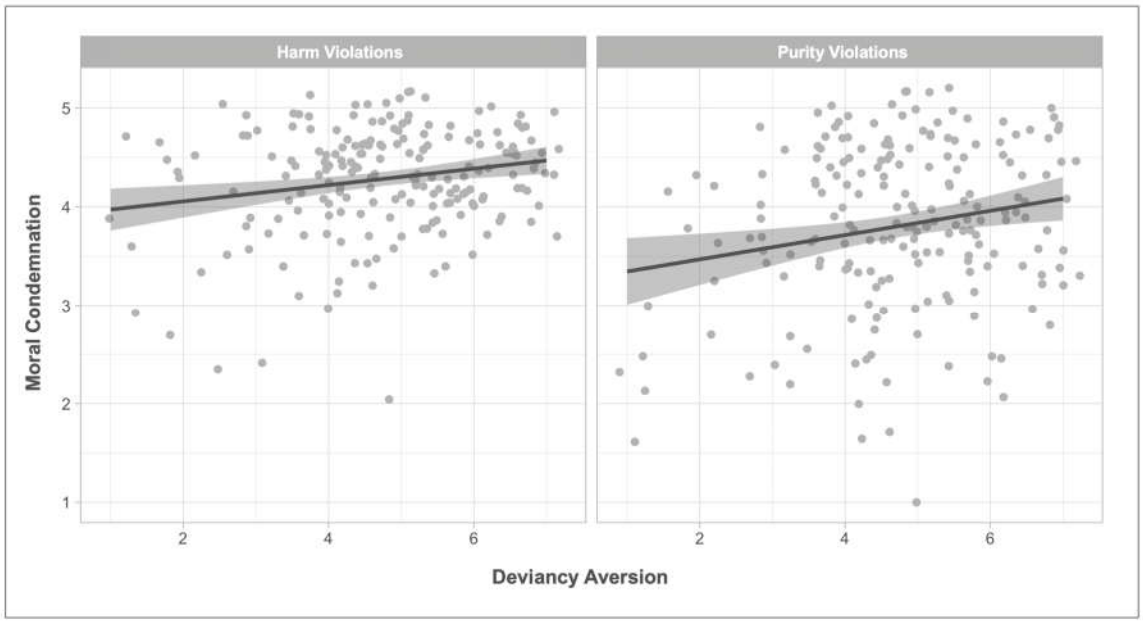

Figure 4.2. Study 1: Participants' deviancy aversion predicted their degree of moral condemnation of harm and purity violations.

To test unique predictive validity, we entered participants' deviancy aversion, disgust, and political orientation into multivariate regressions predicting moral condemnation of harm and purity violations, respectively. Only deviancy aversion predicted judging both harm and purity violations as wrong, harm: $\beta = .21$, $p = .003$, and purity: $\beta = .21$, $p = .002$. Disgust and political orientation predicted judging purity violations as wrong, $\beta = .14$, $p = .031$, and $\beta = .34$, $p < .001$, respectively, but did not predict judging harm violations as wrong, $\beta = .08$, $p = .263$, and $\beta = .00$, $p = .956$, respectively. These relationships indicate that deviancy aversion is associated with both moral judgment types even when accounting for other predictors of moral judgment, and further, has similar predictive power in terms of predicting moral impurity judgments ($\beta = .21$) as one's disgust

sensitivity (β = .14), a major theoretical predictor of impurity violation concerns (Schnall et al., 2008).

We next examined participants' reliance on intuitive versus deliberative thinking. First, a link between deviancy aversion and CRT performance was not found, $r(194) = .04$, $p = .589$. And, replicating past research (Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2014; Royzman, Landy, & Goodwin, 2014), lower CRT scores predicted judging purity violations as more wrong, $r(194) = -.20$, $p = .006$, but not harm violations, $r(194) = -.08$, $p = .256$.

Importantly, in line with our prediction, participants' reliance on intuitive thinking moderated the relationship between deviancy aversion and moral condemnation: The interactions between deviancy aversion and CRT performance predicting condemnation of harm and purity violations were observed, harm, $p = .052$ (marginal) and purity, $p = .028$ (Table 1). Further analyses (simple effects) elucidated that, as predicted, participants who performed worse on the CRT (-1 *SD*) exhibited a stronger link between their deviancy aversion and condemnation of harm and purity violations, ps < .001, than those who had higher scores on the CRT (+1 *SD*), ps > .502 (see Table 2). These findings tentatively suggest that the link between deviancy aversion and moral judgment occurs via intuitive, heuristic based responding rather than via deliberative processes.

Table 4.1. Participants with a Greater Tendency to Engage in Intuitive Thinking Exhibited a Stronger Link Between Deviancy Aversion and Moral Condemnation of Harm and Purity Violations in Study 1.

	Links Between Deviancy Aversion and Moral Condemnation of Harm and Purity Violations	Interaction Term
Reliance on Intuitive Thinking		
High Cognitive Reflection (+1 *SD*) (Low reliance on intuitive thinking)	$\beta = .07$, $p = .502^{h}$ $\beta = .05$, $p = .533^{p}$	$\beta = -.14$, $t(188) = -1.96$, $p = .052^{h}$
Low Cognitive Reflection (-1 *SD*) (High reliance on intuitive thinking)	$\beta = .36$, $p < .001^{h}$ $\beta = .36$, $p < .001^{p}$	$\beta = -.14$, $t(188) = -2.22$, $p = .028^{p}$

Note. h = harm violations. p = purity violations. Participants' conservatism, disgust, aversion towards a lack of deviancy (unbroken geometric patterns), and social desirability were controlled for in these analyses.

Finally, it might seem surprising that deviancy aversion predicted condemning harm and purity violations similarly in terms of effect size ($r = .24$ and $r = .25$) given that past research has found purity violations to be judged as 'weirder' than harm violations (see Gray & Keeney, 2015). To address this claim, we had participants judge the weirdness of the included harm violations and purity violations in a supplemental study (between-participants design [harm, purity]; Study S1; $N = 94$; see Supplements of Gollwitzer et al., 2020). In line with the similarly sized observed correlations, participants did not judge the purity violations as weirder than the harm violations collapsed across the included morality measures, though, they did do so specifically on the MFVQ. Moreover, in line with this finding, specifically on the MFVQ, the relationship between deviancy aversion and moral condemnation was stronger for the purity items than the harm items, as expected (see Supplements of Gollwitzer et al., 2020 for details).

4.3.3 Discussion

Study 1 indicated that people's sensitivity towards deviancy is linked to their moral judgment. Nonsocial deviancy aversion—assessed, for instance, via participants' aversion towards broken patterns of geometric shapes—was associated with greater moral condemnation of both harm and purity transgressions. Notably, deviancy aversion remained a significant predictor of moral judgment even when controlling for various factors previously linked to moral judgment, such as disgust propensity and sensitivity, and political orientation. Importantly, Study 1 also found that people with a greater tendency to rely on intuitive thinking (i.e., have difficulty overriding intuitive responding) exhibit a stronger relationship between deviancy aversion and moral condemnation. These results raise the possibility that deviancy aversion predicts moral judgment via an intuitionist pathway (Greene & Haidt, 2002; Haidt, 2001; Cushman, Young, & Greene, 2010).

4.4 Study 2: Punishment

Study 2 took an applied perspective. Does deviancy aversion also predict greater punishment of moral violations? In Study 1, participants higher in deviancy aversion judged moral transgressions as more wrong. Given that such moral condemnation predicts punitive behavior (Fehr & Fischbacher, 2004), deviancy aversion may also predict assigning harsher punishment to harm and purity transgressions. Study 2 tested this possibility.

4.4.1 Method

Participants. A power-analysis based on the relationship between deviancy aversion and moral condemnation in Study 1 (r = .25) revealed that we needed 202 participants (95% power). We aimed to recruit 215 participants. The final number of recruited participants was 214 participants (MTurk; 130 Female; M_{age} = 35.40, SD_{age} =11.95). Four responses were excluded for failing the attention check, and two were excluded because a participant completed the study twice.

Deviancy aversion. We assessed deviancy aversion as in Study 1

Punishment. Participants were first told to imagine being a courtroom judge. They then reported how harshly they would punish several impurity and harm violations taken from the moral harm and purity vignettes included in Study 1 (from the Dungan et al., 2017 and Chakroff et al., 2017 measures). Likert-scale: 1 = *No punishment*, 2 = *$10 Fine*, 3 = *$50 Fine*, 4 = *$250 Fine*, 5 = *1 Day Jail Time*, 6 = *1 Week Jail Time*, 7 = *1 Month Jail Time*. Similar scales have been used in past research (e.g., Carlsmith, Darley, Robinson, 2002). For more details regarding the punishment measure, see Supplements of Gollwitzer et al. (2020).

