THE COMMUNICATIVE ETIOLOGY OF CONSENSUAL STEREOTYPES:
INTEGRATING COMMON INFORMATION BIAS AND POSITIVE INGROUP BIAS

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by

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ABSTRACT

How do stereotypes against an outgroup become consensual through ingroup communication? To advance the theoretical understanding of this question, this dissertation presents a two-phase model of consensual stereotype formation. In the first phase, ingroup members build a common core of consensual stereotypes by selectively sharing some stereotypic attributes and strategically expressing them with abstract language. In the second phase, exposure to the specific stereotypic attributes, expressed more or less abstractly, leads the ingroup to achieve a collective endorsement of the outgroup stereotypes. The two-phase model was tested by means of a laboratory-based experiment in which participants in small groups discussed and evaluated the stereotypic attributes about an outgroup. The results supported the predictions in the common core phase, as well as provided partial support in the collective endorsement phase. When the participants’ ingroup identity was salient, stereotypic attributes that devalued (vs. praised) the outgroup were mentioned more frequently and abstractly. When participants’ personal identity was salient, stereotypic attributes known to the entire ingroup (vs. one member only) were mentioned more frequently and abstractly. The more frequently an ingroup as a whole mentioned stereotypic attributes about the outgroup, the more strongly the ingroup members endorsed the outgroup stereotypes because the attributes were perceived as valid. No evidence indicated that linguistic abstraction affected perceived representativeness of the stereotypic attributes, even though ingroup members endorsed the stereotypes that they considered as representative of the outgroup. The theoretical implications of the findings were discussed in the broader context of social influence and norm formation.
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CHAPTER ONE: LITERATURE REVIEW

In 1994, Rwanda—a small country in East Africa—witnessed one of the worst humanitarian crises in human history. During a short period of three months, members of the Hutu ethnic majority slaughtered almost 800,000 people; most of them were members of the Tutsi minority (Prunier, 1995). Later, the International Criminal Tribunal for Rwanda (ICTR) prosecuted people held responsible for these crimes and argued in their verdicts that the hate media created a shared belief in the Hutu population that demonized the Tutsi people as having “inherently evil qualities” (Thompson, 2007, p. 2). In the media, Tutsi people were labeled as liars, thieves, killers, and traitors (Prunier, 1995). Tutsi women were described as femme fatales whose mission was to overthrow Hutu regime and destroy the nation (Prunier, 1995). Furthermore, the media broadcast their criticism of Hutu people who did not stigmatize the Tutsi. Rumors about the Tutsi people (e.g., that they danced in the street to celebrate the death of Hutu president in a plane crash) circulated across the country (Hintjens, 1999; also see a discussion about consensual stereotypes in Rwanda genocide in Kline, Tindale, & Brauer, 2008).

The Rwanda genocide provides an extreme illustration of how shared beliefs may have harmful intergroup consequences (Klein et al., 2008). Consensual negative beliefs about an outgroup are thought to be at the heart of many social problems (Lyons, Clark, Kashima, & Kurz, 2008), including racism (e.g., Sechrist & Stangor, 2001), intergroup aggression (e.g., Struch & Schwartz, 1989), segregation (e.g., Massey, 2012), and stigmatization (e.g., Puhl, Schwartz, & Brownell, 2005). The “precise danger” (Haslam, Turner, Oakes, McGarty, & Reynolds, 1998, p. 206) of such consensual, negative beliefs is that they become an integral part of the fabric of the society, or social facts (Durkheim, 1969), that regulate the society’s reactions toward specific (often minority) groups (Schaller, Conway, & Tanchuk, 2002). Indeed, some
scholars argue that social issues such as racism and intergroup conflict “would hardly be a problem or even exist at all if not for the beliefs and ideas that spread and perpetuate within particular groups or communities” (Lyons et al., 2008, p. 59).

One type of shared beliefs that has received much attention is *consensual stereotypes*. In the eight decades since Katz and Braly (1933) first demonstrated that stereotypes are not just pictures in the head of individuals (cf. Lippmann, 1922), but may be shared by numerous people, many studies have investigated the etiology of consensual stereotypes (Schneider, 2004). This research largely falls within the socio-cognitive paradigm, which focuses on “the nature of the links between group membership and the structured psychological activity that underpins stereotype consensus” (Haslam et al., 1998, p. 206). The greatest amount of empirical attention focused on a positive ingroup bias (for review, see Haslam, 1997): People share and endorse the stereotypes that favorably distinguish the groups in which they hold memberships (i.e., ingroups) from the groups in which they do not (i.e., outgroups). Although Tajfel (1981) acknowledged that consensual stereotypes imply “a process of effective diffusion” (p. 147), with a few exceptions (e.g., Haslam et al., 1998), little is known about the interactive processes by which personal stereotypes become communal; that is, communicative etiology of consensual stereotypes.

A separate line of research, largely in small group communication, focused on the social-interactive processes underpinning the emergence of consensus, with common information bias receiving much of that attention (Stasser & Titus, 1985). The common information bias predicts that groups discuss information known to all group members rather than information known to only one group member (Klein et al., 2002). Small-group communication research has produced many insights into the types of messages people tend to discuss, and the means by which
interpersonal communication leads to consensus in freely interacting, task-oriented groups (Wittenbaum, Hollingshead, & Botero, 2004).

Despite of the complimentary nature of the two lines of research, little effort has been made to integrate them. I believe that such an integration, specifically between positive ingroup bias and common information bias, will advance our understanding of the emergence of consensual stereotypes from interpersonal communication. Researchers adopting the social-cognitive approach can benefit from a closer look at message production and interactional processes. Likewise, scholars from the social interactive tradition in small group communication may benefit from appreciating how the salience of group membership shapes social influence and consensus formation. Together, this integration promises to advance our understanding of how stereotypes move from being privately-held beliefs to social norms through interpersonal interactions.

This dissertation serves as a first step in a program of research on the communicative etiology of shared beliefs (see Zhu & Smith, 2016 for an agenda for consensual stereotypes, gossip, and rumor). The primary goal of this dissertation is to propose a novel model that explains how consensual stereotypes about outgroups emerge from conversations with ingroup members. To that end, the remainder of this chapter is as follows. I begin with defining stereotypes and consensual stereotypes, and articulate the assumptions that I make in the definitions I selected for this study. Then, I review existing scholarly literature concerning common information and positive ingroup bias. The chapter ends with the rationale for the new, integrative model of consensual stereotypes.

**Defining Stereotypes**

Since Lippmann (1922) first introduced the term “stereotype,” scholars in psychology
(e.g., Allport, 1954), sociology (e.g., Mackie, 1973), anthropology (e.g., LeVine & Campbell, 1972), and communication (e.g., Leets & Giles, 1999; Ruscher, 2001) have studied the phenomenon. Over time, dozens of definitions appeared. In fact, at this point, multiple papers (e.g., Ashmore & Del Boca, 1981; Gardner, 1994; Hamilton & Sherman, 1994; Schneider, 2004; Stangor, 2009) have analyzed the strengths and limitations of the different definitions, which I review next.

The word “stereotype” comes from two Greek words: stereo, meaning solid, and typos, meaning “the mark of a blow, impression, or model” (Miller, 1982, p. 4). Following from its Greek roots, the English term stereotype was first used to describe the practice of printing pages on a metal plate (Miller, 1982). The modern adaptation of the term keeps the connotation of duplication or sameness (Miller, 1982), which suggests that a group of people can be perceived as a distinct but cohesive entity that shares a set of common attributes (Hamilton & Sherman, 1996).

**Definition similarities.** Existing definitions share the assumption that stereotypes are a natural product of people’s limited capacity to process information (Hamilton & Trolier, 1986). People rely on short cuts to simplify the process of making sense of the physical and social information in their environment (Hamilton, 1981; McGarty, Yzerbyt, & Spears, 2002), which allows them to obtain a sense of predictive control over their environment (Anderson, 1991). One short cut is categorization, which refers to the subjective classification of physical or social stimuli into distinct categories in a way that is meaningful to the perceiver (Tajfel, 1969). A categorization scheme is meaningful to the extent that it accentuates the perceptual differences between and similarities within the categories (i.e., accentuation effect; Tajfel, 1957). Stereotypes, however, are more than just categorization schemes. In social environments, when
people stereotype others, they compare and attempt to distinguish their ingroups from outgroups (Abrams & Hogg, 1998).

For the purpose of illustration, imagine a fictitious group referred to as Bleens (a term coined by Sternberg, 1982 to assess gifted children’s ability to acquire and think in terms of novel concepts). If a person holds a stereotype that Bleens are lazy, duplication or sameness implies that the person presumes that every Bleen is lazy. By categorization, people simplify their perceptions by focusing on a narrow set of attributes for all Bleens (e.g., lazy). Through stereotyping, ingroups are distinguished (e.g., proactive and energetic) from Bleens.

**Definition differences.** The definitions of stereotype differ in respect to three attributes: structure, valence, and normalization. In regard to structure, stereotypes represent a single belief (e.g., Harding, Proshansky, Kutner, & Chein, 1969), or as multiple beliefs about the attributes of an outgroup (e.g., Ashmore & Del Boca, 1981), or as a collection of feature-category associations (e.g., Gaertner & Dovidio, 1986). Regarding valence, stereotypes are sometimes defined as inherently negative (e.g., Allport, 1954), or as potentially positive or negative (e.g., Jones, 1997). In respect to normalization, stereotypes reside in a person (i.e., an individual’s beliefs; e.g., Judd & Park, 1993) or in a social group (i.e., beliefs that are shared and normalized among an ingroup; e.g., Mackie, 1973).

Schneider (2004) argued that, although there is no right or wrong definition of stereotypes, scholars need to articulate how their definitions prioritize some attributes while treating others as nonessential. For this dissertation, I adopted the following definition:

*Stereotypes are the constellation of fixed, simplified beliefs held by individuals about the attributes of an outgroup and its members* (Ashmore & Del Boca, 1981; Judd & Park, 1993).

**Definition assumptions.** In adopting this definition, I prioritize the following attributes
and assumptions. First, I assume that stereotypes reflect individuals’ beliefs, as opposed to their knowledge or awareness of other people’s beliefs. Beliefs imply a notion of agreement; they are propositions that a person endorses as being valid (Devine, 1989). Also, a stereotype does not exist if an individual hears about the stereotypic attributes but does not endorse them as valid representations of the group. For example, an individual may be aware that the media stereotypes Bleens as lazy, but he or she may not endorse the stereotype. Distinguishing awareness from endorsement leaves room for exploring why some stereotypes gain suasory power while others do not.

Second, my definition of stereotype allows for people to hold multiples beliefs about a group. This assumption aligns with scholars who consider stereotypes as a constellation of beliefs (Ashmore & Del Boca, 1981) about the attributes including, but not limited to, behavioral patterns (Dovidio, Hewstone, Glick, & Esses, 2010), etiology, and social roles (Hilton & von Hippel, 1996) of a particular group. For example, Lin and colleagues (2005) determined that stereotypes about Asian Americans included the beliefs that Asians are socially awkward, competent, and ambitious. Multiple beliefs underlying stereotypes about a group allow people to choose one or more attributes from the constellation that best justify their reactions toward a stereotyped outgroup in different contexts (Fiske, Cuddy, Glick, & Xu, 2002). In a social context, for example, Asians may be disliked because they are not as social as others; in a competitive context, however, Asians may be rejected because they always strive to become number one and sometimes act too smart (Operario & Fiske, 2001). Even when evidence challenges a specific belief in a stereotype-constellation, people can resist adjusting all of the stereotypic beliefs by basing their perceptions and inferences on the other beliefs in the constellation of stereotypic beliefs (Schaller et al., 2002). I refer to the stereotypic beliefs that
come to mind when people think about an outgroup as *stereotypic attributes* (Fiske et al., 2002; e.g., lazy, bright, and foolish).

Third, I assume that stereotypes can have a positive or negative valence, as well as that this quality is not as important as whether it is used to praise or devalue a group. Whether a stereotyped attribute is positive or negative depends on the reference group. For example, the stereotype that Bleens are hardworking may be considered as positive. The exact same stereotype, however, may be judged negative among a group of people who like to party (Schneider, 2004). Hence, instead of locating stereotypic attributes on a continuum from positive to negative, I focus on its social valence; that is, the degree to which an ingroup uses the stereotypic attributes to *praise* or *devalue* an outgroup. These terms emphasize the relative nature of stereotype valence to the reference group and avoid the connotation of absoluteness in the original terms of positive and negative stereotypes.

Fourth, I assume that stereotypes reside “in the minds of individuals” (Hamilton, Stroessner, & Driscoll, 1994, p. 297); they do not have to be shared among a group of people to exist. Stereotypes about the same outgroup may vary from person to person due to different stereotypic attributes and valence (Ashmore & Del Boca, 1979; Judd & Park, 1993). For example, one person may stereotype Bleens as lazy and gossipy, whereas to another person, Bleens may be viewed as gossipy, aggressive and selfish. Stereotypes also may vary in the extent to which people endorse them (Judd & Park, 1993). For example, one person may endorse laziness more strongly than gossipiness as an attribute of Bleens, while another person may endorse both attributes. Conceptualizing stereotypes at the individual-level acknowledges the fact that not all stereotypic attributes about an outgroup are widely shared and endorsed in an ingroup (Stangor & Schaller, 2000). This highlights the need to understand why some outgroup...
stereotypes become common knowledge and collectively endorsed among ingroup members (i.e., consensual).

In summary, I define stereotypes as a constellation of fixed, simplified beliefs about an outgroup. I assume that they vary from person to person in terms of stereotypic attributes, valence, and endorsement. In the next section, I review the definitions of consensual stereotypes.