Other variables. Again, we assessed participants' conservatism and tendency to engage in socially desirable responding. To reduce the length of the study, we did not assess participants' disgust sensitivity and propensity.

Procedure. Participants completed the three deviancy aversion measures (clustered together) and the punishment measure in random order. They then completed the attention

check item, demographic (including political orientation), and social desirability measures (as in Study 1).

4.4.2 Results

Nonsocial deviancy aversion (collapsed across the three measures as in Study 1; α = .79) related to harsher punishment of harm violators, $r(206) = .17$, $p = .016$, 95% CI[.03, .30] (**see Figure 4.3**; see Table S1 for descriptive statistics). This relationship remained, $r(203) = .19$, $p = .007$, when controlling for political orientation, aversion towards a lack of deviancy (*un*broken patterns), and social desirability. In contrast to harm violations, deviancy aversion did not predict punishing purity violations, $r(206) = -.02$, $p = .749$, 95% CI[-.16, .12].

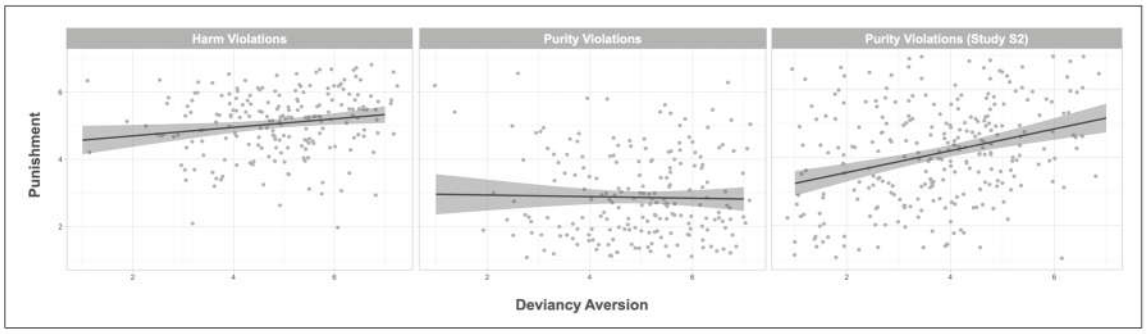

Figure 4.3. In Study 2 (left two graphs), participants' deviancy aversion predicted greater endorsement of punishing moral violations in terms of harm violations but not in terms of purity violations. In Study S2 (far right graph), however, participants' deviancy aversion did predict greater punishment of purity violations when using a more appropriate scale of punishment.

In hindsight, it is possible this null relationship arose because the scale we used to assess punishment was inappropriate for purity violations. For instance, it is odd to

punish someone with a monetary fine or jail time for ‘pouring urine on themselves’ or ‘smearing cat poop on themselves.’ We thus conducted a supplemental study largely similar to Study 2 in which the response-scale was altered to “How strongly do you think the following actions should be punished” 1 = *Not at all Punished* to 7 = *Punished a Lot* (Study S2; $N = 282$; see Supplements of Gollwitzer et al., 2020). This revised scale leaves open the possibility of punishment without monetary fine or imprisonment, but perhaps via verbal condemnation or another form of emotional expression (e.g., Xiao & Houser, 2005). In this supplemental study, we observed the predicted relationship between deviancy aversion and punishing purity violations, $r(280) = .30$, $p < .001$, 95% CI[.19, .40] (**Figure 3.3**, rightmost graph).

4.4.3 Discussion

Study 2 expanded upon Study 1 by demonstrating that deviancy aversion not only predicts greater condemnation of moral transgressions, but also predicts greater punishment of moral transgressions. This relationship at first did not hold for purity transgressions. We believe this link did not originally appear because we assessed punishment via fine or jail time, and these forms of punishment were inappropriate for punishing purity violations. Indeed, when using a revised scale in Study S2, we found the predicted relationship between deviancy aversion and greater punishment of purity violations. Taken together, our findings extend the findings of Study 1 to an applied moral domain (punishment), and suggest that people’s deviancy aversion may even be linked to moral behavior.

4.5 Study 3: Context-Dependent Moral Judgment

Collectively, the findings of Studies 1 and 2 demonstrate that deviancy aversion predicts harsher moral judgment towards harm and purity violations. Yet, it remains unclear why this relationship exists. In the introduction, we proposed that people's sensitivity to deviancy should predict such moral judgment because immoral actions (including harm and purity violations) overwhelmingly deviate from the assumed regularities and pattern of behavior in society. That is, people's aversion towards deviancy should incite negative affect towards immoral actions because these actions break repeated and regular behaviors, and this in turn should heighten individuals' moral condemnation and punishment of these actions.

If this reasoning is true, then deviancy aversion should predict a greater shift towards tolerating immoral actions when immoral actions do *not* break the regularities or pattern of behavior. We tested this possibility in Study 3 using an "alternate world" paradigm. Specifically, we examined whether deviancy aversion predicts a greater decrease in individuals' condemnation of moral violations from baseline (in one's own society) to when these violations are described as common and accepted (in an alternate society). Such findings would strongly support our claim that deviancy aversion and moral judgment are linked (Studies 1 and 2) because immoral actions in society (at baseline) deviate from behavioral regularities. Additionally, these findings would indicate that deviancy aversion predicts context-dependent moral judgments—moral judgments that are attuned to the surrounding behavioral regularities (moral flexibility, Bartels, 2008; moral relativism; e.g., Shaw & Wainryb, 1999). Furthermore, these findings would raise the

possibility of deviancy aversion as one factor underlying the common-is-moral heuristic—that common actions are generally judged as more moral (Lindström et al., 2018). And finally, these findings may help explain why moral judgments can vary over contexts, time, and communities—actions that are deviant in one context (given specific behavioral regularities) may not be deviant in a different context (Bartels, 2008; Bloom, 2010).

4.5.1 Method

Participants. We applied the power-analysis from Study 2. We aimed to recruit 215 participants, and ended up with 215 participants (122 Female; M_{age} = 35.61, SD_{age} = 11.92) on MTurk. Ten responses were excluded. For detailed methods see Supplements of Gollwitzer et al. (2020).

Deviancy aversion. Nonsocial deviancy aversion was assessed as in Studies 1 and 2 except the valence of some of the items were reversed to ensure that our results remain consistent across oppositely valenced items (see Supplements of Gollwitzer et al., 2020).

Context-dependent moral judgment: Baseline. Participants' baseline moral judgment (i.e., in their own culture) was evaluated by having participants respond to three of the harm violations and three of the purity violations from the Chakroff et al. (2017) and Dungan et al. (2017) measures. Participants were presented with the three harm ("John cuts his brother with a sharp knife."; "John intentionally pours a cup of boiling hot water on his brother's lap."; "John calls his brother worthless and insults him.") and the three purity violations ("John kisses his brother on the mouth."; "John strokes his brother's bare inner thigh."; "John changes his phone background to a picture of a man having sex with a

horse."), and asked "How morally wrong is this behavior?" Likert-scale: 1 = *not at all wrong*, 2 = *not too wrong*, 3 = *somewhat wrong*, 4 = *very wrong*, 5 = *extremely wrong*.

Context-dependent moral judgment: Alternate society. Participants' moral condemnation was measured identically to the baseline measure except that participants were told that the moral violations occurred in a society in which such actions were behavioral regularities—accepted as well as common behaviors: (e.g. "John is in a society where it is completely acceptable for siblings to cut each other with sharp knives. All siblings typically cut each other with sharp knives, and it is common practice to do this. John cuts his brother with a sharp knife." "How morally wrong is this behavior?" Likert-scale: 1 = *not at all wrong*, 2 = *not too wrong*, 3 = *somewhat wrong*, 4 = *very wrong*, 5 = *extremely wrong*.

Context-dependent moral judgment (explicit). Four items explicitly assessed participants' endorsement of context-dependent, flexible moral judgment. The items were: "Morals are flexible—what is immoral in one culture is not necessarily immoral in another culture," "When it comes to figuring out what is moral and what is immoral I tend to look at the actions of those around me," "To figure out what is immoral you have to look at the actions of those around you," and "Morals are absolute—what is immoral in one culture is also immoral in another culture" (reverse-coded). Likert-scale: 1 = *Not at all agree* to 7 = *Strongly agree*.[28]

[28] One of the four items exhibited poor inter-item reliability ("Morals are absolute—what is immoral in one culture is also immoral in another culture"). Therefore, we did not include this item when calculating participants' explicit context-dependent, flexible moral judgment (including the item did not change the results).

Procedure. Participants completed the nonsocial deviancy aversion measures (randomized; clustered together) and the context-dependent moral judgment measures (baseline and alternate society) in random order. They then completed the explicit context-dependent moral judgment, attention check, demographics, and social desirability measures in that order.

4.5.2 Results

In line with past research on moral relativism (e.g., Shaw & Wainryb, 1999), participants rated moral violations as less immoral when these violations were described as common and accepted in an alternate society, harm: $t(204) = 9.54$, $p < .001$, $d = .75$, impurity: $t(204) = 13.22$, $p < .001$, $d = 1.16$ (see Supplemental Table S1 of Gollwitzer et al., 2020 for descriptive statistics). Importantly, as predicted, deviancy aversion moderated this effect for both harm and purity violations. A repeated measures GLM with deviancy aversion as a continuous predictor, moral violation (baseline vs. alternate society) as a within-participants variable, and moral condemnation as the dependent variable found that participants' deviancy aversion predicted a greater change in moral judgment from baseline to when moral violations were described as common and accepted in an alternate society, harm: $p = .004$, and purity: $p = .042$, respectively (**Table 4.2**; **Figure 4.4**). More specifically, in line with our hypotheses, participants higher in deviancy aversion were more likely to judge moral violations as less wrong, compared to baseline, when these

violations were described as common and accepted in an alternate society (see Table 2 for simple effects).[29]

Table 4.2. Study 3: Deviancy Aversion Predicts Context-Dependent, Flexible Moral Judgment

	Moral Judgment: Baseline	Moral Judgment: Alternate Society	Simple Effect	Interaction Term: Deviancy Aversion * Moral Judgment (Baseline Vs. Alternate Society)
	M, *SD*	*M*, *SD*		
High Deviancy Aversion (+1 *SD*)	4.43, 1.16^{harm}	3.34, 1.90^{harm}	$F(1, 203) = 80.12$, $p < .001$, $\eta p^2 = .283^{harm}$	
	3.97, 1.15^{purity}	2.79, 1.76^{purity}	$F(1, 203) = 117.92$, $p < .001$, $\eta p^2 = .367^{purity}$	$F(1, 203) = 8.69$, $p = .004$, $\eta p^2 = .041^{harm}$
Low Deviancy Aversion (-1 *SD*)	4.36, 1.16^{harm}	3.78, 1.90^{harm}	$F(1, 203) = 22.82$, $p < .001$, $\eta p^2 = .101^{harm}$	$F(1, 203) = 4.18$, $p = .042$, $\eta p^2 = .020^{purity}$
	3.72, 1.15^{purity}	2.85, 1.76^{purity}	$F(1, 203) = 63.42$, $p < .001$, $\eta p^2 = .238^{purity}$	

Note. harm = harm violations. purity = purity violations.

[29] Regarding these simple effects, participants' responses to the common and accepted purity violations did not greatly differ depending on deviancy aversion ($M = 2.76$ vs $M = 2.88$). However, importantly for our hypothesis, the interaction was significant. That is, the *change* from baseline to alternate society in moral impurity judgments was larger for participants higher in deviancy aversion (see also the difference scores analyses in the next paragraph). We are specifically interested in this change as it represents the construct we wished to assess—the moral flexibility of participants (i.e., the tendency for their moral judgments to shift depending on the surrounding context).

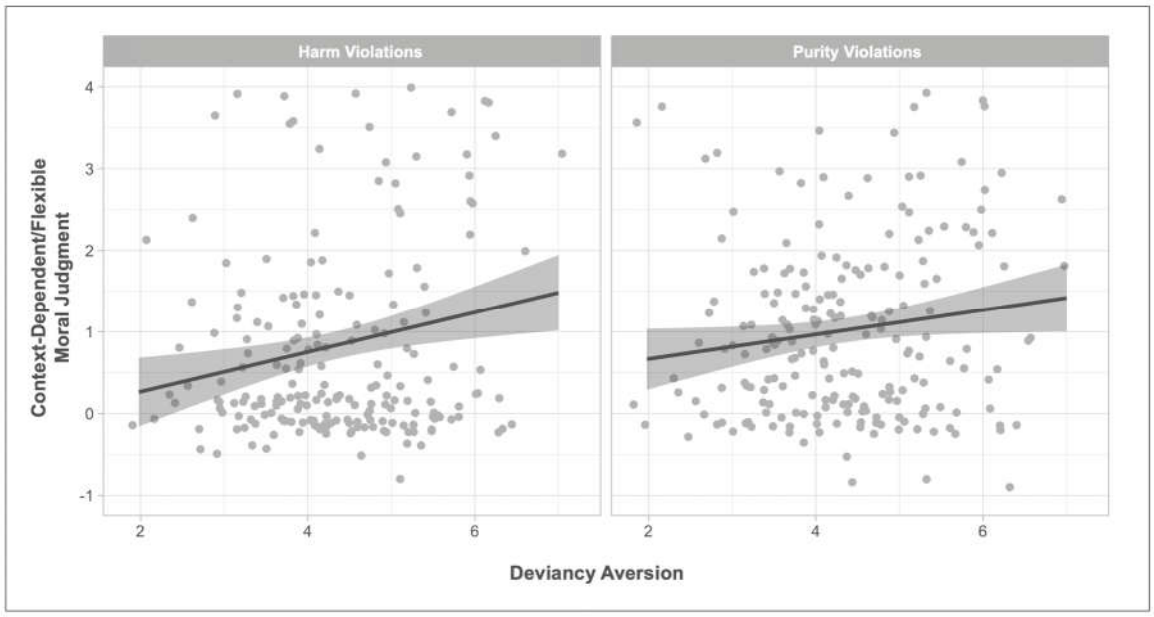

Figure 4.4. Study 3: Deviancy aversion predicted context-dependent, flexible harm and purity moral judgments. Deviancy aversion positively related to judging moral violations as less egregious when these violations were described as common and accepted in an alternate society as compared to baseline (in one's own society). Flexible moral judgment was calculated via difference scores (see the results section of Study 3) for the purposes of this figure.

To provide additional support for these results, we re-analyzed these findings when calculating context-dependent, flexible moral judgment via change-scores. That is, when calculating difference-scores between participants' moral judgments at baseline and when the same moral violations were described as common and accepted in the alternate society (rather than using a repeated measures design as above). Consistent with the earlier findings, deviancy aversion predicted a larger decrease in moral condemnation from baseline to when moral violations were described as common and accepted, harm: $r(203) = .203$, $p = .004$, and impurity: $r(203) = .14$, $p = .042$ (see Figure 4).

Crucially, the observed interactions did not significantly differ depending on the type of moral violation (harm versus purity violations); that is, a three-way interaction

including moral violation type was not found, $p = .501$. Additionally, these findings did not substantially change when controlling for political orientation, aversion to a lack of deviancy (*un*broken patterns), and social desirability: harm violations, $p = .005$, and purity violations, $p = .085$. Furthermore, the order in which participants completed the baseline and alternate society moral items did not impact the results; interactions between measure order (baseline versus alternate society moral items presented first) and deviancy aversion were not significant, harm: $p = .854$, and purity: $p = .400$. Finally, aligning with these findings, deviancy aversion also marginally predicted participants' explicit endorsement of context-dependent, flexible moral judgment, $r(203) = .13$, $p = .059$. We conclude that a domain-general aversion to deviancy may encourage people to align their moral judgment to the regular patterns of behavior in their environment.

4.5.3 Discussion

In Study 3, participants' deviancy aversion predicted context-dependent, flexible moral judgment. Individuals high (versus low) in deviancy aversion were more likely to evaluate moral transgressions as less egregious when these transgressions were described as common and accepted in society as compared to baseline (when judging the moral transgressions in their own culture). These results tentatively indicate that a low-level sensitivity to deviancy may help explain why moral judgments can vary over contexts, time, and communities (Bartels, 2008; Bloom, 2010)—actions that break behavioral regularities in one context do not necessarily break those regularities in another context.