**Defining Consensual Stereotypes**

If stereotypes reside “in the minds of individuals” (Hamilton et al., 1994, p. 297), consensual stereotypes exist in the “fabric of the society” (Stangor & Schaller, 2000, p. 68). I define consensual stereotypes as *stereotypic attributes about an outgroup that are known and endorsed among the members of an ingroup.*

In this definition, I make two assumptions about consensual stereotypes. First, I assume that commonality is a defining feature that distinguishes consensual stereotypes from personal stereotypes. People who hold consensual stereotypes should know the same stereotypic attributes about an outgroup (Stangor & Schaller, 2000), which I refer to as a *common core.* Second, consensual stereotypes reflect the extent to which we as a group, rather than I as an individual, endorse the stereotypic attributes (Stangor & Schaller, 2000), which I refer to as *collective endorsement.* Thus, I separate the process of creating consensual stereotypes into two phases: developing a common core, and then generating collective endorsement of the core.

Although this distinction between a common core and collective endorsement has not been explicitly stated in the existing research, it is implied in two common approaches to assessing consensus empirically (Gardner, 1994). One methodological approach operationalizes consensus as an inter-individual consistency in the attributes assigned to a stereotyped outgroup (see Richards & Seary, 1999). This approach assumes that people organize concepts (e.g., the
attributes of a group) as a set of points in a mental space. Concepts stay close in the mental space if they have similar meanings along certain dimensions. For example, the concept lazy stays closer to the concept of foolish rather than the concept of creative. This approach, then, prioritizes the notion of a common core by assessing people’s awareness of the same stereotypic attributes and the similarity of their mental configurations of them (see Richards & Seary, 1999). The second methodological approach to assessing consensus focuses on inter-individual consistency in the endorsement of stereotypic attributes (see Richards & Seary, 1999). For example, a group achieves consensus regarding stereotypes about Bleens if the group members unanimously endorse the attributes that Bleens are lazy and gossipy. This methodological approach to consensus emphasizes collective endorsement, and parallels with how researchers operationalize consensus in small decision-making groups (e.g., Davis, Kameda, Pars, Stasson, & Zimmerman, 1989; Gouran, 1969; Sager & Gastil, 1999).

Both common core and collective endorsement are essential for the consensual stereotypes to serve the functions they do for groups and society. Tajfel (1981) argued that consensual stereotypes serve the function of contributing to social causality (also see Hogg & Abrams, 1988, p. 66-68), which refers to the search for a socially validated explanation for the attributes and behavior of an outgroup (Tajfel, 1981). A common core of consensual stereotypes offers ingroup members a repertoire of common knowledge about an outgroup, creating common ground among ingroup members and a common reference from which to make inferences about outgroups and their members (Augoustinos & Walker, 1999). Moscovici (1984) argued that a common core describes “our ‘theory’ of society and of human nature” (p. 30).

Consensual stereotypes also serve the function of social justification, which refers to the coordination of ingroup actions against outgroups at times when distinctions between the groups
are subject to challenge (Tajfel, 1981; Tajfel & Forgas, 1981). Collective endorsement makes the common core of an outgroup stereotype a normative expectation that ingroup members should uphold. Consensual stereotypes reveal how ingroup members ought to react to a stereotyped outgroup (Hogg & Reid, 2006). For example, Sechrist and Stangor (2001) found that people with strong racial stereotypes sat farther away from African American confederates when collective endorsement of the stereotypes was high rather than low. Collective endorsement, then, gives the common core a prescriptive power to translate common knowledge concerning outgroup members into concrete and coordinated actions against an outgroup (Stangor & Lange, 1994).

Ingroups do not start with knowledge of a common core of stereotypic attributes and collective endorsement of them; consensual stereotypes must be socially constructed through communication and influence. Models of the emergence of consensual stereotypes should articulate how ingroup members a) communicate to build a common core of stereotypic attributes and b) generate collective endorsement of the core. Existing theories and research lead to competing predictions with regard to what becomes the common core of consensual stereotypes and have yet to reveal why people endorse them. In the next section, I briefly review the relevant research on diffusing outgroup stereotypes in small discussion groups, starting with the meta-theoretical assumptions in this work.

Meta-Theoretical Assumptions of Shared Beliefs

The idea that communication in small groups leads to the emergence of consensual stereotypes by means of the diffusion of specific stereotypic attributes comes from a meta-theoretical perspective called neo-diffusionism (e.g., Dawkins, 1976; Sperber, 1996). The basic tenet of neo-diffusionism is that there exists a unit of meaning that can be instantiated in the form of communicable symbols (e.g., messages). Societal beliefs (e.g., consensual stereotypes) form
as the symbols (i.e., messages) spread from person to person (for a review, see Kashima, Peters, & Whelan, 2008).

Theorists of neo-diffusionism use a selection or transformational perspective to describe the mechanisms of spread. From the selection perspective, Dawkins (1976) coined a term “meme” to describe messages that are capable of replication. Just as genes replicate themselves as organisms reproduce, memes replicate themselves among communicators as they are shared via interpersonal communication. In addition, the context in which sharing occurs creates environmental pressures to which memes must adapt. Memes that successfully reproduce among the communicators spread through the larger community.

The transformation perspective (e.g., Sperber, 1996), in contrast, focuses less on whether a message is shared, but more on how the meaning of a message changes over the course of sharing. When a message is shared interpersonally, receivers do not repeat verbatim what they have heard, but share a modified version. The modifications occur for many reasons; the consequence of these modifications is that the message’s meaning may change with each retelling. Eventually, the meaning of shared information stops changing and becomes conventional—the point at which consensual stereotypes emerge (Kashima et al., 2008).

The scope of the research for this dissertation is limited to focusing on the process of selection, without attending to transformation. I hope to examine message transformation over the course of interaction (see an example, Martin et al., 2014) in future projects. Like other scholars focusing on selection (e.g., Schaller et al., 2002), my aim was to identify stereotypic attributes that are most likely to be shared and investigate different types of biases that lead to sharing some stereotypic attributes, but not others. I focused on two types of biases receiving most scholarly attention: common information bias and positive ingroup bias.
Common Information Bias

Group members may discuss a topic about which they have common and unique knowledge, a condition that can be induced experimentally. For example, Stasser and Titus (1985) conducted a seminal study in which group members were presented with information about three hypothetical candidates for student body president and were to decide collectively the best candidate for the position. The information about the candidates was distributed such that some information was commonly known to all group members (i.e., common information), and other information was known to only one group member (i.e., unique information). Furthermore, the experimental design for distribution created a hidden profile: group members could only identify the best candidate if they discussed both the common information and all of the unique information. In this and related experiments (e.g., Stasser, Taylor, & Hanna, 1989), groups discussed more common than unique information, which provides one explanation for why group discussions can lead to suboptimal decisions. This bias was later referred to as common information bias (Stasser, 1999).

Dozens of studies (e.g., Cruz, Boster, & Rodriguez, 1997; D. Henningsen & M. Henningsen, 2003; Wittenbaum, 1998; Stasser, Stewart, & Wittenbaum, 1995) have been conducted to replicate Stasser and colleagues’ findings (see narrative reviews in Sohrab, Waller, & Kaplan, 2015; Stasser, 1999; Stasser & Titus, 2003; Wittenbaum et al., 2004). A meta-analysis involving 65 studies (Lu, Yuan, McLeod, 2012; see also T. Reimber, A. Reimber, & Czienskowski, 2010) revealed a significant effect size \( d = 2.03, k = 33 \)—an effect considered to be large by Cohen’s (1992) guidelines—of the mean difference between the proportions of common and unique information discussed. Group members discuss, on average, two standard deviations more common than unique information (Lu et al., 2012). In the meta-analysis (Lu et
al., 2012), the bias was not affected by the type of decision tasks, but became larger as group size, the total amount of information, and the amount of unique information increased. These findings suggest that the common information bias has a substantial, consistent influence on what information people discuss and withhold in small group discussions.

A straightforward prediction from the existing research is that the common information bias influences how people build the common core of consensual stereotypes through group discussion. Stereotypic attributes known to all group members (vs. only one member) should be discussed more during the group interaction, giving those attributes a greater likelihood of becoming part of a consensual stereotype. An experiment testing the formation of consensual stereotypes about hypothetical groups with a hidden-profile design (Klein, Jacobs, Gemoets, Licata, & Lambert, 2003, study 1) revealed tendencies consistent with the common information bias: Group members discussed more common than unique stereotypic attributes about hypothetical groups, and the consensual stereotype represented common (vs. unique) stereotypic attributes.

**Positive Ingroup Bias**

The second bias considered here is *positive ingroup bias* (Hogg & Abrams, 1990). Informed by social identity theory (Tajfel, 1978; Tajfel & Turner, 1979, 1986), positive ingroup bias (Abrams & Hogg, 1990) assumes that people have ingroup identities: They derive part of their self-concept from the groups to which they belong. The positive ingroup bias (Abrams & Hogg, 1990) predicts that group members will tend to evaluate their ingroups more positively than they do outgroups. Extending this reasoning to group conversations, ingroups should discuss more stereotypic attributes that devalues rather than praises an outgroup.
The positive ingroup bias has received empirical support: a meta-analysis of 137 studies (Mullen, Brown, & Smith, 1992) revealed a moderate (Cohen, 1992) effect size for positive ingroup bias ($r = .35$). The bias has been observed even with little reason for being a group (i.e., the minimal group paradigm), such as dividing unacquainted participants into groups on the basis of similar levels of accuracy in estimating the number of dots in a paper (Tajfel et al., 1971), similar preferences for photographs (Doise et al., 1972), and the flip of a coin (Billig & Tajfel, 1973). In the meta-analysis (Mullen et al., 1992), the positive ingroup bias was smaller when ingroup-outgroup distinction was based on artificial ($r = .26, k = 74$) rather than real ($r = .40, k = 63$) groups, but it was still remarkably strong. As a relevant example, Haslam and colleagues (1998, experiment 2) gave Australian participants a list of traits (e.g., tradition-loving and arrogant) and asked the participants to select the traits they considered as most typical of Americans. Consistent with the positive ingroup bias, more participants selected the devaluing than praising attributes about Americans when their Australian identity was salient.

**Reflecting on Common Information and Positive Ingroup Bias**

Both common information bias and positive ingroup bias have implications for the emergence of consensual stereotypes about an outgroup, but neither provides a thorough understanding of how groups build a common core and achieve collective endorsement through conversation. The two biases focus on distinct antecedents to the emergence of consensual stereotypes. Common information bias prioritizes attribute commonality (i.e., common and unique stereotypic attributes), while positive ingroup bias emphasizes social identity. Importantly, some scholars assume that identity-related processes are most applicable to large-scale intergroup relationships, not intra-group dynamics; this assumption contributes to a
bifurcation between small group communication and intergroup communication (see Hogg, Abrams, Otten, & Hinkle, 2004; Postmes, Haslam, & Swaab, 2005). All said, little effort has been put into theorizing how these antecedents (i.e., attribute distribution and social identity) may interact to determine a common core of stereotypic attributes. Neither bias provides insight into why some common cores achieve collective endorsement.

To address these limitations, I propose a model that 1) distinguishes between building a common core and promoting collective endorsement, 2) identifies the conditions in which common information bias or positive ingroup bias prevails in building a common core, and 3) extends bias-based processes to predict why a common core acquires collective endorsement. The next sections start with an overview of the proposed model, followed by a detailed discussion on the rationale and research leading to testable hypotheses.

**Model of Consensual Stereotype Formation**

In the proposed model, I argue that the processes of consensual stereotype formation consist of two interlocking parts: 1) building a common core of the consensual stereotypic attributes and 2) achieving collective endorsement of the common core. The theoretical system is organized within the input-process-output (IPO) model of small group communication. The IPO model, formalized independently by Gouran (1973) in communication and Hackman and Morris (1975) in psychology, has been widely used as a heuristic framework for theorizing social influence processes and communication in small groups (e.g., McGrath, 1984; Pavitt, 2014; Poole, Seibold, & McPhee, 1986). The basic IPO model posits that group communication, such as ingroup members discussing stereotypic attributes of an outgroup, can be represented as a sequence, in which group members’ knowledge (input) influences their communication behaviors during the group interaction (process), which shapes members’ cognitions and
decision-making outcomes (output).

The first part of the IPO model (i.e., building a common core; see Figure 1.1) assumes that ingroup members are motivated to make sense of their personal knowledge of an outgroup stereotype (input). This motivation is especially strong when ingroup members’ common and unique knowledge of stereotypic attributes differs in valence (e.g., common knowledge devalues an outgroup, and unique knowledge praises the outgroup). Depending on the salient social identity (personal or ingroup), the ingroup members engage in an intragroup or an intergroup social comparison process to validate the stereotypic attributes known to them. The mode of social comparison (intragroup or intergroup) then determines what stereotypic attributes the ingroup members discuss and whether they discuss it with abstract or concrete language (processes). The rationale for these predictions are described in greater detail in the next sections.
Figure 1. 1. Building a common core of consensual stereotypes

Predicting What Group Members Say: Stereotypic Knowledge and Identity Salience

The model consists of an input constituted by the commonality (i.e., is it common knowledge or uniquely known to one member) and the valence (i.e., praising or devaluing) of stereotypic attributes. Although commonality and valence are distinct attributes of stereotypic attributes, I focus on a specific case in which the common and the unique stereotypic attributes known to the ingroup members before their discussion is either praising or devaluing. For example, imagine that a group of people all read a news article describing Bleens as arrogant and aggressive. Also imagine that each group member had met a Bleen in the past and found that person to be easy-going and friendly. In this example, commonality and valence of stereotypic
attributes (arrogant, aggressive, easy-going, and friendly) interact such that the common attributes known to all group members are devaluing (arrogant and aggressive), whereas the unique attributes are praising (easy-going and friendly).

The difference in the valence of stereotypic attributes known to a group member should motivate them to make sense of the discrepancy and to confirm what is valid. From the perspective of Social Comparison Theory, “there exists, in the human organism, a drive to evaluate his opinions and abilities” (Festinger, 1954a, p. 117). In particular, a person is driven to “know that one’s opinions are correct” (Festinger, 1954b, p. 217). When the objective standard is absent or cannot be readily employed, such as outgroup stereotypes, people assess their opinions and abilities through comparisons with others in the social milieu (Festinger, 1954a). The need for validation is especially strong for one’s stereotypic knowledge about a group of people, as “the properties of a person must be assumed from the behaviors a perceive has observed, and are hardly as verifiable as the attributes that define an object” (Moskowitz, 2005, p. 141).

**Social Comparisons.** In intergroup settings (e.g., ingroup members’ considering stereotypes about an outgroup), social comparison takes one of two forms: intragroup and intergroup (Brewer & Weber, 1994; Hogg, 2000). *Intragroup social comparison* refers to a process in which ingroup members assess their opinions and abilities by means of comparison with the other ingroup members (Brewer & Weber, 1994; Hogg, 2000), which satisfies self-enhancement motivation to be accurate and correct (Corcoran, Crusius, & Mussweiler, 2011; Suls, Martin, & Wheeler, 2002). If people want to validate whether or not Bleens are aggressive, they may compare what they know to what other ingroup members say about Bleens. Their pre-existing knowledge of stereotypic attributes about Bleens is validated to the extent that the other members mention similar stereotypic attributes. Indeed, as Wittenbaum, Hubbell, and
Zuckerman (1999) argued, common information bias exists because people are motivated to confirm the accuracy of what they know through a search for similarity between themselves and the other ingroup members, a defining attribute of intragroup social comparison. Empirical evidence (e.g., Postmes, Spears, & Cihangir, 2001; Wittenba & Bauman, 2004) supports the claim that intragroup social comparison underpins common information bias.

In contrast, **intergroup social comparison** is a process in which group members compare their ingroup as a whole with other outgroups (Brewer & Weber, 1994; Hogg, 2000). In contrast to intragroup social comparison, intergroup social comparison is driven by social-enhancement motives: people are motivated to increase the relative standing of their in-groups over out-groups (Hogg, 2000). As people compare themselves as an ingroup with Bleens as an outgroup, they want to establish an ingroup-outgroup distinction that is advantageous for their ingroup (Tajfel, & Turner, 1986). Intergroup social comparison is ostensibly the reason why a positive ingroup bias should appear in group discussions of outgroup stereotypic attributes. Ingroup identities are bolstered by stereotypic attributes that serve to devalue the outgroup and is threatened by the attribute used to praise the outgroup (Brewer, 2003; Tajfel, & Turner, 1986). Group discussion presents opportunities to share and listen to stereotypic attributes that affirm or threaten the ingroup identity people have because of their group membership.

The social comparison process—intragroup or intergroup—determines the stereotypic attributes that the group members discuss, which ultimately becomes the common core of a consensual stereotype. When ingroup members have common knowledge of the stereotypic attributes that devalue an outgroup, and unique knowledge of praising attributes, the two types of social comparisons lead to the same prediction because the common stereotypic attributes that fulfill self-enhancement motivations also satisfy social enhancement motivations. Thus,
common, rather than unique, attributes are more likely to be discussed, such that the common
core of consensual stereotypes includes more negative than positive attributes of the outgroup.
However, the two types of social comparisons yield different predictions when ingroup
members have common knowledge of praising stereotypic attributes, and unique knowledge
of devaluing stereotypic attributes. The intragroup social comparison, with its focus on
similarity, should result in more group discussion of the positive stereotypic attributes known
to everyone. The intergroup social comparison, with its focus on relative ingroup favoritism,
should result in more group discussion of the devaluing attributes, even if it is only known by
one member.

**Identity Salience.** Ingroup identity salience, a second input into the system, determines
whether people engage in intragroup or intergroup social comparison. Following self-
categorization theory (SCT; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), people may
define the self as a unique individual (i.e., personal identity) or as being a member of a group
(i.e., ingroup identity). Identity is salient when the level of abstraction at which the self is defined
comes psychologically engaged to guide the perception and behavior (Turner et al., 1987).
According to SCT, the transfer from personal to ingroup identity marks a qualitative shift in how
people engage in self-evaluation (Turner et al., 1987). When personal identity is salient, it
activates intragroup social comparison. In contrast, a salient ingroup identity activates an
intergroup social comparison. The motivation to be accurate and correct, which drives an
intragroup social comparison, is likely self-enhancing (Corcoran et al., 2011; Suls et al., 2002)
and self-serving in nature (Wheeler, 1991). In contrast, intergroup social comparison is driven by
social-enhancement (Hogg, 2000) and characterized by a collective, group-serving focus, making
the notion of groups override self-interests of being accurate and correct (Brewer & Weber,
1994). Empirical evidence supports this prediction (e.g., Blanton, & Crocker, & Miller, 2000; Brewer & Weber, 1994; Smith & Schwarz, 2003). For example, in the presence of a salient threat to ingroup identity (home game against a long-standing rival football team), participants showed ingroup favoritism in comparison to the outgroup, and similarity to other ingroup members; the results disappeared or even flipped when the social threat was not present (Smith & Schwarz, 2003).

The present model presumes that as one identity (e.g., ingroup) becomes more salient, the other (e.g., personal) becomes less so (Hogg, 1996; Turner et al., 1987). It follows, therefore, that certain discussion bias should prevail during the interaction when its corresponding identity becomes salient. Specifically, as an ingroup identity becomes more salient, the positive ingroup bias (vs. the common information bias) theoretically should shape what group members discuss. The salient ingroup identity would be threatened by the discussion of praising (albeit common) attributes about the outgroup, but enhanced by the discussion of devaluing (albeit unique) attributes. In contrast, as a personal identity becomes more salient, the common information bias (vs. the positive ingroup bias) would appear to shape what group members discuss. As group members strive for accuracy, they should mention common stereotypic attributes. These considerations led to following hypotheses:

**H1a:** When ingroup identity is salient, ingroup members discuss more devaluing, rather than praising, stereotypic attributes about an outgroup, regardless of whether the attributes were commonly or uniquely known.

**H1b:** When personal identity is salient, ingroup members discuss more common, rather than unique, stereotypic attributes about an outgroup, regardless of whether the attributes were outgroup-praising or outgroup-devaluing.
Predicting How Group Members Talk: Linguistic Abstraction

The language that ingroup members use to discuss outgroup stereotypes during group discussion serves as a window into psychological processes (Semin, 2000), including social comparisons (Giles & Wiemann, 1987). As Holtgraves and Kashima (2008) noted, “language use frequently involves the recoding of implicit, nonlinguistic representations into explicit, linguistic ones” (p. 75). In scholarship concerning the formation and maintenance of stereotypes, linguistic abstraction has received the most attention (Beukeboom, 2014; Kashima, Feidler, & Freytag, 2008; Semin, 2011).

According to the linguistic category model (LCM; Semin & Fiedler, 1988, 1991), people can describe a social event with words that differ in concreteness. The LCM categorizes the words into four classes, including adjectives and three types of verbs. Descriptive action verbs (DAV) are the most concrete lexical choices, in that they provide a noninterpretive description of a specific, observable behavior (e.g., The Bleens kicked Joe). Interpretive action verbs (IAV) are slightly more abstract as they convey an interpretive description of a specific behavior, and involve an evaluative connotation (e.g., The Bleens hurt Joe). State verbs (SV), which are more abstract than DAV and IAV, refer to people’s enduring psychological states, and do not encompass specific events or behavior that are directly observable (e.g., Bleens hate Joe). The most abstract word choices are adjectives (ADJ), which refer to generalizations about the dispositions or inherent qualities of a group of people (e.g., Bleens are aggressive). Later, Semin and colleagues (2002) extended the LCM by adding nouns to the same abstract category with adjectives. For example, Smith (2007) argued that nouns used to label group are an intrinsic feature of stigma messages (e.g., The epileptic is in town vs. the person living with epilepsy is in town), which leads to “depersonalizing people from individuals to embodiments of a group’s
attributes” (p. 469).

Research has consistently shown that when ingroup identity is salient, people tend to use more abstract language (e.g., Bleens are rude and aggressive) to describe outgroup-devaluing attributes, but use more concrete language (e.g., The Bleens open the door for others) to describe outgroup-praising attributes (Maass, Salvi, Arcuri, & Semin, 1989; see Maass, 1999 for a review). Indeed, linguistic abstraction serves as a subtle way to distinguish favorably an ingroup from an outgroup when ingroup identity is salient (Maass, Ceccarelli, & Rudin, 1996). Maass and colleagues (1996) found that the differences in linguistic abstraction between praising and devaluing outgroup behaviors occurred when ingroup identity was made salient by having ingroup members receive identity-threatening messages from an outgroup. The differences in the linguistic abstraction that ingroup members use to describe outgroups are pervasive in individuals’ description of media figures (Gorham, 2006) and even in the national news coverage about ethnic minority groups (e.g., Dragojevic, Sink, & Mastro, 2017).

Even in the absence of a salient ingroup identity, people still demonstrate systematic differences in linguistic abstraction when they describe outgroup behavior (Maass, Milesi, Zabbini, & Stahlberg, 1995). When personal identity is salient, ingroup members tend to use more abstract language to describe others’ behaviors that are consistent (as opposed to inconsistent) with their pre-existing beliefs or expectations (Maass, et al., 1995; Wigboldus, Semin, & Spears, 2000, 2006). The use of abstract language to describe expectancy-consistent behavior aligns well with the motivation to develop a valid, correct sense of the world. For example, if people expect Bleens to be competent and Glues to be arrogant, Bleens’ competent behavior and Glue’s arrogant behaviors are described more abstractly than Bleens’ arrogant behavior and Bleens’ competent behavior. In contrast to those with a salient ingroup identity,
people with a salient personal identity use linguistic abstraction maintain a degree of consistency in their evaluation about an outgroup (Maass et al., 1995).

When personal identity is salient, common knowledge of stereotypic attributes is an important source for ingroup members to form an expectancy about an outgroup’s attributes. Several studies have indicated that the group members form an expectancy of the group decision on the basis of the common information prior to the group discussion, and perceive the unique information as violating the expectancy (Greitemeyer & Schulz-Hardt, 2003; T. Reimer, A. Reimer, Hinsz, 2010). This suggests that the ingroup members with a salient personal identity may vary their linguistic abstraction based on whether the stereotypic attribute is common or unique knowledge, regardless of its valence. Ingroup members will use more abstract language to describe the common stereotypic attributes because it is consistent with their pre-discussion expectancy. In contrast, if unique stereotypic attributes (e.g., competence) are inconsistent with common attributes (e.g., arrogance), ingroup members will use more concrete language. There is some indirect evidence in support of this position. For example, Wigboldus, Spears, and Semin (2005) observed that ingroup members used more abstract language to convey stereotype-consistent information about an outgroup, but used more concrete language to convey stereotype-inconsistent information. Because stereotype-consistent information tends to be distributed as common knowledge and stereotype-inconsistent information as unique knowledge (Brauer, Judd, & Hacquelin, 2001), the findings suggest that common knowledge may described more abstractly than unique knowledge of stereotypic attributes about an outgroup. This argument leads to the following hypotheses:

**H2a:** When ingroup identity is salient, ingroup members use more abstract language to discuss devaluing (vs. praising) stereotypic attributes, regardless of whether the attributes
were commonly or uniquely known.

**H2b:** When personal identity is salient, ingroup members use more abstract language to discuss common (vs. unique) stereotypic attributes, regardless of whether the attributes were outgroup-praising or outgroup-devaluing.

**Predicting Why Group Members Endorse: Attribute-Assessment and Person-Perception**

The second part of the IPO model (i.e., achieving collective endorsement; see Figure 1.2) illuminates the effects of discussing stereotypic attributes, more or less abstractly, on endorsement. I draw on heuristic processes to make this extension. Heuristics are mental shortcuts that allow people to make judgments about complex cognitive tasks efficiently and effortlessly (Chen & Chaiken, 1999). The heuristics are stored in the memory as if-then rules of thumb (e.g., if a message is long, then its argument is strong; Chen & Chaiken, 1999). Two heuristics, in principle, shape whether or not ingroup discussion of stereotypic attributes achieve collective endorsement: familiarity and representativeness. The next sections explain these processes in greater detail.
Figure 1.2. Achieving collective endorsement of consensual stereotypes

**Perceived validity.** Familiar information is perceived to be valid (Begg, Anas, & Farinacci, 1992; Boehm, 1994; also see Unkelbach, 2007). For example, DiFonzo and colleagues (2016) determined that repeated exposure to rumors increased the participants’ belief in the validity of the rumors. As specific stereotypic attributes are mentioned more in the group conversation, they are apt to be more strongly endorsed by the ingroup members because they are perceived to be more valid due to the *familiarity heuristic* (Boehm, 1994).

Importantly, the familiarity heuristic may be particularly relevant to a comparative context in which ingroup members discuss some stereotypic attributes more than the other. For example, Dechêne et al. (2010) found that repeated information (which can make information
more familiar) was perceived as valid only when people were exposed to a mixture of new and repeated information. The effect of repetition on perceived validity disappeared when participants were exposed only to repeated information. The familiarity heuristic could support both intragroup and intergroup social comparisons in group discussions. As ingroup members mention particular stereotypic attributes more, those beliefs should be perceived as more valid, which should bond ingroup members together.