4.6 General Discussion

Across three studies, we demonstrated that people's deviancy aversion—their negative affect in response to a perceived regularity or pattern being broken, disrupted, or distorted—predicts their moral judgment. In Studies 1 and 2, participants' dislike of simple examples of nonsocial deviancy, for instance, socially-irrelevant broken patterns of geometric shapes, predicted their moral condemnation and punishment of harm and purity violations. And, in Study 1, suggesting that this link occurs via an intuitionist pathway to moral judgment (Haidt et al., 1993), this link was stronger for more intuitive thinkers than deliberative, analytical thinkers. Finally, in line with people's aversion to deviancy predicting greater moral condemnation (Studies 1 and 2) because immoral actions break behavioral regularities in society, deviancy aversion in Study 3 predicted context-dependent moral judgment—judging moral violations as less immoral when these violations were described as common and accepted in an alternate society compared to at

baseline. Collectively, these three studies demonstrate that a cognitive-affective factor as simple as people's aversion towards low-level deviancy is linked to moral judgment.

4.7 Confounding Variables

Notably, our findings remained when controlling for alternate factors predicting moral judgment, including disgust (Schnall et al., 2008; Study 1), political orientation (Graham et al., 2009; Haidt & Graham, 2007), and social desirability (e.g., Fisher, 1993; Maccoby & Maccoby, 1954). Moreover, past research has demonstrated that people's sensitivity to deviancy is unrelated or only weakly related to other potential third-variables (e.g., need for closure; disliking novel stimuli; Gollwitzer et al., 2017). Response bias also does not seem to explain our results; differently valenced response items were utilized across the studies, and further, participants' socially desirable responding did not account for our results. Finally, in Study 1, we observed hypothesis concordant results when assessing participants' reliance on intuitive thinking using the cognitive reflection test—a behavioral performance measure that is unlikely to be influenced by response or demand bias (Frederick, 2005).[30]

4.8 Comparative Predictive Power

Our findings contribute to research on moral judgment by introducing a basic domain-general, cognitive-affective factor—people's sensitivity to deviancy—as one predictor of the variation observed in people's moral judgments (e.g., Bloom, 2010;

[30] Our findings are unlikely to arise via anthropomorphism (i.e., that participants personified the geometric shapes); Gollwitzer et al. (2017) found participants' tendency to anthropomorphize not to moderate the link between deviancy aversion and prejudice, and, the deviancy aversion measures included in the studies presented here included nonvisual measures, explicit measures (which one cannot anthropomorphize).

Kohlberg, 1971; Greene & Haidt, 2002; Haidt, 2001; Cushman, Young, & Greene, 2010). Notably, of the predictors of moral judgment included in our studies (disgust sensitivity and political orientation), only deviancy aversion predicted moral condemnation of divergent types of moral violations—both harm and purity violations. Additionally, deviancy aversion predicted moral condemnation of purity violations to a similar extent as disgust propensity and sensitivity, a major theoretical predictor of moral purity concerns (e.g., Schnall et al., 2008). Taken together, our findings suggest that people's aversion towards low-level deviancy may motivate greater moral sensitivity which, importantly, can facilitate human cooperation and cohesion (Harms & Skyrms, 2008; Nowak, 2006).

4.9 Intuitionist Pathway to Moral Judgment

Though researchers have noted that intuitive processes inform morality (Greene & Haidt, 2002; Haidt, 2001), it remains unclear where such "gut" responding originates from. Potentially, deviancy is one factor that informs this intuitionist pathway to moral judgment. That is, a negative response to deviancy may heighten negative affect towards moral violations (given their irregularity), which in turn induces harsher moral judgments. In line with this possibility, in Study 1, the relationship between deviancy aversion and moral judgment was stronger for more intuitive thinkers; indeed, analytical, reflective thinkers were able to attenuate or even eliminate the predictive power of their deviancy aversion on their moral judgment. Nonetheless, interpreting the results of Study 1 in terms of the intuitionist pathway to moral judgment should be approached cautiously. For one, we did not directly test the intuitionist pathway—we did not test whether causally heightening deviancy aversion increases negative affect towards moral violations and in turn induces

harsher moral responding. Second, we did not control for participants' numerical ability, a factor commonly controlled for in studies involving the CRT (see Pennycook & Ross, 2016). Future research should more directly examine whether deviancy aversion qualifies as an antecedent of the intuitionist pathway to moral judgment (Haidt et al., 1993).

4.10 Interactionist Perspective on Morality

Our findings encourage the adoption of an interactionist perspective when studying morality—psychological phenomena emerge from an interaction between the individual and the environment (Lewin, 1946). In Study 3, participants' deviancy aversion interacted with behavioral regularities in a society to predict their moral judgment; deviancy aversion predicted a greater shift (from baseline) towards judging moral violations as less wrong when these violations were described as common and accepted in an alternate society. The findings of Study 3 also indicate that deviancy aversion may in part underlie or at least moderate the common is moral heuristic—selfish as well as altruistic acts are evaluated as more moral when they are more common (Lindström et al., 2018). And finally, the findings of Study 3 and Study 1, considered collectively, suggest that people's aversion to deviancy is an intuitive, automatic factor potentially contributing to moral relativism—previous research has only identified reflective, deliberative causes (e.g., reasoning that a moral violation accepted in an alternate society must be beneficial and consensual in that society; Shaw & Wainryb, 1999).

4.11 Common Immoral Actions

Our findings may also help elucidate why immoral actions such as lying and cheating are judged as less morally wrong than other moral violations (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996; McCabe & Trevino, 1993)—these immoral actions do not deviate from behavioral regularities in society per se. Deviancy aversion may also help explain antisocial punishment—punishment of people exhibiting extreme pro-sociality (Herrmann, Thöni, Gächter, 2008; Du & Chang, 2015; Lindström et al., 2018). That is, extremely pro-social actions, similarly to anti-social actions, break the behavioral regularities in a society, and thus, people's low-level aversion to deviancy should drive them to disapprove of and punish such actions. Supporting this possibility, Irwin and Horne (2013) explicitly created descriptive behavioral regularities in an economic game paradigm (i.e., set amounts that players contributed to other players) and found that participants willingly punished players who altruistically broke these regularities.

4.12 Limitations

The current research is limited in certain ways. First, we did not examine whether potential subtypes of deviancy differentially relate to moral judgment. For instance, prototype deviancy, deviations from people's perceived 'perfect' mental representation of a category (Palmer, Schloss, & Sammartino, 2013), may differentially relate to moral judgments as compared to how we assessed deviancy here—deviations from contextual regularities (more akin to "pattern" deviancy). Though we see no reason that such subtypes of deviancy would reveal significantly different results, future research should still examine this possibility. Second, the current findings are largely restricted to self-report

measures, and thus, the generalizability of the current findings regarding actual behavior (e.g., actual judges' sentencing; Study 2) should be approached cautiously. Third, the scenario presented to participants in Study 3 (that immoral actions are accepted and common in an alternate society) was largely artificial—that is, we did not actually change the moral environments of participants; rather, we asked participants to imagine these changes. Fourth, we examined the link between deviancy aversion and moral judgment solely in a correlational manner. Future research should examine the potential causality of this link.

Finally, a few points deserve to be emphasized. First, numerous factors aside from people's aversion to deviancy underlie variance in moral judgment (e.g., rational thought, religious beliefs). These different factors may override and interact with deviancy aversion in predicting certain moral judgments. Second, we do not claim that moral judgments are 'scaffolded' off of deviancy aversion. That is, deviancy aversion does not need to arise earlier in development or be more 'rudimentary' than people's moral judgment for such aversion to inform moral judgment. Third, we do not claim that the predictive power of deviancy aversion is specific to moral judgments or the moral domain. That is, deviancy aversion may also predict judging *non*-moral norm violations as wrong and punishing these violations. Such results would support our argument that deviancy aversion predicts harsher moral judgment because moral violations break the normative pattern of behavior in society—similarly to moral violations, norm violations break the descriptive regularities of societal behavior.

4.13 Conclusions

Across three studies, we demonstrated that people's sensitivity to deviancy predicts individual differences in moral judgment (Studies 1 and 2). Additionally, we found that this sensitivity plays a role in the context-dependency and flexibility of people's moral judgment (Study 3). Taken together, the current results endorse the notion that, though seemingly unrelated, simple cognitive-affective factors—such as people's aversion to low-level deviancy—may inform morality.