Stereotypic attributes that are perceived to be more valid should be more persuasive and, thus, receive greater endorsement. The dual-processing models (Chen & Chaiken, 1999; Petty & Cacioppo, 1986) consider persuasion as a function of a message’s perceived validity. Although the basis of validity judgments depends on the receivers’ motivation and ability to process messages, it is generally posited that people are more likely to be persuaded by a message that they judge as valid and believable. Several studies (e.g., Nan, 2013; Slater & Rouner 1996; Chang, 2009) have shown a positive association between perceived message validity and persuasive outcomes (e.g., attitude change toward the message). Parallel to the empirical evidence from studies of persuasion, research dealing with common information bias suggests that group members make decisions based on the common information because they judge the information as more valid and believable than unique information (e.g., Parks & Cowlin, 1996; Wittenbaum & Bowman, 2004; van Swol, 2007). Indeed, discussing information judged as valid by the group has been considered as an effective means by which minority members influence the majority view (Kameda, Ohtsubo, & Takezawa, 1997; van Swol, Braun, Acosta Lewis, Carlson, & Dimperio, 2015; van Swol & Seinfeld, 2006), suggesting the persuasiveness of valid information. The argument leads to the following hypothesis:

**H3**: The more that specific stereotypic attributes are mentioned, the more they will be
endorsed, because they are perceived as more valid.

**Perceived representativeness.** In addition to judging the validity of the stereotypic beliefs, people assess whether stereotype attributes represent the essential attributes of a social category (Moskowitz, 2005). Linguistic abstraction may cue the heuristic of representativeness. The linguistic category model (LCM; Semin & Fiedler, 1988) posits that a set of inferences are built into the semantic meaning of language: locus (i.e., whether the outgroup behavior is explained in terms of internal traits or external constraints), distinctiveness (i.e., whether the behavior generalize to the other outgroup members), and consistency (i.e., whether the occurrence of behavior persists over time). Specifically, abstract language implies that the behavior is essential to the group, generalizes across individual members, and persists over time (Semin & Fiedler, 1991). As a result, ingroup members are likely to infer that the abstractly-described stereotype attributes are representative of the outgroup as a whole. In contrast, concrete language suggests that the stereotypic attributes are situationally-dependent, temporally-variant, and subject-specific (Semin & Fiedler, 1991). Hence, the ingroup members should perceive concretely described stereotypic attributes as isolated instances associated with specific individuals rather than being representative of the outgroup as a whole.

Existing empirical evidence indicates a relationship between linguistic abstraction and perceived representativeness (Assilamehou, Lepastourel, & Teste, 2013; Maass et al., 1989, experiment 3; Werkman et al., 1999; Wigboldus et al., 2000, 2006; Yzerbyt & Rogier, 2001; see a review, Wigboldus & Douglas, 2007). For example, Maass et al. (1996) repeated the evidence that abstract language led participants to perceive negative attributes as an inherent, generalizable quality of the outgroup members, while concrete language encouraged the participants to construe the same negative attributes as anomalous and un-representative.
Notably, the relationship between linguistic abstraction and perceived representativeness of described behavior may occur early in life (Werkman et al., 1999). For example, Werkman et al. (1999, study 2) noted children as young as 5 years old perceived the abstractly-described behaviors as more likely to be repeated, as well as that the tendency to associate the abstract language with high likelihood of behavioral repetition increased as the children became older. Indeed, the ability to infer representativeness based on linguistic abstraction seem to start even before children are capable of systematically varying abstract or concrete language to describe differently valanced behaviors of an outgroup (Werkman et al., 1999, study 1).

Perceived representativeness of stereotypic attributes should increase ingroup members’ endorsement to the outgroup stereotype through the representativeness heuristic (Kahneman & Tversky, 1972). Representativeness heuristic refers to a mental rule whereby people infer the probability of an object A belongs to another object B. As Tversky and Kahneman (1974) pointed out, “When A is highly representative of B, the probability that A originates from B is judged to be high” (p. 1124). Brewer’s (1988) dual process model suggests two ways by which the representativeness heuristic can influence the stereotyping process (also see Brewer & Feinstein, 1999). First, when people have already-held stereotypes about a group, they may use the representativeness heuristic in a top-down way to form impressions about a specific individual. If the individual is perceived to have the representative attributes of the group, the individual is then judged to belong to the group. This means of using the representative heuristic aligns with the research examining the effects of stereotypes on information processing. People rely on stereotypes in social perceptions when the available information fits with their stereotyped expectancies (Fiske & Neuberg, 1990; Oakes, Haslam, & Turner, 1994).

Second, and more pertinent to the present context, Brewer (1988) suggested that people
may also rely on the representativeness heuristic to infer their beliefs about a group when they do not have pre-existing stereotypes about the group. In this case, if the individuals’ attributes are perceived to be generalizable, persistent, and hence representative, people tend to endorse these attributes as representative of the entire outgroup (Brewer, 1988; Moskowitz, 2005). Although few studies have examined this bottom-up use of the representativeness heuristic, there is some indirect evidence in the intra-group settings. For example, Bratanova and Kashima (2014) discovered that people tended to repeat their biased communication with the first audience to the subsequent audiences if they perceived the first audience’s attitude was representative of the group as a whole. In other words, perceiving a member as a representative of the group encourages people to replicate their communicative acts within a broader social spectrum. Similarly, the perceptions of certain stereotypic attributes as representative may allow people to infer them as collectively-shared by the entire outgroup and thereby, promotes endorsement of the stereotyped trait as representative of the outgroup. The argument leads to the following hypothesis:

**H4:** As specific stereotypic attributes are mentioned more abstractly, the more the attributes will be endorsed, because these attributes are perceived as more representative of the outgroup.
CHAPTER TWO: METHOD

Participants

Undergraduate students were recruited from introductory communication courses at the Pennsylvania State University. They received a small amount of research credit for their participation in the study reported herein. Alternative assignments were available for students who did not want to take part in the study. Qualified participants were (a) at least 18 years of age and (b) were willing to participate in a communication research lab. The participants constituted two samples: one for testing hypotheses of theoretical interest (i.e., the study sample), and the other for establishing the baseline for the key variables (i.e., the baseline sample).

The study sample consisted of 256 participants (50% female, 50% male). They constituted 66 groups: 8 with three members, and 58 with four members. On average, participants were 20 years old ($SD = 1.12$, $Min = 18$, $Max = 27$). They identified their race as White (87.9%), Asian (7.8%), Hispanic (7.8%), African American (2.3%), Native Hawaiian or Pacific Islander (0.8%), Native American or Alaska Native (0.8%), and other (0.4%). The sample had freshmen (10.7%), sophomores (46.0%), juniors (24.6%), seniors (18.3%), and other (0.4%) participants. The majority identified English as their native language (96.9%).

The baseline sample had 119 participants (43.7% female, 55.5% male, 0.8% unidentified). They comprised of 32 groups: 9 with three members and 23 with four members. On average, the participants were 20 years old ($SD = 1.21$, $Min = 18$, $Max = 25$). They identified their race as White (83.2%), Asian (9.2%), Hispanic (6.7%), African American (6.7%), Native American or Alaska Native (1.7%), and other (0.8%). Educational standings included: freshmen (16.8%), sophomores (47.1%), juniors (18.5%), seniors (16.0%), and other (1.7%). All the participants in the baseline sample identified English as their native language.
Experimental Design

This study employed a 2 (identity salience: ingroup vs. personal) × 2 (attribute profile: common, devaluing attributes and unique, praising attributes vs. common, praising attributes and unique, devaluing attributes) between-subjects design. Figure 2.1 shows its nested structure.

![Diagram of nested structure]

**Figure 2.1.** Diagram of the nested structure and sample size at each level

Because the groups were each randomly assigned to one of four experimental conditions, the two experimental factors (i.e., identity salience and attribute profile) constituted group-level variables. Table 2.1 shows the number of groups and participants in each experimental condition.

**Table 2.1.** Sample size per experimental condition

<table>
<thead>
<tr>
<th>Study Sample (N = 256)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Attribute Profile</td>
</tr>
<tr>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Common devaluing, unique praising</td>
</tr>
<tr>
<td>Common praising, unique devaluing</td>
</tr>
</tbody>
</table>

**Baseline Sample (N = 119)**

<table>
<thead>
<tr>
<th>Attribute Profile</th>
<th>Ingroup</th>
<th>Personal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common, unique praising</td>
<td>7 groups (25 participants)</td>
<td>9 groups (33 participants)</td>
</tr>
<tr>
<td>Common, unique devaluing</td>
<td>9 groups (34 participants)</td>
<td>7 groups (27 participants)</td>
</tr>
</tbody>
</table>

**Procedures**

The participants signed up for time slots online prior to the experiment. A researcher greeted them in a waiting room as they arrived at the research laboratory. As soon as the three participants arrived, the researcher provided a general description of the study and engaged in the process of receiving informed consent. After securing consent, the researcher randomly assigned the entire group to one of four experimental conditions and then asked the participants to move to another room that contained a circular table, four computer stations separated by movable partitions, and recording devices. Cameras were mounted on the room’s walls so that each participant could be caught on a camera. The cameras did not aim at the computer stations, so as to ensure the privacy and anonymity as participants completed questionnaires. A microphone was suspended from the ceiling over the center of the circular table. Before engaging in group interaction, each participant used a computer station to complete self-report measures, including demographic information and personality scales.

**Identity induction.** After completing the questionnaire, the participants were told that...
the study had two phases: decision-making and performance evaluation. In the decision-making phase, the participants engaged in a survival game (“Lost at Sea”), in which they ranked a list of items in terms of their importance for people who survive a sea accident and waiting for rescue. The decision-phase task served to prime participants with a salient ingroup or personal identity. The survival-type game offered an ideal scenario for priming identity salience in three respects. First, the game was flexible in emphasizing individual competition within a group or in emphasizing between-group competition. Second, the survival-type game had an objectively correct outcome. The objective standard made it unlikely for the participants to perceive the researchers as an outgroup during intergroup social comparison through, for example, attributing the group performance to the unfairness of the researchers. Third, the survival-type game was intellectually challenging and increased the participants’ involvement in the decision task (Burleson, Levine, & Samter, 1984), which was important for generating observational data among experimentally created, zero-history groups (see Wittenbaum, 2012). The survival game has been widely employed in group communication experiments (e.g., Burleson et al., 1984; Hall & Waston, 1971; Hirokawa, 1980; see a review, Hirokawa & Salazar, 1994).

The participants were to sit at the circular table to perform the task and reach a group decision. They had up to 10 minutes for discussion of the rankings. A pilot study showed that the groups took, on average, 12 minutes to complete the ranking of 15 items in terms of survival value. To avoid participants’ fatigue, the number of items in the main study was reduced to 8. Participants in different experimental conditions had the same amount of time for discussion and decision making.

Identity salience was manipulated via the wording of the instructions and the decision-making procedures. In the ingroup identity salience condition, the participants were told that the
group would compete against another group with the same number of people who had finished the task. Group performance was judged according whether or not their group solves the problem correctly (*intergroup competition*). The participants were to chose collectively a name for their group (*group labeling*). The set of labels provided to the participants further primed the ingroup identity by suggesting that the ingroup was united (e.g., Group Unity), prestigious (e.g., Group Elites), and in competition with another group (e.g., Group Crushers). The participants were instructed to select the group name of their choice and record it on name cards. The researcher encouraged these participants to refer to each other as a member of the group. Upon the completion of the survival game, they were to reflect the practices that made them feel proud of their group (*ingroup identity praising*).

In the personal identity salience condition, the participants received the instruction that they would compete with another set of individuals who worked on the same task. Individual performance was to be evaluated on their ability to make correct decisions (*intragroup competition*). Instead of choosing a group label, the participants were to identify three unique, individual attributes that would help them stand out in the task. They were also to write their first name on the name cards and refer to others by their first names (*personal labeling*). Following the task, they were to identify the practices that made them proud of themselves (*personal identity praising*).

**Commonality induction.** The participants were next presented with another set of instructions informing them about performance-evaluation phase of the study. The performance-evaluation task was adapted from the psychological profile task used in the research on group participation and consensus formation (see Bonito, 2001, 2003, 2006). Each participant received a folder containing a list of statements that describe the behavior of another group (hereafter, the
outgroup) who engaged in the Lost at Sea game and paper on which to make any notes they wished.

The attribute profile (see Appendix F) was manipulated in accordance with a method adapted from research involving common information bias (e.g., Stasser & Stewart, 1992). Specifically, the attribute profile varied whether the stereotypic attribute was known to the entire group (i.e., common knowledge) or to one member only (i.e., unique knowledge) prior to the group discussion, and whether the stereotypic attributes praised the outgroup as competent or devalued it as being arrogant.

For a three-member group, a total of 25 statements relating to the outgroup’s stereotypic attributes were distributed among the ingroup members. Each member received 15 statements about the outgroup. Among them, 10 were known to all three ingroup members (i.e., common knowledge) and 5 were known to one ingroup member only (i.e., unique knowledge). Each member individually had more common (10 statements) than unique knowledge (5 statements), but the group collectively had more unique (15 statements) than common knowledge (10 statements). Hence, for individual group members, the stereotypic attributes based on the unique knowledge was hidden by the stereotypic attributes based on the common knowledge. In addition, all the statements involving common knowledge reflected one stereotypic trait, whereas the statements in the unique knowledge reflected the other stereotypic trait. As such, the common knowledge was in praise of the outgroup as competent, and the unique knowledge devalued the outgroup as arrogant in one condition. The pattern was reversed in the other condition. Table 2.2 presents the exact distribution of the stereotypic attributes in a group.

<table>
<thead>
<tr>
<th>Experimental</th>
<th>Profile 1</th>
<th>Profile 2</th>
</tr>
</thead>
</table>

Table 2.2. Profile of stereotypic attributes distribution in the groups of three
Following Klein et al. (2003), the participants’ seating in the waiting room determined the folders of the statements they received. The order of the statements in each folder was random. The researcher told the participants that these statements were from the outgroup members’ own reflection of their group performance. Specifically:

You just read some information about your competitor. Let me give you some background about how we collected the information. Your competitor from another Big Ten institution completed the task in an earlier session. They had the same number of people with yours, and worked on the same task. After their completion, we asked each member of that group to write down in private what they observed and thought about their group performance. We collected their comments, randomly shuffled the cards, and assigned them to you. So we do not know if the cards you read were from one person or multiple people in that group. But we know that they were about the same group with which you compete. [ingroup-identity condition]

You just read some information about a group who worked on the same task. Let me give you some background about how we collected the information. Another group completed the task in an earlier session. They had the same number of people with yours, and worked on the same task. The only difference is that we told them to work together to produce a group ranking. After they completed the task, we asked each individual of that group to write down in private what they observed and thought about their performance. We collected their comments, randomly shuffled the cards, and assigned them to you. So we do not know if the cards you read were from one person or multiple people in that group. But we know that they were about the same group. [personal-identity condition]

The participants first read the statements and evaluated the outgroup’s performance privately. Following that, the participants sat at the circular table, discussed the statements, and
evaluated the outgroup’s performance collectively. Following prior research on the hidden profile paradigm (e.g., Stasser & Stewart, 1992), the folders of the information were not available for the participants during the discussion. The participants were reminded that they did not have the same information about the outgroup and that it was important that they exchange information they possessed during the discussions. Then the researcher left the room, and the group discussion was videotaped and recorded. Although some scholars embraced the view that video recording may distort the group interaction (e.g., Lomax & Casey, 1998; Latvala, Vuokila-Oikkonen, & Janhonen, 2000), relatively recent empirical evidence showed that the participants’ alertness to the camera decayed significantly overtime (Heath, Hindmarsh, & Luff, 2010; Knoblauch, Schnettler, Raab, & Soeffner, 2006). Because the recording occurred in the second phase of the study, the video-taping was expected to have minimal effects on social interaction.

The participants had a maximum of 15 minutes to discuss the outgroup performance. Once the groups finished the discussion, the recording was stopped. The researcher then re-entered the room and directed the participants back to the computer stations, where they responded to the questionnaire items including perceived validity, perceived representativeness, and stereotype endorsement. Upon the completion of the questionnaires, the participants were debriefed and thanked for their participation in the study.

**Instrumentation**

**Measurement procedures.** Multilevel confirmatory factor analysis with Mplus 8.0 (MCFA; L. Muthén & B. Muthén, 2017) was used to assess validity, as the variables assessed after group interactions were subject to interdependence in observation. Different from traditional confirmatory factor analysis at a single level, MCFA estimates the factor structure
based on both within- and between-group covariance matrices (Heck & Thomas, 2015). Figure 2.2 presents a conceptual model of MCFA with a hypothesized single factor at both within- and between-group level.

![Figure 2.2. A conceptual model of multilevel confirmatory factor analysis with a single factor structure](image)

The interdependence in the data structure also affected the accuracy of reliability estimates of measurement scales (Bonito, Ruppel, & Keyton, 2012). Classical reliability estimates, such as Cronbach’s alpha, assume that item error terms vary randomly, and do not

---

1 Several scholars (e.g., B. Muthén, 1994; Hox, 2010) have proposed step-by-step procedures for multilevel confirmatory factor analysis. Although specific procedures differ, they all involve the comparisons of alternative factor structure at the higher-order level (e.g., group level). In the analysis, I compared the reported model with two alternative models: a null model and an independence model (Hox, 2010). The null model completely levels out the specification at the group level, thereby testing if covariance at the group level can be attributed to individual sampling variation alone. An independence model specifies only variance at the group-level, but no covariance, thereby testing if there is substantively meaningful factor structure at the group-level at all. The results for null and independence models were not presented here, but their model fits were significantly worse than the reported models.
covary with one another as well as the true scores of the latent construct (DeVellis, 2012). However, these assumptions may not be tenable when the constructs are assessed as the outcomes of group interaction because participants’ true scores of the construct may depend, in part, on the responses of their fellow group members. As a result, the covariance among the items can no longer be assumed to be driven by the latent construct the items purportedly measure. Bonito et al. (2012) demonstrated through a series of Monte Carlo simulations that Cronbach’s alpha unadjusted for interdependence tend to overestimate the scale reliability than the adjusted alpha, with the differences becoming larger as inter-item correlations decrease.

Following Bonito et al.’s (2012) recommendations, Cronbach’s alpha was adjusted by a series of three-level unconditional multilevel models, in which items (level 1) nested within individuals (level 2) who are nested within groups (level 3). The adjusted alpha at individual level was calculated with the following formula (Bonito et al., 2014, p. 449, formula 5):

\[
\alpha_i = \frac{\sigma_{\text{item}}^2}{\sigma_{\text{individual}}^2 + \frac{\sigma_{\text{item}}^2}{p}}
\]

where \(p\) represents the number of items in the scale.

The adjusted alpha at group level was calculated with the following formula (Bonito et al., 2014, p. 449, formula 6):

\[
\alpha_g = \frac{\sigma_{\text{group}}^2}{\sigma_{\text{group}}^2 + \frac{\sigma_{\text{individual}}^2}{n} + \frac{\sigma_{\text{item}}^2}{p \cdot n}}
\]

where \(p\) represents the number of items in the scale, and \(n\) represents group size. Bonito et al. (2014) recommended using average group size in a study including groups of different sizes.

Identity salience and stereotype endorsement were assessed after the group interaction. Their validity and reliability estimates were adjusted for interdependence. Because individual
differences, such as fear of invalidity and implicit theories of personality, were not subject to interdependence, traditional CFA and Cronbach’s alpha were used to estimate the scale validity and reliabilities respectively.

**Induction checks.** Four items adapted from Hogg and Hains’s (1996) ingroup identification scale were used to check the identity salience induction. The items were assessed via 11-point scales (0 = *strongly disagree*, 10 = *strongly agree*). Sample items included “To what extent do you identify yourself as a member of the group?” MCFA showed that the four items had a unidimensional structure at both the within- and between-group level, $\chi^2 (df = 4, N = 256) = 11.21, p < .05$, CFI = .99, RMSEA = .08, SRMR$_{within}$ = .03, SRMR$_{between}$ = .01. Hence, participants’ responses were averaged to form one score, with higher values indicating greater salience of ingroup identity. The scale reliability adjusted for interdependence was .82 at individual level, and .64 at group level. Table 2.3 presents the descriptive statistics of the items for ingroup identification.

**Table 2.3.** Descriptive statistics of items for ingroup identification

<table>
<thead>
<tr>
<th>Items</th>
<th>$M$</th>
<th>$SD$</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item1</td>
<td>7.52</td>
<td>3.26</td>
<td>1, 11</td>
<td>-0.70</td>
<td>-0.73</td>
<td>.38</td>
</tr>
<tr>
<td>Item2</td>
<td>7.20</td>
<td>2.56</td>
<td>1, 11</td>
<td>-0.76</td>
<td>-0.01</td>
<td>.11</td>
</tr>
<tr>
<td>Item3</td>
<td>7.34</td>
<td>2.74</td>
<td>1, 11</td>
<td>-0.70</td>
<td>-0.23</td>
<td>.26</td>
</tr>
<tr>
<td>Item6</td>
<td>6.02</td>
<td>3.04</td>
<td>1, 11</td>
<td>-0.16</td>
<td>-1.06</td>
<td>.26</td>
</tr>
</tbody>
</table>

*Note: N = 255*

**Attributes profile.** Although attribute distribution was experimentally manipulated, I did not include an induction check for it. O’Keefe (2003) argued that the manipulation is not needed when the differences in the manipulated stimulus is not a matter of participants’ perceptions.
O’Keefe (2003) illustrated the claim with the example in which the researchers investigated the persuasive effects of the variation in the length of a message. “No matter what participants thought about the length of the message that they encountered, the messages did differ in length” (p. 252). Similar to the length of the message, whether the stereotypic attributes represented common or unique knowledge was independent of the participants’ perception. Indeed, this may be one reason why previous empirical studies of common information bias (e.g., Cruz et al., 1997; Stasser & Stewart, 1992) often did not include a manipulation check on information distribution.

The amount of stereotypic attributes mentioned. The video-recordings of the group discussions were transcribed verbatim using professional services, and the discussion data was coded in a three-step sequence by two undergraduate research assistants who were unaware of the hypotheses. For each step of the attribute analysis, 10% of the data was randomly chosen for coders’ training. Then, another 20% of the data was coded independently by the two coders. The inter-coder reliabilities were calculated on the basis of this portion of the data. After reasonable intercoder reliabilities were achieved, each coder analyzed the half of the remaining discussion data.

First, the coders segmented the group discussion into thought units (Folger, Jewes, & Poole, 1984), which was operationalized as an independent clause. The coders were instructed to bracket the thought unit every time it was located on the transcript. Guetzkow’s U (1950) was used to calculate the unitizing disagreement with the following formula:

\[ U = \frac{O_2 - O_1}{O_2 + O_1} \]

where \( O_1 \) and \( O_2 \) refer to the amount of the units coded by the first and second coder respectively. A lower Guetzkow’s U indicated a greater reliability of unitization. Following
Guettzow (1950), values of U below .05 (which is equivalent to 95% agreement between two coders on unitization) were considered acceptable for intercoder reliability. Guettzow’s U ranged from 0 to 0.08, with an average of 0.03 ($SD = 0.03$). The re-check showed an average Guettzow’s U of 0.03 ($SD = 0.03$), with no signs of significantly decreasing intercoder reliabilities. Disagreement was resolved via discussion by the coders. Groups on average generated about 74 thought units ($SD = 35.59$).

Second, the coders reviewed a fact sheet including all 25 statements collectively accessible to the entire group. The coders used the transcripts split into the thought units and coded if the certain stereotypic attributes were mentioned by a group member during the discussion. If a group member repeated an attribute during the same speaking turn, it was coded a second time. If a stereotypic attribute was mentioned by a group member during two separate speaking turns, it was coded (Kolb & Van Swol, 2018). During this round of coding, the coders merely identified whether or not a thought unit included a stereotypic attribute from the fact sheet, and whether or not the attribute was commonly or uniquely known by a group member.

Third, for the thought units including the statements from the fact sheet, the coders then identified whether or not the stereotypic attribute was commonly or uniquely known by a group member. For attributes identified as unique knowledge, the coders further noted whether it was the unique knowledge that group members knew before the group discussion (i.e., own unique) or the unique knowledge they knew from the discussion (i.e., other unique; Van Swol, 2007). Cohen’s kappa was the index of intercoder reliability, with values greater than .70 being considered acceptable (Lombard, Snyder-Duch, & Bracken, 2002). Cohen’s kappa was calculated using reliability calculation for the masses (ReCal; Freelon, 2013). The reliability was .78 for common knowledge, and .68 for unique knowledge. Although intercoder reliability
for unique knowledge was below the threshold of .70, it was acceptable because it was comparable with previous studies using a hidden-profile design (e.g., $\kappa = .68$; Kolb & Van Swol, 2018). The disagreement was resolved through discussion.

Following the coding, the proportion of common and unique stereotypic attributes discussed was calculated for each group member using the following formulas:

$$\text{% of common attributes}_m = \frac{\text{# of common attributes mentioned and repeated}}{\text{total # of common attributes a member has}}$$

$$\text{% of unique attributes}_m = \frac{\text{# of own unique attributes} + \text{# of other unique attributes}}{\text{total # of unique attributes a member has}}$$

In addition, the proportion of common and unique stereotypic attributes discussed was calculated for each group using the following formulas:

$$\text{% of common attributes}_g = \frac{\sum \text{# of common attributes mentioned and repeated})}{\text{total # of common attributes a group possess}}$$

$$\text{% of unique attributes}_g = \frac{[\sum (\text{# of own unique attributes} + \text{# of other unique attributes})]}{\text{total # of unique attributes a group possess}}$$

where $n$ refers to the number of members in a group.

**Linguistic abstraction.** Linguistic abstraction was analyzed with computer-assisted coding using Linguistic Inquiry Word Count (LIWC) software (Pennebaker, Booth, & Francis, 2007). LIWC software counts the number of words based on pre-defined categories (Pennebaker et al., 2007). Seih, Beier, and Pennebaker (2017) developed the dictionary on the basis of linguistic category model that allows to classify words into DAVs, IAVs, SVs, and ADJs. Based on the coding, each participant had two transcripts for the analyses in LIWC. One transcript included the thought units concerning the common stereotypic attributes, and the other included
the thought units about the unique stereotypic attributes. The transcripts were analyzed via LIWC to determine the number of words in each linguistic category. The average occurrence rate of the words related linguistic abstraction was 25.25% ($SD = 2.76\%$, $Min = 18.50\%$, $Max = 31.15\%$). This occurrence rate was comparable to that in other studies using computerized coding for linguistic abstraction (e.g., 24.4% in Seih et al., 2017).

Then linguistic abstraction scores were calculated for common and unique stereotypic attributes respectively, using the algorithm provided by Semin et al. (2002):

$$LCM\ score_m = \frac{[DAV \times 1 + (IAV \times 2) + (SV \times 3) + (ADJ \times 4)]}{(DAV + IAV + SV + ADJ)}$$

A higher LCM score suggested that a member used more abstract language to discuss certain stereotypic attributes. In addition, a group-level $LCM\ score_g$ was computed by dividing the weighted sum of the linguistic categorical words that a group use by the total number of the coded words the group have.

**Perceived validity and representativeness.** After group discussion, the participants all received the statements about the outgroup (i.e., 25 statements), regardless of whether they were common or unique knowledge and whether they were obtained before the interaction or through the discussion. The order of the statements was random. For each of the statements, they evaluated the perceived validity and representativeness of the stereotypic attributes. To reduce the participants’ fatigue, perceived validity and perceived representativeness were assessed by means of two items, respectively. Together these items yielded 100 measurement points per participant (i.e., 25 statements × 4 items).

Perceived validity and representativeness were not tested for construct validity and reliability due to two reasons. First, the stereotypic attributes for which participants reported perceived validity representativeness varied by experimental conditions. Second, the latent
structure was too complicated to estimate with the current factor analysis models. Specifically, each indicator of validity or reliability was nested within the stereotypic attributes, which, in turn, were nested under the participants, and then nested in groups. With this complex nesting structure, it was difficult to obtain a well-converged model.