Summary, Limitations, and Future Directions

5.1 Summary

The present dissertation aimed to broaden our conceptualization of deviancy to one not limited to irregular social actions. Specifically, I proposed that we should re-conceptualize people's responses to deviancy as a domain-general affective-cognitive phenomenon, an aspect of the human experience that manifests across distinct domains and has a meaningful impact on social phenomena. Three chapters and 21 studies supported this broad re-conceptualization of deviancy. Participants' responses to deviancy—the violation or distortion of regularities and patterns—overlapped across numerous divergent domains (e.g., nonsocial and social, visual and nonvisual, explicit and implicit). More specifically, participants appeared to respond similarly to deviancy regardless of whether such deviancy involved social stimuli (e.g., someone violating moral norms, members of a statistical minority in society), nonsocial stimuli (e.g., descriptions of objects violating a homogenous collection), visual stimuli (e.g., images of distorted patterns of geometric shapes), or nonvisual stimuli (e.g., reported attitudes towards positive and negative social outliers), among other domains. Moreover, and in line with past work examining deviancy, people's domain-general responses towards deviancy were largely negative in affect (across domains) and were observed at a young age and cross-culturally. Additionally, I found people's nonsocial deviancy aversion to even causally contribute to a complex social phenomenon, specifically, people's degree of prejudice (against social outliers). Collectively, these findings highlight the potential of adopting a broad domain-general conceptual understanding of deviancy to gain new traction on fundamental questions asked in social and cognitive psychology.

5.1.1 Summary of Chapter 2

In line with a domain-general perspective on deviancy, Chapter 2 found people's responses to 'low'-level deviancy to overlap with their responses to 'higher'-order deviancy. Specifically, nine studies (N = 994) and a meta-analysis demonstrated that people's aversion towards nonsocial deviancy (deviancy in everyday scenes of objects, broken patterns of geometric shapes, and a written vignette describing nonsocial deviancy) predicted their aversion towards social deviancy (i.e., prejudice against stigmatized individuals, social norm-breakers, statistically negative and positive societal outliers, and even members of a racial minority—Black individuals in the United States). Importantly, this overlap was quite robust, it remained consistent: (1) across cultures (in the United States and in China), (2) across explicit as well as implicit measures (i.e., at the nonconscious level), (3) with regards to "positive" social deviancy (i.e., experiencing aversion towards social outliers who are generally judged positively in society, such as the very rich), (4) when accounting for numerous potential third-variables (e.g., need for closure, neuroticism, political orientation), and (5) across adults as well as children (though starting only at around age 7 and not in younger children). Furthermore, the reported studies also documented—in line with the previous research (discussed in section 1.1.2 People Generally Experience an Aversion Towards Deviancy)—that people generally experience aversion (as opposed to a preference) in response to deviancy. Taken together, the findings of Chapter 2 provide initial support for deviancy sensitivity as a domain-general phenomenon and suggest that people's sensitivity to deviancy may play an important role in the complex social phenomena of stigma and prejudice.

5.1.2 Summary of Chapter 3

Building on Chapter 2, Chapter 3 examined a potential mechanism underlying the observed overlap between nonsocial deviancy (i.e., lower-level deviancy) and social deviancy (i.e., higher-level deviancy), as well as tested whether this overlap is causal. Specifically, Chapter 3 examined whether manipulating people's degree of nonsocial deviancy aversion causally impacts their prejudice (against social outliers), and whether this potential effect occurs in part by inciting a dislike of statistical minorities. Indeed, disliking statistical minorities may function as one mechanism underlying the observed link in that infrequent people in a population are likely to be perceived as deviant as they disrupt the statistical regularities of how people tend to look, think, and act in society, and this deviancy should incite others' prejudice.

Nine studies (N = 1,821) observed the proposed mediation model. Manipulating people's aversion towards nonsocial deviancy (e.g., aversion towards images of violated geometric patterns) heightened their dislike of novel statistical minorities (minorities on an 'alien' planet) which in turn heightened their prejudice towards individual social outliers (e.g., members of a racial minority, individuals with a physical disability, individuals with atypical physical appearances, individuals engaging in non-majority customs). Documenting the robustness of this mediation model, the pathway model remained consistent: (1) in correlational as well as experimental studies, (2) when using descriptive as well as motivational manipulations of nonsocial deviancy aversion, (3) when measuring prejudice via explicit as well as implicit measures, (4) when controlling for numerous potential third-variables (e.g., novelty aversion, perceiving novel statistical minorities as

in power, political orientation), (5) when assessing the three variables included in the mediation in a longitudinal manner, and (6) across adult as well as child samples. Moreover, the proposed mediation was supported in that (1) intervening on the proposed mediator—people's dislike of novel statistical minorities—eliminated the effect of nonsocial deviancy aversion on prejudice, and (2) the proposed pathway model was *not* found when assessing prejudice against a group that is discriminated against in society but that is not a statistical minority, that is, prejudice against women.

Notably, in line with past theorizing on the context-dependency of deviancy in terms of anti-social actions (e.g., Durkheim, 1985), Chapter 3 also provided initial support for the context-dependency of the broad conceptualization of deviancy proposed here. Specifically, in Chapter 3, participants' aversion to nonsocial deviancy actually predicted *decreased* prejudice against real-world minority group members (Black and Muslim individuals) when such individuals were presented as the majority in an alternate society. Strikingly, participants higher in nonsocial deviancy aversion even reported that they would prefer to be a Black person and a Muslim person in majority Black and majority Muslim contexts (as compared to minority Black and Muslim contexts).

Chapter 3 also had a number of secondary contributions. For one, Chapter 3 elucidated boundary conditions on the causal impact of nonsocial deviancy aversion on prejudice. For instance, while deviancy aversion substantially influenced prejudice against various types of stigmatized individuals (e.g., individuals with a physical disability), it did *not* meaningfully influence racial prejudice (in terms of prejudice against Black individuals). Reasons for this divergence are discussed in detail in Chapter

3 (see 3.7.4 Types of Prejudice). Second, in Chapter 3, participants' racial identity did not moderate the observed findings (see Brown, 1995; Henrich et al., 2010; Nielsen et al., 2017). That is, I did not find any parts of the observed mediation pathway to be moderated by participants' racial identity (see 3.6 Participants' Racial Identity Across the Reported Studies). These results demonstrate the robustness of the presented findings and, troublingly, suggest that societies' perception of Black individuals as social outliers may be pervasive enough to extend even to participants who themselves identify as Black.

5.1.3 Summary of Chapter 4

Building on Chapters 2 and 3, Chapter 4 examined whether people's domain-general aversion to deviancy impacts a psychological phenomenon aside from prejudice. Given the prominence and rapid growth of the study of morality in psychology (see Haidt & Kesebir, 2010), I examined whether deviancy aversion plays a role in moral judgment. Specifically, because most moral violations deviate from assumed behavioral regularities in society, I tested whether people's degree of nonsocial deviancy aversion predicts their degree of condemnation and punishment of moral violations. Supporting this possibility, two studies (N = 404) found that nonsocial deviancy aversion (e.g., aversion towards broken patterns of geometric shapes) predicts greater moral condemnation and punishment of harm and purity violations. Supporting the robustness of this link, the observed relationship remained consistent: (1) across various measures of nonsocial deviancy aversion (e.g., a visual measure, a face-valid measure, a mental imagery measure), (2) across different types of moral violations (harm and purity violations), (3) across different

types of moral responding (moral condemnation and punishment), and (4) when controlling for numerous potential third-variables (e.g., disgust, political orientation, social desirability). Moreover, people's nonsocial deviancy aversion predicted harsher moral condemnation of purity violations to a similar extent as people's disgust propensity and sensitivity, a major theoretical predictor of moral purity concerns (e.g., Schnall et al., 2008). Taken together, these findings indicate that something as basic as people's domain-general sensitivity to deviancy overlaps substantially with people's sense of morality.