Two items adapted from Nan (2013) were used to assess perceived validity (i.e., not at all valid/extremely valid; not at all accurate/extremely accurate). The participants rated the perceived validity of each statement on 11-point Likert-type scales. Responses concerning the statements about the outgroup’s competence was averaged into one score, and responses to the statements about the outgroup’s arrogance was averaged into one score. Higher scores suggest that the participants perceived the statements about competence or arrogance as more valid.

Two items adapted from Haslam, Oakes, McGarty, Turner, and Onorato (1995) served as indices of the perceived representativeness of the behavior on an 11-point Likert-type scale. The items included: not at all representative/extremely representative and not at all typical/extremely typical. Responses to the statements relating to the outgroup’s competence were averaged to form one score, and responses to the statements about the outgroup’s arrogance were also averaged to form one score. Higher scores suggested that the participants perceive the described competent or arrogant behaviors as more representative of the outgroup.

**Personal stereotype endorsement.** Participants rated their agreement with a list of stereotypic attributes on 11-point scales (0 = strongly disagree, 5 = neutral, 10 = strongly agree). The items, adapted from Levy, Stroessner, and Dweck (1998), asked “How much do you agree with the view of the group as competent, capable, skillful, accomplished, arrogant, self-centered, cocky, and condescending?” MCFA showed that the eight items reflected two-factor structure at both within- and between-group level, \( \chi^2 (df = 38, N = 255) = 83.20, p < .001, \text{CFI} = .98, \)
RMSEA = .07, SRMR\text{within} = .04, SRMR\text{between} = .07. Therefore, responses to the first four traits were averaged to generate one score, with higher values indicating greater endorsement of competence stereotype. Responses to the last four traits were also averaged to generate one score, with higher values indicating greater endorsement of arrogance stereotype.

The reliability of competence endorsement scale adjusted for interdependence was .89 at individual level, and .63 at group level. The reliability of arrogance endorsement scale adjusted for interdependence was .92 at individual level, and .47 at group level. The fact the group-level reliability was lower than individual-reliability was not surprising. A nearly perfect group-level reliability suggests strong invariance across clusters (Jak & Jorgensen, 2017). Because my proposed theoretical models predicted variance across groups as a function of experimental inductions and group discussion, low group-level reliability coefficients for endorsement scales were expected. Table 2.4 presents the descriptive statistics of the items for competence and arrogance endorsement respectively.

Table 2.4. Descriptive statistics of endorsement of outgroups’ competence and arrogance

<table>
<thead>
<tr>
<th>Items</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item1</td>
<td>6.18</td>
<td>2.53</td>
<td>1, 11</td>
<td>-.06</td>
<td>-.81</td>
<td>.29</td>
</tr>
<tr>
<td>Item2</td>
<td>6.36</td>
<td>2.56</td>
<td>1, 11</td>
<td>-.16</td>
<td>-.71</td>
<td>.31</td>
</tr>
<tr>
<td>Item3</td>
<td>6.04</td>
<td>2.37</td>
<td>1, 11</td>
<td>-.06</td>
<td>-.45</td>
<td>.25</td>
</tr>
<tr>
<td>Item4</td>
<td>5.54</td>
<td>2.36</td>
<td>1, 11</td>
<td>.05</td>
<td>-.50</td>
<td>.21</td>
</tr>
</tbody>
</table>

| **Arrogance** |     |     |       |          |          |     |
| Item1   | 8.38| 2.12| 1, 11 | -1.20    | 1.43     | .19 |
| Item2   | 8.45| 2.25| 1, 11 | -1.17    | 1.16     | .17 |
| Item3   | 7.93| 2.47| 1, 11 | -0.99    | 0.48     | .09 |
### Table

| Item  | 8.37 | 2.52 | 1, 11 | -1.19 | 0.77 | .17 |

*Note. N = 254;*

**Collective stereotype endorsement.** The above-mentioned operationalization assumed that the mean extremity of the group members’ stereotype endorsement as a proxy of the degree of consensus. Although it has been widely used in the existing research to assess collective endorsement, mean extremity alone is at best a rough proxy for consensus (Conway & Schaller, 1998). Indeed, it is possible for two groups to achieve identical mean scores without achieving the same degree of consensus. Imagine that a group of four people indicates their endorsement of the stereotypes that Bleens are untrustworthy on a 9-point scale ranging from disagreement to agreement. All four members score exactly 7 on the scale. Imagine another group of four members indicates endorsement on the same scale. Two of them score 5, which suggested a lack of strong endorsement, whereas another two score 9, which indicated the strongest endorsement of the stereotype. The means of the two groups are identical, but the degree of consensus is clearly different.

Another criterion for determining the degree of consensus is reduced dispersion. Dispersion reflects the extent to which values are spread out in a distribution (Larsen & Marx, 2010). If consensual stereotypes are truly normalized in a group, then the group members should not only strongly endorse stereotyped attributes, but also converge toward an anchor at which beliefs of a whole group are best represented. Collective endorsement was assessed via the variance ratio index ($r_{wg}$), which was developed by James, Demaree, and Wolf (1984). The index was calculated by dividing the actual variance within a group by an estimate of the expected amount of variance that would occur by chance alone, and then by subtracting this value from 1. The formula for the variance ratio index is as follows:
\[ \tau_{wg} = 1 - \frac{s_{x_j}^2}{\sigma_{x_j}^2} \]

where \(s_{x_j}^2\) represents the observed variance on a judgment \(x_j\) (e.g., stereotype endorsement), and \(\sigma_{x_j}^2\) represents the expected variance that would be by chance alone. The formula for the expected variance appears below.

\[ \sigma_{x_j}^2 = \frac{A^2 - 1}{12} \]

where \(A\) represents the number of alternatives on the judgment scale, and 12 served to normalize the expected variance across scales with different number of response categories. Because the constructs in this study were assessed on 11-point Likert scale, \(A\) equals 11, and \(\sigma_{x_j}^2 = \frac{11^2 - 1}{12} = 10\). In other words, the expected variance with 11-point scales was 10.

**Control variables.** Several control variables were assessed to explore the alternative explanations for the hypothesized effects and test the robustness of the expected relationships. Research on stereotype formation has suggested that individual differences may have a systematic impact on people’s discussion of stereotypic attributes and their endorsement of a stereotype. For example, Clow and Esses (2005) reported that people higher in fear of invalidity discuss stereotypic attributes in greater details than those lower in fear of invalidity. In addition, implicit theories of stereotype development (Levy et al., 1998; Levy, Plaks, Hong, Chiu, & Dweck, 2001) posit and found that people who view personality as fixed and immutable (i.e., entity theorists) tend to exhibit greater stereotype endorsement than those who consider personality as situationally determined and developmentally malleable (i.e., instrumental theorists). Hence, the measures of fear of invalidity and implicit theories about personality were included.
The following scales assessed individual differences, and theoretically should not be interdependent. Confirmatory factor analysis with non-clustered covariance matrices was used to assess scale validity. The analysis was performed via AMOS 24. A confirmatory factor analysis using maximum likelihood estimation showed good fit with two-factor structure, \( \chi^2 (df = 34, N = 256) = 73.78, p < .001, \text{CFI} = .97, \text{RMSEA} = .07, 90\% \text{CI: [.05, .09]}, \text{SRMR} = .05. \) Table 2.5 presents the descriptive statistics for the items pertaining fear of invalidity and implicit theories, respectively.

Seven items from work by Neuberg, Judice, and West (1997) were used to assess the individual differences in the fear of making invalid judgments. Participants indicated their agreement to the items on 11-point scales (0 = strongly disagree, 5 = neutral, and 10 = strongly agree). The sample items included “I can be reluctant to commit myself to something because of the possibility that I might be wrong;” and “I wish I didn't worry so much about making errors.” The responses were averaged to form one score, with higher values indicating greater fear of invalidity (\( \alpha = .84 \)).

Three items from a study by Levy et al. (1998) were used to assess the extent to which people perceive personality as fixed. Participants indicated their agreement with the items on 11-point scales (0 = strongly disagree, 5 = neutral, and 10 = strongly agree). The sample item included “Everyone is a certain kind of person, and there is not much that they can do to really change that.” The responses were averaged to create one score (\( \alpha = .91 \)). In line with Levy et al. (1998), the participants whose scores fell in the upper 45% of the scale were identified as entity theorists, while those in the lower 45% were identified as incremental theorists. The middle 10% were identified as unclassified participants, that is, individuals who did not have a well-defined or consistent theory concerning personality.
Data-Analysis Plan

The data structure was interdependent as a result of theoretical assumptions, the experimental design, and substantive issues under consideration. Theoretically, the input-process-output model assumes that group members influence each other by means of within-group interaction (Gouran, 1973). As a result, the participants’ responses to the variables of interest (e.g., perceived validity) may have been shaped by and dependent upon the other members’ responses from the same group. By design, the individual participants are clustered by groups, which potentially made their responses more similar to (or different from) one another than the responses of the participants who were not the members of the same group (see Kenny, Kashy, & Cook, 2006). Substantively, the research for this dissertation focused on a specific case in which people had both common and unique knowledge about outgroup stereotypic attributes. Hence, the type of knowledge (common or unique) was repeated within each group member, which introduced interdependence. The interdependence of the observations violated the assumption in ordinary least squares (OLS) regression analyses, which could lead to biases in the estimates of the standard errors and inaccurate significance tests (Hox, 2010).

To address the concerns about interdependence, multilevel modeling (MLM) was used to test the hypotheses. In brief, MLM estimates the intercepts and slopes of lower-level (e.g., member) predictors with separate regression equations at each level, and use these parameters as the outcome variables for higher-level (e.g., group) predictors (Hox, 2010). MLM is a robust method to model the emergence of consensual stereotype as a function of group-level input (e.g., identity salience) and member-level cognitions (e.g., perceived validity), while simultaneously accounting for the variance across members and groups.

Power Analyses
Snijders (2005) noted that the sample size at the higher level (i.e., group) is the main limiting factor of the statistical power in the multilevel design (i.e., individuals nested with groups). Hence the statistical power was estimated to determine the minimum number of groups. Optimal design (Spybrook et al., 2016) was used for multilevel models. Using a two-level cluster randomized trials, with the treatment at level 2 and the outcome at level 1 ($\alpha = .05$, $ICC = .15$, $R^2_{level2} = .30$), about 60 groups of four members were needed to achieve 80% power to detect an effect size of .40. Because the optimal design did not allow for the estimation of factorial design, a rough estimate was conducted in G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) with the groups as the unit of analysis. About 70 groups of four members were needed to achieve 80% power to detect an effect size of .40, using a $2 \times 2$ analysis of variance with an alpha of .05.

Pilot Studies

**Pilot study one: Identity salience manipulation.** A pilot study was conducted to determine whether or not identity salience manipulation was successful. Forty participants from the same population of the main study were recruited. The pilot study followed the procedures described in the experimental manipulation for one exception. Participants in the personal identity salience condition were also to have conversations with the other individuals in competition as a way to demonstrate their ability to think logically and build arguments. The participants responded to the manipulation check measures both prior to the group discussion (i.e., following group selection) and after the group discussion (i.e., following group reflection). The repeated measures reflected the concern that group interaction might reduce the magnitude of salience manipulation due to the potential conflicts during the discussion. Table 2.5 presents the descriptive statistics for ingroup identification.

**Table 2.5.** Descriptive statistics of ingroup identification by experimental conditions
Experimental conditions | $n$ | Mean | $SD$
---|---|---|---
Pre-discussion salience | Personal identity salience | 18 | 6.10 | 1.47
| Ingroup identity salience | 19 | 7.74 | 1.64
Post-discussion salience | Personal identity salience | 18 | 6.13 | 2.00
| Ingroup identity salience | 19 | 7.79 | 1.70

Note. All variables were assessed on 11-point scales ($0 = \text{not at all}$, $5 = \text{neutral}$, $10 = \text{very much}$).

Two multilevel models were used for predicting pre- and post-discussion salience respectively, with experimental condition as a group-level variable. Table 2.6 shows the results and indicates that the proposed manipulation created differences in terms of identity salience in the expected direction for both pre-discussion and post-discussion check. Inspection of the means suggests that the group discussion did not influence the degree of identity salience. However, the means in the personal identity salience condition were above the mid-point of the scale, which suggested that personal identity manipulation was not strong enough. To address this concern, I made two revisions on the identity manipulation. First, the participants in the person identity salience condition were not asked to discuss with the other individuals in competition. Instead, they had the same amount of time to work on an individual ranking. Second, instead of reflecting the practices that made them feel proud of themselves, participants in the personal identity salience condition were to identify three reasons why they believed they would win the competition.

Table 2.6. Results of identity salience manipulation in pilot study 1
The participants in this pilot study were also asked to describe 1) behavior that they found most desirable and 2) behavior that they found most annoying or offensive during group discussion. They were told that the examples of behavior could come from the discussion they just held, their previous experience of discussion with other individuals, others’ experience that they heard about, or even a hypothetical situation. For each behavior they described, they were to indicate what they inferred about the person’s attributes from the behavior. The most frequently mentioned attributes were competence and arrogance. A total of 50 types of behavior were selected on the basis of what the participants reported as diagnostic of competence or arrogance. These were tested in the pilot study 2.

**Pilot study two: Stereotypic attributes.** The second pilot study was conducted to identify a list of specific types of behaviors that were most diagnostic of competence or arrogance during group discussion. The list collected from the pilot study 1 was submitted to another 17 participants recruited from the same population in the main study. The participants received a brief description of the survival game, and were to imagine that another group had completed the game. Then they received a list of all the behavior, and were to assess the extent to which each was diagnostic of competence and arrogance, respectively (1 = not at all, 5 = very much). The results revealed that 19 behavioral descriptions were perceived as highly diagnostic of competence, but not arrogance, and another 15 were perceived as highly diagnostic of arrogance, but not competence. The 34 behavioral descriptions were included in the main study.
to manipulate the social valence of stereotypic attributes. Table 2.7 presents descriptive statistics for stereotypic attributes that were diagnostic of outgroups’ competence and arrogance.

**Table 2.7. Stereotypic attributes diagnostic of competence and arrogance**

<table>
<thead>
<tr>
<th>Stereotypic Attributes</th>
<th>Arrogance</th>
<th>Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Stereotypic attributes diagnostic of arrogance</td>
<td>4.35</td>
<td>1.17</td>
</tr>
<tr>
<td>1. People kept rolling their eyes toward the speaker whose opinions differed from theirs.</td>
<td>1.50</td>
<td>0.73</td>
</tr>
<tr>
<td>2. People acted as if they had nothing to learn from the other group members.</td>
<td>4.12</td>
<td>1.36</td>
</tr>
<tr>
<td>3. People made demeaning remarks about others’ performance during the discussion.</td>
<td>1.44</td>
<td>0.96</td>
</tr>
<tr>
<td>4. People frequently cut off others during the discussion, even if what they said was just a repetition of the previous discussion.</td>
<td>4.24</td>
<td>1.35</td>
</tr>
<tr>
<td>5. People ignored others’ attempt to speak.</td>
<td>1.60</td>
<td>1.18</td>
</tr>
<tr>
<td>6. People denied to admit that they made self-conflicting arguments.</td>
<td>4.18</td>
<td>1.29</td>
</tr>
<tr>
<td>7. People insisted in making extended monologue, and closed off to others’ opportunities to make a contribution.</td>
<td>1.73</td>
<td>1.44</td>
</tr>
<tr>
<td>8. When disagreeing with others, people explicitly told the others that they were absolutely wrong.</td>
<td>1.80</td>
<td>1.21</td>
</tr>
<tr>
<td>9. People in my group tended to adopt &quot;know it all&quot; attitudes.</td>
<td>4.07</td>
<td>1.53</td>
</tr>
<tr>
<td>10. People let out a deep sigh when someone asked for more explanations.</td>
<td>1.69</td>
<td>1.11</td>
</tr>
<tr>
<td>11. People often argued against with others just for the sake of argument.</td>
<td>1.81</td>
<td>1.28</td>
</tr>
<tr>
<td>12. People tended to lean toward and stare at the person when they disagreed with them.</td>
<td>3.94</td>
<td>1.34</td>
</tr>
<tr>
<td>13. People constantly looked past one person for someone else to talk to.</td>
<td>1.60</td>
<td>1.12</td>
</tr>
<tr>
<td>14. People increased volume of their voice when the others expressed doubts about their choice.</td>
<td>3.82</td>
<td>0.90</td>
</tr>
<tr>
<td>15. People did not listen carefully about others’ opinions.</td>
<td>1.67</td>
<td>0.98</td>
</tr>
<tr>
<td>16. People bragged about their extensive experience with the decision task during the discussion.</td>
<td>3.76</td>
<td>1.35</td>
</tr>
<tr>
<td>17. People let out a deep sigh when someone asked for more explanations.</td>
<td>1.67</td>
<td>1.18</td>
</tr>
<tr>
<td>18. People bragged about their extensive experience with the decision task during the discussion.</td>
<td>2.00</td>
<td>1.32</td>
</tr>
</tbody>
</table>
17. People laughed at others who made some obvious mistakes. 4.06 1.34 2.00 1.13
18. People in my group got mad or irritated when the center of attention moved away from them. 3.94 1.43 1.94 1.24
19. People acted as if they were the leader of the group even if they made no more contribution than others members. 4.00 1.17 2.00 1.26

<table>
<thead>
<tr>
<th>Stereotypic attributes diagnostic of competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Group members were sensitive to time management, and they knew when it was necessary to move on. 1.93 1.16 3.94 1.25</td>
</tr>
<tr>
<td>21. People in my group tended to value others’ opinion even when it differed from their own. 1.87 1.06 3.94 1.09</td>
</tr>
<tr>
<td>22. Group members carefully monitored their own language, and avoided expressions that may hurt others’ feelings. 1.53 0.83 4.00 1.12</td>
</tr>
<tr>
<td>23. People were humorous, and cited interesting anecdotes to help others understand their point. 1.67 0.90 4.18 1.13</td>
</tr>
<tr>
<td>24. People left time to reflect as a group what they had achieved together by the end of the discussion. 1.53 0.92 4.06 1.14</td>
</tr>
<tr>
<td>25. People were able to illustrate their arguments with concise language and concrete examples. 1.60 0.99 4.18 1.33</td>
</tr>
<tr>
<td>26. People in my group had excellent listening skills. 1.69 1.08 4.29 0.85</td>
</tr>
<tr>
<td>27. Members in my group were devoted to the task. They actively contributed to the discussion throughout an entire session. 1.69 1.14 4.29 1.21</td>
</tr>
<tr>
<td>28. People took ample notes to keep the discussion organized. 1.47 0.74 4.12 0.86</td>
</tr>
<tr>
<td>29. People in my group were knowledgeable about the decision task and items. 1.63 0.96 4.29 0.77</td>
</tr>
<tr>
<td>30. People shared credit for good ideas with others, and were willing to acknowledge others' skills, experience and contributions. 1.53 0.83 4.29 1.10</td>
</tr>
<tr>
<td>31. People were willing to share their expertise when it was relevant. 1.67 0.72 4.47 0.87</td>
</tr>
<tr>
<td>32. People gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion. 1.53 0.83 4.35 1.00</td>
</tr>
<tr>
<td>33. People were attentive to what other group members said, and maintained eye contacts with the speakers. 1.56 1.21 4.41 1.18</td>
</tr>
<tr>
<td>34. People in my group helped each other to understand the group goal, and explained with patience how a decision item can be used. 1.53 0.64 4.47 0.72</td>
</tr>
</tbody>
</table>
CHAPTER THREE RESULTS

Descriptive Statistics for Self-Reported Variables

The means, standard deviations, ranges, normality estimates, and intraclass correlations for self-reported variables (i.e., ingroup identification, evaluation and endorsement of outgroup stereotypes, and personality traits) appear in Table 3.1. Participants received a list of stereotypic attributes about two outgroup stereotypes (competence and arrogance), which were considered separately.

Table 3.1. Descriptive statistics of self-report variables (N = 254)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Scale Range</th>
<th>Observed Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingroup identification</td>
<td>7.02</td>
<td>2.55</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.62</td>
<td>-0.49</td>
<td>.34</td>
</tr>
<tr>
<td>Outgroup stereotype: Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived validity</td>
<td>6.11</td>
<td>1.95</td>
<td>1, 11</td>
<td>1, 10.88</td>
<td>0.11</td>
<td>-0.55</td>
<td>.56</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>5.78</td>
<td>1.86</td>
<td>1, 11</td>
<td>1, 10.71</td>
<td>0.12</td>
<td>-0.32</td>
<td>.50</td>
</tr>
<tr>
<td>Pre-Personal endorsement</td>
<td>6.66</td>
<td>1.76</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.22</td>
<td>-0.04</td>
<td>—</td>
</tr>
<tr>
<td>Post-Personal endorsement</td>
<td>6.03</td>
<td>2.23</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.07</td>
<td>-0.47</td>
<td>.33</td>
</tr>
<tr>
<td>Collective endorsement</td>
<td>.67</td>
<td>.33</td>
<td>-1, 1</td>
<td>-.82, .99</td>
<td>-2.01</td>
<td>5.64</td>
<td>—</td>
</tr>
<tr>
<td>Outgroup stereotype: Arrogance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived validity</td>
<td>7.68</td>
<td>1.97</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.58</td>
<td>-0.04</td>
<td>.28</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>7.12</td>
<td>2.21</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.29</td>
<td>-0.70</td>
<td>.38</td>
</tr>
<tr>
<td>Pre-Personal endorsement</td>
<td>7.98</td>
<td>1.98</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-0.84</td>
<td>0.73</td>
<td>—</td>
</tr>
<tr>
<td>Post-Personal endorsement</td>
<td>8.28</td>
<td>2.14</td>
<td>1, 11</td>
<td>1, 11</td>
<td>-1.23</td>
<td>1.28</td>
<td>.19</td>
</tr>
<tr>
<td>Collective endorsement</td>
<td>.63</td>
<td>.38</td>
<td>-1, 1</td>
<td>-.47, 1</td>
<td>-1.26</td>
<td>0.64</td>
<td>—</td>
</tr>
<tr>
<td>Personality traits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of invalidity</td>
<td>6.74</td>
<td>1.89</td>
<td>1, 11</td>
<td>2, 10.71</td>
<td>-0.13</td>
<td>-0.72</td>
<td>—</td>
</tr>
<tr>
<td>Implicit theorists</td>
<td>5.98</td>
<td>2.42</td>
<td>1, 11</td>
<td>1, 11</td>
<td>0.04</td>
<td>-0.72</td>
<td>—</td>
</tr>
</tbody>
</table>

Notes: ICC = intraclass correlations; Pre and Post indicate measures collected before (pre) or after (post) the group discussion. Collective endorsement were calculated based on the \( r_{wg} \) agreement index (James et al., 1984). The index assesses the degree of similarity in group members’ responses controlling for
the amount of variance that would be expected by chance alone. $r_{wg}$ ranges from -1 to 1, with higher scores indicating greater similarity (i.e., smaller dispersion).

One-sample $t$-tests were used to determine whether the means differed significantly from the neutral point of the scale. Paired-sample $t$-tests were used to explore whether there were differences in the participants’ endorsement of outgroup stereotypes before and after the group discussion. In line with the work by Burlingame, Kircher, and Honts (1994), bootstrapping procedures for standard errors (1,000 trials) were used in both one-sample $t$-tests and paired-sample $t$-tests to reduce the inflated Type I error rates due to observational interdependence. Intraclass correlation coefficient (ICC) was used to assess the degree to which participants’ responses varied across groups. The ICC was calculated using the intercept-only model (i.e., no explanatory variables, Hox, 2010), thus estimating how much of the total variance could be attributed to the clustering structure alone. A strong ICC suggests that observed variance in the variables of interest is due to between-group rather than within-group differences. Of note, Hox (2010) found that small group research and family studies typically report intraclass correlations ranging from .15 to .30. The next paragraphs describe the findings for each variable in detail.

One-sample $t$-tests and paired-sample $t$-tests with bootstrapping procedures were conducted using SPSS 24. SAS 9.4 PROC MIXED (SAS, 2013; Singer, 1998) was used to estimate the parameters for calculating ICC.

**Ingroup identification.** On average, participants identified with their experimental group. The one-sample $t$ tests revealed that participants’ ingroup identification was higher than the midpoint of the scale, $t(255) = 6.41, p < .01, 95\% \text{ CI}_{\text{bootstrap}} [0.71, 1.33]$. The intercept-only model showed significant variance in participant’s ingroup identification ($estimate = 2.00, SE = 0.59, p < .01$), which suggested the potential effects of the experimental induction. The intraclass correlation coefficient for ingroup identification was .34, which was larger than a typical group
Study (Hox, 2010).

**Evaluation and personal endorsement.** On average, participants provided neutral judgments of the perceived validity ($M = 6.11$, $SD = 1.95$), $t(255) = 0.93$, $p = .35$, 95% CI$_{bootstrap} [-0.13, 0.35]$, and perceived representativeness ($M = 5.78$, $SD = 1.86$), $t(255) = -1.87$, $p = .06$, 95% CI$_{bootstrap} [-0.46, 0.01]$, of the stereotypic attributes about the outgroup’s competence. Prior to the group discussions, participants on average endorsed the stereotype of the outgroup’s competence ($M = 6.66$, $SD = 1.76$), $t(255) = 5.60$, $p < .01$, 95% CI$_{bootstrap} [0.42, 0.87]$. After the group discussion, however, the participants reported neutral levels of their own endorsement of the outgroup’s competence ($M = 6.03$, $SD = 2.23$), $t(255) = 0.22$, $p = .82$, 95% CI$_{bootstrap} [-0.24, 0.31]$. Overall, participants decreased their endorsement of outgroup’s competence after the group discussion ($M_{diff} = -0.62$, $SD_{diff} = 1.99$), $t(255) = -5.03$, $p < .01$, 95% CI$_{bootstrap} [-0.86, -0.38]$. The intraclass correlations of outgroups’ competence ranged from .33 to .56, which were larger than those for a typical group study (Hox, 2010). The strong intraclass correlations suggested that participants from the same ingroup had more similar evaluations and endorsement of outgroups’ competence than participants from different ingroups.

The participants judged the stereotypic attributes about the outgroup’s arrogance as valid ($M = 7.68$, $SD = 1.97$), $t(255) = 13.62$, $p < .01$, 95% CI$_{bootstrap} [1.43, 1.92]$, and representative ($M = 7.12$, $SD = 2.21$), $t(255) = 8.10$, $p < .01$, 95% CI$_{bootstrap} [0.85, 1.39]$. They endorsed the stereotype of the outgroup’s arrogance both before the group discussion ($M = 7.98$, $SD = 1.98$), $t(255) = 16.00$, $p < .01$, 95% CI$_{bootstrap} [1.73, 2.22]$, and after the group discussion ($M = 8.28$, $SD = 2.14$), $t(255) = 17.03$, $p < .01$, 95% CI$_{bootstrap} [2.02, 2.55]$. Overall, the participants increased their own endorsement of outgroup’s arrogance after the group discussion ($M_{diff} = 0.31$, $SD_{diff} = 1.67$), $t(255) = 2.93$, $p < .01$, 95% CI$_{bootstrap} [0.07, 0.52]$. The intraclass correlations of outgroups’
arrogance fell between .19 and .38, that is, in the range of a typical group study (Hox, 2010). Participants also showed similarity in their evaluation and endorsement of outgroups’ arrogance within their ingroup; however, the within-group similarity of outgroups’ arrogance was smaller than that of outgroups’ competence.