Chapter 4 also had a number of secondary contributions. First, in line with the observed context-dependency of domain-general deviancy aversion in Chapter 3, participants' nonsocial deviancy aversion predicted context-dependent moral judgment (see Study 3, $N = 205$, in Chapter 4). Participants higher in deviancy aversion exhibited a greater shift towards tolerating moral violations when these violations were described as the regular pattern of behavior in an alternate society. Second, Chapter 4 indicated that the link between nonsocial and social deviancy aversion occurs via an affective rather than deliberative pathway (i.e., an intuitionist rather than reasoning pathway; see Greene & Haidt, 2002; Haidt, 2001; Cushman, Young, & Greene, 2010). Specifically, the observed relationship between nonsocial deviancy aversion and moral judgment was found to be stronger for more intuitive thinkers than deliberative thinkers; indeed, analytical, reflective thinkers were able to attenuate or even eliminate the predictive power of their nonsocial deviancy aversion on their moral judgment. Importantly, these results (1) indicate that the domain-generality of people's sensitivity to deviancy may be driven by intuitive, automatic processing, (2) suggest that conscious deliberation can override the domain-generality of

people's responses to deviancy, and (3) shed light on the intuitive pathway to morality (Greene & Haidt, 2002) by revealing a potential source of the negative affect that informs people's moral judgments.

5.2 Theoretical and Applied Implications

On a general level, previous scientific research has predominantly discussed deviancy in terms of actions (usually but not always antisocial actions) that break established norms (e.g., Bicchieri, 2005; Durkheim, 1985). While this research greatly informs our understanding of rule breaking and antisocial behavior, it has shed little light on deviancy as a more domain-general construct. Specifically, deviancy need not be limited to only social behavior; instead, it can be thought of as simple, nonsocial distortion, for instance, the distortion of simple statistical regularities or assumed prototypes. For example, any row of stimuli with one varying stimulus (a row of triangles with one triangle out of line or a row of people with one person looking physically different) qualifies as deviancy. Importantly, thinking of deviancy in this domain-general way bridges divergent aspects of our psychology by showing that people's responses to irregularities span across varying domains—social and non-social, visual and non-visual, concrete and abstract, belief and behavior.

From a historical and broad theoretical perspective, the domain-general conceptualization of deviancy documented here compliments the theorizing of early pioneers of modern psychology. For instance, William James (1890), Fritz Heider (1958), and Kurt Lewin (1946), all argued that human attitudes and behavior are motivated by 'consistency' motives—the drive to experience balance, regularities, and constancy in

terms of the self, beliefs, and behaviors. By assessing people's sensitivity towards deviancy in low-level stimuli (e.g., in geometric shapes) the present work arguably was able to quantify such a 'consistency' motive at the lower-order individual level, and in turn, as theorized by these seminal psychologists, demonstrate that this motive plays a significant role in social judgment and behavior.

More concretely, the re-conceptualization of people's responses to deviancy as domain-general should impact a number of influential research areas. This includes, for instance, many of the constructs and findings covered in the introduction section of this dissertation (see sections 1.2.2. People Generally Experience an Aversion Towards Deviancy and 1.23 Prior Support for the Domain-Generality of Deviancy). For instance, though not directly examined here, the present findings suggest that people's domain-general aversion to deviancy may help explain societies' general acceptance and adherence to social norms (Sherif, 1936), individuals' arbitrary preference for stimuli they have seen before (mere exposure; Zajonc, 1968), people's resistance to changes in their environments (Jost, 2015), people's close adherence to habits (even when these habits are harmful; e.g., James, 1890; Neal, Wood, & Quinn, 2006), and people's tendency to conform (Asch, 1952; see Berg & Bass, 1961). Indeed, supporting the role of domain-general deviancy aversion in such phenomena, Gollwitzer et al. (2021) found that nonsocial deviancy aversion (assessed similarly to the studies presented here) predicts and leads to a greater adherence to social norms in terms of heightened norm following and desiring more pervasive and rigid social norms in society. And, Asch (1952), found that conformity dramatically decreases when non-conformist actions are made less

deviant, that is, when a confederate has already violated the conformist behavior (before the participant has to act). As such, it seems likely that people's domain-general sensitivity to deviancy may play a role in these major features of our psychology.

Even more concretely, the current work informs a number of specific findings, some of which are largely unexplained. For instance, people's domain-general aversion to deviancy may help explain why actions are judged as more moral when they are perceived as more common (the "common is moral heuristic", Lindström et al., 2018), why people engage in anti-social punishment—the punishment of individuals who deviate from the norm in terms of being overly-prosocial (e.g., Hermann, Thöni, & Gächter, 2008), why faces that violate symmetrical regularities are judged as less attractive (e.g., Langlois & Roggman, 1990), why people experience aversion towards social outliers who are extreme examples of positive characteristics in society (e.g., the very wealthy; e.g., Smith & Kim, 2007), why certain visual aesthetics are preferred over others (e.g., Palmer et al., 2013), why certain stimuli are processed more 'fluently' than others (e.g., Reber et al., 2004), why people follow nonfunctional descriptive norms (e.g., Pryor, Perfors, & Howe, 2019), and why we respond negatively to purity violations (even when they are technically harmless, e.g., Haidt & Nosek, 2009). Moreover, our findings align with a number of claims regarding the role of deviancy in social constructs, for instance, that a low-level aversion to deviancy plays a role in the development of children's sense of morality (e.g., Kagan, 1984; Kochanska et al., 1995), that irregular visual scenes can induce irregular, anti-social behavior (see Keizer, Lindenberg, & Steg, 2008; Kotable et al., 2016), and that prediction-errors across differing domains (e.g., word mismatches and attitudinal dissonance) induce

negative arousal (Proulx, et al., 2012). In sum, the broad conceptualization of deviancy presented here may inform a host of overarching psychological concepts while also shedding light on specific past findings.

5.2.1 Context-Dependency

On top of these contributions, the observed context-dependency of deviancy (see Chapters 3 and 4) provides an additional layer of insight. For one, the findings argue against a solely individual- or situation-based perspective on human psychology in favor of an interactionist perspective—that people's attitudes and behavior are determined by an interaction between the individual and the environment (e.g., Lewin, 1946; Mischel, Shoda, & Mendoza-Denton, 2002). Moreover, the presented context-dependency findings provide a potential low-level explanation for why and how people's social judgments, such as prejudice and moral judgment, can change over time and depend on the surrounding environment (e.g., Bartels, 2008; Bloom, 2010; Garcia-Marques et al., 2017; Payne et al., 2017). For instance, people's domain-general deviancy aversion may help explain why prejudice against women is especially pervasive in contexts in which women are perceived as being deviant—whether that is due to being a statistical minority or other deviancy inducing factors (e.g., positions in finance; e.g., Mankoff, 1971; Williams & Teidens, 2016). In the same vein, as certain identities or actions are perceived as less deviant in society (more normative), people's low-level deviancy aversion should lead to an attenuation of their negative attitudes towards these people and behaviors. For instance, on an applied level, people's domain-general aversion to deviancy may drive them to become less prejudiced against minorities as minorities (as a collective) become

the majority in terms of population in the United States (though, of course, other factors may outweigh any impact of deviancy aversion, for instance, status threat; see Craig & Richeson, 2014; Craig, Rucker, & Richeson, 2018). In sum, the demonstrated context-dependency of deviancy aversion can help explain why people's attitudes and behavior shift according to the regularities in their specific situations and environments.

5.2.2 An Intuitive, Affective Pathway

Aside from the context-dependency of deviancy aversion, the presented findings also suggest that the domain-generality of deviancy aversion is likely driven by intuitive, automatic processing. Specifically, in Chapter 4, I found that the link between nonsocial deviancy aversion and condemnation of moral violations was stronger for intuitive thinkers than deliberative thinkers; indeed, deliberative thinkers were able to attenuate and even eliminate the predictive power of their deviancy aversion on their moral judgment. These results suggest the following three-part pathway: (1) people's aversion to deviancy automatically induces negative affect towards irregularities across domains (e.g., social outliers, immoral actions), (2) this negative affect leads people to develop negative attitudes towards these specific irregularities (e.g., prejudice), (3) people misattribute their negative attitudes and create rationalizations (some of which are fallacious) justifying these negative attitudes (e.g., judging people who identify with the opposite gender as threatening social values), and finally, (4) these rationalizations in turn feed people's negative attitudes, creating a cycle of prejudice. This framework fits neatly into past work documenting the intuitionist pathway to morality (see Haidt et al., 1993) and affective processes leading to prejudice and type-rationalizations (inaccurate reasons

supporting one's prejudice; Hegarty & Golden, 2008; LaPiere, 1936; Smith, 1993). Moreover, if this proposed pathway is accurate, it would significantly extend such past theorizing by elucidating that deviancy aversion functions as a low-level antecedent or precursor of these affective, intuitive pathways to prejudice and moral judgment.

5.2.3 Interventions

On top of the above noted theoretical contributions, the presented results may inform attitudinal and behavioral interventions, especially in terms of recognizing and overriding our deviancy aversion and adopting positions of tolerance and openness. For instance, Chapter 3 found that consciously reflecting on the positive attributes of minority groups eliminated the effect of people's deviancy aversion on their expression of prejudice. And similarly, in Chapter 4, deliberative thinkers were able to override the predictive power of their deviancy aversion on their moral judgment.

Both these findings tentatively suggest that self-regulation interventions (see Boekaerts, Zeidner, & Pintrich, 1999) could be applied to successfully allow individuals to modulate their deviancy aversion and the potential outcomes of this aversion. And, given the assumed automaticity of the effects of deviancy aversion (see previous section), interventions that target automatic processes may be particularly effective (e.g., Gollwitzer, 1999). Notably, however, such interventions should be developed with both down- and up-regulation in mind. That is, while the work I present here indicates that deviancy aversion contributes to deleterious phenomena, such as prejudice, other work I have completed finds that deviancy aversion also predicts positive behaviors (e.g., social-norm adherence, such as following preventative health measures during COVID-19; Gollwitzer et al., 2021). As

such, interventions should be developed that allow people to down- as well as up-regulate their deviancy aversion depending on the specific situation (i.e., to reduce deleterious outcomes and heighten beneficial ones; see Gollwitzer et al., 2017 for one way to do so).

Though the observed findings indicate that interventions may allow individuals to alter their deviancy aversion and the outcomes of this aversion, these potential interventions (as conducted in Chapters 3 and 4) should not be directly applied in the real-world. For one, the studies discussed here were not conducted in the field (Paluck & Green, 2009), and thus their generalizability is unknown. Additionally, the observed effect-sizes of these interventions were quite small, and we did not examine whether these manipulations had any long-term outcomes. Said another way, even if the conducted interventions are able to effectively change individuals' behaviors outside of the laboratory, the magnitude and meaningfulness of these effects may be trivial. As such, instead of applying the observed findings directly to interventions, the present work is useful in that it (1) can shed light on the potential mechanisms underlying existing successful real-world interventions, and (2) may inform future interventions in the field that more directly target anti-social attitudes and behaviors.

Regarding explaining potential mechanisms of past interventions, the present findings may help partially explain the efficacy of interventions that reduce prejudice by prioritizing individualized over categorized social perception (Miller & Brewer, 1986; Tajfel, 1970), encouraging integration (Crisp & Hewstone 2007), and re-framing individuals as part of a single superordinate group (Gaertner & Dovidio 2000; see Paluck & Green, 2009 for an overview of varying prejudice interventions). Simply put, if clear

categories are absconded then social outliers are less likely to be perceived as deviant or irregular (as they have no anchor to deviate from), in turn making it less likely that people's deviancy aversion becomes active and heightens their prejudice. Aside from these interventions, the current results also may help partially explain why interventions utilizing habituation and exposure to outgroups and stigmatized individuals can (in certain instances) reduce prejudice (e.g., Pettigrew & Tropp, 2006). That is, individuals may perceive stigmatized individuals as less deviant if they have repeated, regular interactions with these individuals, in turn reducing their prejudice.

Regarding creating future real-world interventions that directly target anti-social outcomes, the observed findings suggest that interventions that encourage an open-mind towards irregularities and deviancy may be future avenues to potentially mitigate anti-social outcomes. Indeed, in the real-world, such interventions may already be utilized, for instance, in children's books that teach young children to celebrate uniqueness and reframe deviancy in terms of being different rather than deviant (e.g., *It's okay to be different*; Parr, 2011; Sapon-Shevin, 2010). Taken together, then, the presented findings may provide insight into the mechanisms that underlie successful interventions, as well as provide an empirical foundation for future applied interventions that directly attempt to reduce prejudice and other anti-social behaviors.

5.2.4 Implications Summary

In sum, the presented research should have a significant theoretical, and potentially, even an applied impact. As noted above, it is difficult to stress the sheer number of phenomena that are potentially influenced by how we feel and think about deviancy in our

environments. For instance, how we feel about deviancy should inform the extent to which we tolerate social outliers and eccentrics, whether we follow important norms and rules, how we respond to innovation, and whether we embrace or abscond rigid social and political policies, among many other outcomes. As such, although the proposed conceptualization of deviancy as domain-general may be quite simple (and indeed this is in part why it has such broad implications), as elucidated above, this broader conceptualization can shed substantial light on unexplained variance underlying a vast variety of different phenomena.

5.3 Functionality

While the present work suggests that a domain-general sensitivity towards deviancy is a component of our social cognition and psychology, it does not explain *why* this would be the case. One potential explanation comes from a body of work documenting that constructs that are seemingly independent (but semantically or conceptually related) are actually driven by domain-general processes. For instance, physical and social pain have been shown to overlap (e.g., taking pain killers reduces emotional pain after a breakup; Eisenberger et al., 2006), as have physical and social warmth (e.g., people feel physically warmer when thinking of loved ones; Williams & Bargh, 2008; Inagaki & Eisenberger, 2013), and physical and social distance (e.g., priming closeness in nonsocial physical distance impacts feelings of social closeness; Williams & Bargh, 2008b). To explain these findings, researchers have suggested that these overlaps exist because higher-order processes are built off of low-level processes. That is, abstract and complex concepts are scaffolded off of (or at least develop in tandem with) simpler low-level ones, such as

physical experiences and perceptual analysis (e.g., movement, physical sensation, propulsion; e.g., Casasanto & Bottini, 2014; Clark, 1973; Mandler, 1992; Williams et al., 2009). Indeed, this possibility is supported by the principle of neural-reuse (see Anderson, 2010); for instance, Inagaki and Eisenberger (2013) observed shared neural activity for physical (nonsocial) as well as social warmth. Potentially this explanation applies here. Namely, people's responses to higher-order deviancy (e.g., social deviancy) may be 'scaffolded' off of (or develop in tandem with) people's responses to lower-level deviancy (e.g., deviations in terms of simple shapes) to promote cognitive efficiency (e.g., by sharing common neural circuitry).

Additionally, it is unclear why participants in our studies judged deviancy across varying domains negatively—why are deviant stimuli, events, or actions generally experienced as aversive? On a proximate level, deviancy may be aversive because it does not neatly fit into pre-existing categories and thus requires substantial cognitive effort (which can be an uncomfortable experience; e.g., Kurzban, 2016). Relatedly, deviancy may be perceived by individuals as disfluent and therefore feel aversive (Reber et al., 1998). These explanations are limited to the proximate level, however. From a more ultimate, evolutionary standpoint, people may experience deviancy aversion to aid survival—deviations from regularities and repetition may signal danger (Shermer, 2008). Indeed, Gollwitzer and Clark (2019) found that people are more comfortable with deviancy after being primed with feelings of interpersonal safety and security. Relatedly, people's aversive response to deviancy may aid survival by functioning as a low-level evolved motive that drives people to conform to their surrounding and cooperate with others in their

community (see Argyle, 2013). Despite these potentially viable explanations, it remains largely unknown, at least to my knowledge, why people are generally averse to deviancy. Future research should investigate this question.

5.4 Open Questions and Speculative Thoughts

The presented work opens a number of deeper questions, for which I do not have empirical data, but wish to briefly speculate on. First, consider the potential bi-directionality of the presented findings. In the presented work, I found that manipulating lower-order deviancy can influence higher-order deviancy (e.g., Gollwitzer et al., 2019) but also, that manipulating higher-order deviancy can influence lower-level deviancy (e.g., Gollwitzer & Clark, 2019). While these findings suggest a cyclical causal relationship at the proximate level, from an ultimate, more evolutionary perspective, the question remains which came first (a classic "chicken or the egg" issue). That is, did people's aversion to physical deviancy develop evolutionary before their aversion to social deviancy (or the opposite)? Or, potentially, did these responses develop in tandem over the course of human history? Some developmental work and theorizing suggests that social or higher-order concepts may be based off of low-level experiences (e.g., Casasanto & Bottini, 2014; Clark, 1973; Mandler, 1992). And indeed, it seems more intuitive that low-level responses to deviancy evolutionarily developed before high-level ones. Yet, this does not necessarily need to be the case. That is, numerous recent findings have shown that infants already have complex social systems and exhibit social biases shortly after birth (e.g., Bloom, 2013; Kinzler, Dupoux, & Spelke, 2007). As such, it remains a possibility that the causal direction—at the ultimate level—began with people's responses towards social or higher-

order deviancy evolving first, and only later did this aversion conceptually transfer to more low-level stimuli. Alternatively, of course, lower-order and higher-order domains of deviancy aversion developed in tandem, allowing a single system to simultaneously and thus efficiently deal with both lower-order threats (e.g., poisonous foods) and higher-order threats (e.g., outgroup members).

In a similar vein, while I do not have concrete data supporting specific evolutionary causes of the observed domain-generality of people's aversion to deviancy, I wish to speculate on some possibilities. First, it is possible that a low-level (and high-level) aversion to deviancy is evolutionarily quite functional (as proposed earlier, for instance in terms of safety and fitting-in in one's community). To provide some perspective on this claim, consider research indicating that people exhibit a natural aversion to pointy or sharp objects (compared to curved objects), presumably, as a result of the high historical risk of death from infection (e.g., Bar & Neta, 2006; Bar & Neta, 2007). Considering this phenomenon, Bar and Neta (2007) write, "Our brains might be organized to extract these basic contour elements rapidly for deriving an early warning signal in the presence of potential danger." Perhaps, similarly to this early 'sharpness' warning signal for danger, deviancy may also be processed rapidly in an effort to identify potentially dangerous stimuli; that is, stimuli that are out of the norm, whether nonsocial or social, should receive greater attention and be generally avoided given their potential danger. Future research should examine these questions. For instance, researchers could use foraging paradigms or other computationally-based games to quantify the degree of reward versus danger in non-normative objects or events (e.g., Giraldeau & Caraco, 2018; Prpic, 2019). Or, researchers

could, from a comparative cognition perspective, examine whether and how the deviancy responses of non-human animals differ from humans, and how this can inform the ultimate origins of humans' domain-general aversion towards deviancy.

Finally, in terms of open and speculative questions, consider that some individuals exhibit a stable counter-normative preference for deviancy across varying domains. Across the data I have collected examining deviancy, approximately 15% of participants appeared to actually prefer deviancy over order. And, notably, in some work not reported here, I found that this 15% (in terms of individual differences) is fairly stable across divergent cultures (~7 different countries I have examined, including some cultures that are not WEIRD: Western, Educated, Industrialized, Rich, and Democratic). These findings raise the question of why a stable portion of the population—approximately 15%—responds positively to deviancy. Potentially, such a distribution may be functional in order to prevent stagnation and encourage creativity in society, as well as signal to others which actions are deviant versus normative in the first place (Durkheim, 1985). In a sense, then, for any society to progress, a portion of people may be needed who hold a domain-general *preference* for deviancy, and in turn question existing norms and regularities. And, these individuals often serve a thankless job. Though they are integral to the furtherment of their communities, they often face the brunt of societal criticisms and prejudice (Bonetto, 2021).

5.5 General Limitations and Constraints

The presented findings have numerous limitations. For one, the generalizability of the present findings is limited; many of the included measures were self-report measures that were measured online and may not necessarily generalize to behavior in the field. And,

as noted earlier, this is especially relevant for the included interventions (see Paluck & Green, 2009). Second, though we examined the causal impact of nonsocial deviancy aversion on prejudice, we did not present evidence showing that such aversion also causally impacts moral judgment (indeed, moral judgments may be too stable to alter in this manner). Third, we did not test whether individuals' accuracy at *detecting* deviancy plays a role in our findings. Suggesting that this is not the case, several studies I conducted (not presented here) found that individuals' performance on odd-ball visual-search paradigms (e.g., accuracy at identifying a square in a collection of triangles presented for a short time-period) does not relate to their degree of aversion towards nonsocial or social deviancy. Fourth, and relatedly, while I observed domain-overlaps in terms of people's affective responses to deviancy (i.e., aversion), I did not examine whether participants' cognitive judgments towards different types of deviancy also overlap. For instance, do individuals who perceive nonsocial deviancy as more 'weird' also consider social outliers as more 'weird'? Supporting this possibility, several studies I conducted (not reported here) have found participants' tendency to judge nonsocial deviancy as deviant to predict their tendency to judge norm violations as deviant (though, these studies are still preliminary).

Fifth, the present work only examined whether nonsocial deviancy aversion overlaps with two higher-order constructs—prejudice and moral judgment. In work not covered here, however, I have found nonsocial deviancy aversion to also overlap with social norm adherence (Gollwitzer et al., 2021) as well heightened anxious attachment-style (in terms of close-relationships; Gollwitzer & Clark, 2019). Future research should nonetheless examine additional domains, for instance, whether deviancy aversion also plays a role in

conformity, authoritarianism, and anxiety, among other topics. Sixth, I did not consider varying subtypes of deviancy. For instance, deviancy may occur specifically in the form of pattern deviancy (deviations from regularities or patterns in a specific context)[31], prototype deviancy (deviations from people's stable representations of a category), and functional deviancy (deviations from the intended function of a stimulus). Future research should consider these potentially differing subtypes and whether they have divergent outcomes. Seventh, and relatedly, I did not directly examine the potentially differentiating role of objective deviancy (more perceptual) versus subjective deviancy (more value based). That is, while I find that the domain-generality of people's responses to deviancy exists across perceptual and subjective stimuli (e.g., images of broken patters, face-valid measures, images of people with a physical disability), I did not directly examine whether deviancy in these two differing formats may diverge in meaningful ways.

Eight, I largely did not consider what causes deviancy aversion. What are the antecedents of such aversion and in what contexts is such aversion particularly active? While this question remains largely unsolved, some work I have conducted indicates that priming feeling of insecurity in terms of social relationships heightens individuals' aversion to deviancy. At the same time, a number of other contexts may modulate people's deviancy aversion. For instance, boredom may induce people to perceive deviancy as desirable (as it can change the current negative state; Nederkoom et al., 2016). Eighth, and relatedly, I largely did not consider the cases in which deviancy may be perceived as

[31] Predominantly this form of deviancy, pattern deviancy, was measured in the studies reported here. However, the reported findings likely also hold true for prototype deviancy because prototypes are in part formed by descriptive regularities—the 'pattern' that one has previously witnessed (Posner & Keele, 1968).

positive. Though, I did consider positive social deviancy in Chapter 3 (in terms of social outliers who deviate in terms of 'positive' characteristics), and Gollwitzer and Clark (2019) found priming feeling of relationship security to reduce people's deviancy aversion, future research should still examine the cases in which we embrace deviant stimuli.

The presented findings also have clear boundary conditions. Particularly, the impact of deviancy aversion may not be observed in cases in which other factors, especially strong social or societal factors, take precedence. A perfect example of this is a finding discussed in Chapter 3: while deviancy aversion substantially influenced prejudice against various types of stigmatized individuals (e.g., individuals with a physical disability), it did *not* meaningfully causally influence racial prejudice (in terms of prejudice against Black individuals). As explicated in section 3.7.4 Types of Prejudice, numerous historical (e.g., segregation; Amir, 1969), social (e.g., group-threat, dominance motives, group-position, resource competition; e.g., Sherif et al., 1961), and large-scale societal and structural (e.g., Blauner, 1972; Bonacich, 1972) factors contribute to the force of racial prejudice against Black individuals in the United States (see Quillian, 2006). Importantly, these factors likely override or suppress any total effect of deviancy aversion on racial prejudice. And, such boundary conditions may not be unique to prejudice. For instance, people's deviancy aversion may not heighten social norm adherence (Gollwitzer et al., 2021) in contexts where other factors take precedence, for instance, if an individual is primarily concerned with lashing out against the presented norms.

5.6 Conclusion

Though deviancy has been discussed in a wide variety of areas and findings, a unifying framework of deviancy has yet to be considered. Here, I presented findings supporting a broad re-conceptualization of deviancy by showing that people's responses to deviancy overlap across highly divergent domains, including nonsocial and social domains, visual and nonvisual domains, and explicit and implicit domains. This re-conceptualization may help inform research on a large number of phenomena that are potentially influenced by how we feel and think about deviancy in our environments (e.g., prejudice, moral judgment, social norm adherence, conformity). Said another way, though the proposed conceptualization of deviancy as domain-general may be quite simple (and indeed this is in part why it has such broad implications), this broader conceptualization can shed substantial light on the variance underlying a vast variety of different phenomena.

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