**Collective endorsement.** Approximate randomization tests based on uniform null distributions (10,000 trials, and alpha = .05) were used to assess whether the collective endorsement of outgroup stereotypes was different from chance alone (Cohen, Doveh, & Nahum-Shani, 2009). The analyses were conducted with the *Multilevel Modeling in R* package (Bliese, 2006).

The average VRI across ingroups for the outgroup’s competence and arrogance were .67 and .63, respectively, which suggested that ingroup members were moderately similar in their endorsement of the two outgroup stereotypes. The critical values for a 95% confidence interval were .89 for the competence stereotype, and .81 for the arrogance stereotype. The experimental ingroups varied in their collective endorsement of the outgroup stereotypes. Among a total of 66 ingroups, 33% (n = 22) reached collective endorsement of the competence stereotype, and 43% (n = 28) achieved collective endorsement of the arrogance stereotype. Only 18% (n = 12) reached collective endorsement of both stereotypes. The percentage of ingroups that exhibited collective endorsement of one outgroup stereotype (competence or arrogance) in this dissertation was higher than the percentage in other studies using zero-history groups (e.g., Haslam et al., 1999)\(^2\); however, collective endorsement of both outgroup stereotypes was infrequent.

**Descriptive Results for Group Discussion Variables**

The experimental stimuli included stereotypic attributes of the outgroup that was given to

---

\(^2\) Haslam et al. (1999) found that less than 25% of groups consensually selected the same set of negative traits to describe a social group.
everyone (i.e., common attributes) and given to selected participants (i.e., unique attributes). Ingroup members’ discussions were analyzed in terms of what and how abstractly common and unique stereotypic attributes were mentioned. Frequency reflected how many times participants mentioned a certain type of stereotypic attributes (common or unique) during the group discussion. In theory, participants can mention a stereotypic attribute as many times as they want. Research on common information bias has used frequency to capture the depth of discussion (Lu et al., 2012). Percentage reflected how many stereotypic attributes participants mentioned of the total number available to them. The participants could mention every stereotypic attribute available in the profile or only selected aspects of it to discuss. The percentage of stereotypic attributes mentioned, then, reflected the scope of discussion (i.e., how comprehensively participants made use of the stereotypic attributes available to them; Lu et al., 2012). Because individual members were nested within experimental groups, the discussion variables were calculated at both member-level (i.e., what and how a group member discussed) and group-level (i.e., what and how a group discussed). At the member-level, percentage was calculated by dividing the number of common (or unique) attributes a participant mentioned by the total amount of common (or unique) attributes available to the participant. At the group-level, percentage was calculated by dividing the number of common (or unique) attributes a group mentioned by the total amount of common (or unique) attributes available to the group. The means, standard deviations, range, normality estimates, and intraclass correlations for the discussion variables (i.e., frequency and percentage of stereotypic attributes mentioned, and linguistic abstraction) appear in Table 3.2.

**Table 3.2.** Descriptive statistics of discussion variables ($N=256$)

<table>
<thead>
<tr>
<th>Variables</th>
<th>$M$</th>
<th>$SD$</th>
<th>Observed Range</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>ICC</th>
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<tr>
<td>Frequency</td>
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### Common attributes

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>3.13</td>
<td>2.04</td>
<td>0.00, 10.00</td>
<td>0.72</td>
<td>0.18</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>13.82</td>
<td>5.65</td>
<td>4.00, 28.00</td>
<td>0.51</td>
<td>-0.07</td>
<td>—</td>
</tr>
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### Unique attributes

<table>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.94</td>
<td>1.58</td>
<td>0.00, 8.00</td>
<td>0.84</td>
<td>0.58</td>
<td>.34</td>
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<tr>
<td></td>
<td>8.66</td>
<td>5.81</td>
<td>1.00, 32.00</td>
<td>1.34</td>
<td>2.55</td>
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### Percentage

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.30</td>
<td>0.20</td>
<td>0.00, 1.00</td>
<td>0.71</td>
<td>0.10</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>0.64</td>
<td>0.20</td>
<td>0.30, 1.00</td>
<td>0.04</td>
<td>-0.98</td>
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</table>

### Unique attributes

<table>
<thead>
<tr>
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<th>Group-level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.10</td>
<td>0.08</td>
<td>0.00, 0.40</td>
<td>0.77</td>
<td>0.42</td>
<td>.35</td>
</tr>
<tr>
<td></td>
<td>0.32</td>
<td>0.17</td>
<td>0.05, 0.80</td>
<td>0.45</td>
<td>-0.26</td>
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### Linguistic abstraction

<table>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.19</td>
<td>0.38</td>
<td>1.00, 3.30</td>
<td>-0.55</td>
<td>1.33</td>
<td>.13</td>
</tr>
<tr>
<td></td>
<td>2.21</td>
<td>0.20</td>
<td>1.40, 2.70</td>
<td>-1.30</td>
<td>4.68</td>
<td>—</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Member-level</th>
<th>Group-level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.15</td>
<td>0.13</td>
<td>2.10, 2.80</td>
<td>2.68</td>
<td>7.93</td>
<td>.71</td>
</tr>
<tr>
<td></td>
<td>2.22</td>
<td>0.20</td>
<td>1.80, 2.90</td>
<td>0.29</td>
<td>0.77</td>
<td>—</td>
</tr>
</tbody>
</table>

*Note:* Kline (2009) suggested that the deviation of data from normality is acceptable if skewness and kurtosis are below 3 and 10 respectively.

What stereotypic attributes were mentioned. A series of two-level models were estimated to explore whether ingroup members differed in their frequency or percentage of mentioning common and unique stereotypic attributes about the outgroup. The two-level models included frequency (or percentage) as the dependent variable, with the type of attributes (0 = *common* attributes, 1 = *unique* attributes) as a level-1 repeated, fixed factor, and with age and sex as level-2 covariates. SAS 9.4 PROC MIXED (SAS, 2013; Singer, 1998) was used to conduct the analyses. In addition, paired-sample *t* tests were used to explore group-level differences in the frequency (or percentage) of mentioning stereotypic attributes. SPSS 24 (IBM, 2016) was used, with groups as units of analysis.

On average, ingroup members mentioned common stereotypic attributes (*M* = 3.13, *SD* =
2.04) more frequently than unique attributes \((M = 1.94, SD = 1.58)\), \(B = -1.32, SE = 0.17, p < .01\). The results were the same at the group level, with ingroups mentioning common stereotypic attributes \((M = 13.73, SD = 5.70)\) more frequently than unique attributes \((M = 8.62, SD = 5.82)\), \(t(65) = 5.56, p < .001, 95\% \text{ CI}[3.27, 6.94]\). With regards to percentage, ingroup members referenced a greater percentage of common \((M = 0.31, SD = 0.20)\) as compared to unique attributes in the ingroup discussions \((M = 0.10, SD = 0.08), B = -0.20, SE = 0.01, p < .01\). Similarly, ingroups mentioned a greater percentage of common stereotypic attributes \((M = 0.64, SD = 0.20)\) than that for unique attributes \((M = 0.32, SD = 0.17)\), \(t(65) = 12.74, p < .001, 95\% \text{ CI}[0.27, 0.37]\). Overall, individual members and ingroups as a whole exhibited common information bias in the group discussion.

The ICC was approximately .10 for mentioning common stereotypic attributes, but roughly .35 for mentioning unique stereotypic attributes. The differences in the ICCs between common and unique attributes suggested a potentially successful induction of the hidden-profile stimuli. Participants could not know about a unique attribute unless it came up during the group discussion, which yielded a large ICC. In contrast, participants did not have to rely on others to know about and reference common attributes, which might explain the smaller ICC.

**How abstractly the stereotypic attributes were discussed.** A two-level model was estimated to explore whether ingroup members differed in linguistic abstraction during their discussion of the stereotypic attributes. The two-level model had linguistic abstraction as the dependent variable, with the type of attributes \((0 = \text{common attributes}, 1 = \text{unique attributes})\) as a level-1 repeated, fixed factor, and with age and sex as level-2 covariates. Paired-sample \(t\)-tests were used to explore group-level differences in linguistic abstraction.

Overall, the participants did not discuss common attributes \((M = 2.19, SD = 0.38)\) more
abstractly than they did unique attributes ($M = 2.15, SD = 0.13$), $B = -0.04$, $SE = 0.03$, $p = .17$.

The results were essentially the same at the group level: The language for discussing common attributes ($M = 2.21$, $SD = 0.20$) was not significantly more abstract than the language for discussing unique attributes ($M = 2.22$, $SD = 0.20$), $t(df = 65) = -0.50$, $p = .62$, 95% CI [-0.07, 0.04]. Overall, members’ and group’s use of language in respect to the level of abstraction was not differentially affected by whether the outgroup stereotypic attribute was known to the whole ingroup or one member only.

The ICCs of linguistic abstraction was .13 for common stereotypic attributes, and .71 for unique stereotypic attributes. The participants in the same experimental group resembled each other with regard to the level of linguistic abstraction during their discussions of outgroup stereotypic attributes. The degree of similarity for linguistic abstraction within experimental groups was particularly strong for unique stereotypic attributes, which suggested that participants mimicked others’ language styles in discussing the stereotypic attributes about which they did have prior knowledge.

**Induction Checks**

The participants were randomly assigned to either the personal-identity or the ingroup-identity condition. Assessing whether or not experimental induction was successful included use of a two-level model with ingroup identification as the dependent variable, and with profile condition ($0 = \text{common devaluing unique praising}$, $1 = \text{common praising unique devaluing}$), identity condition ($0 = \text{personal}$, $1 = \text{ingroup}$), and their interaction as level-two fixed predictors. Age and sex served as covariates.

The fixed-effects parameter estimate for identity manipulation was both positive and statistically significant, $B = 3.17$, $SE = 0.36$, $p < .01$. Participants in the ingroup-identity
condition reported significantly stronger ingroup identification \((M = 8.59, \ SD = 1.49)\) than did those in personal-identity condition \((M = 5.53, \ SD = 2.46)\). A one-sample \(t\) test (using bootstrapped error terms, with 1,000 trials) revealed that participants in the ingroup-identity condition identified with their experimental groups: The average score was above the midpoint of the scale, \(t(124) = 19.40, p < .01, 95\% \ CI_{bootstrap} [2.33, 2.84]\). Participants in the personal-identity condition did not identify with their experimental groups: The average score was below the scale’s midpoint, \(t(130) = -2.19, p < .05, 95\% \ CI_{bootstrap} [-0.86, -0.04]\). Finally, ingroup identification was not supposed to differ by profile condition. The results showed that it did not, \(B = 0.10, SE = 0.36, p = .78\). Together, the identity inductions were successful.

**Baseline Comparisons**

The theoretical focus of the research for this dissertation was on the effects of mixed-valence stereotypic attributes of an outgroup on ingroup members’ discussion and endorsement of the outgroup stereotypes. Accordingly, the experimental inductions of interest involved two profile conditions: 1) common stereotypic attributes devalued the outgroup, whereas unique attributes praised the outgroup \((n = 126)\), and 2) common stereotypic attributes praised the outgroup, whereas unique attributes devalued the outgroup \((n = 130)\). To establish the baseline for the discussion and endorsement of the outgroup stereotypes, two additional profile conditions were included. These baseline profile conditions featured the outgroup stereotypic attributes having the same valence: Common and unique attributes were in praise of the outgroup \((n = 58)\), or devalued the outgroup \((n = 61)\). No differences among the four profile conditions in participants’ ingroup identification were anticipated. Further, participants should have the strongest endorsement of competence stereotypes and weakest endorsement of arrogance stereotypes when all the stereotypic attributes (both common and unique) were in praise of the
outgroup. In contrast, participants should have strongest endorsement of arrogance stereotypes and weakest endorsement of competence stereotypes when all the stereotypic attributes devalued the outgroup.

The results from a two-level model using identity condition, profile condition and their interaction revealed that participants’ ingroup identification did not differ by profile condition (see Figure 3.1), $B = 0.06, SE = 0.07, p = .42$. Participants in the ingroup condition consistently reported stronger ingroup identification ($M = 8.56, SD = 1.59$) than did those in the personal condition ($M = 5.65, SD = 2.45$), regardless of which profile of outgroup stereotypic attributes they read.

![Figure 3.1. Baseline comparisons of ingroup identification](image-url)
The same two-level models were estimated to explore whether or not participants differed in their endorsement of competence and arrogance stereotypes (see Figure 3.2). As expected, those who read a profile with both common and unique attributes praising the outgroup showed the strongest endorsement of competence stereotypes ($M = 9.41$, $SD = 1.90$), $B = 3.91$, $SE = 0.67$, $p < .001$, and weakest endorsement of arrogance stereotypes ($M = 2.59$, $SD = 2.21$), $B = -6.49$, $SE = 0.50$, $p < .001$, following group discussions. Likewise, participants who read a profile with both common and unique attributes devaluing the outgroup showed the strongest endorsement of arrogance stereotype ($M = 9.68$, $SD = 1.79$), $B = 2.70$, $SE = 1.02$, $p < .01$ and weakest endorsement of competence stereotype ($M = 3.13$, $SD = 1.98$), $B = -3.21$, $SE = 0.79$, $p < .001$.

Figure 3.2. Baseline comparisons of endorsement of outgroup stereotypes

The comparisons with the baseline conditions further confirmed that the experimental
inductions of identity and profile were successful.

Hypotheses Testing

Building a common core: H1 and H2. Hypotheses one and two were predictive of three-way interactions among the type of attributes (common vs. unique), identity condition (ingroup vs. personal) and profile condition (common praising unique devaluing vs. common devaluing unique praising) with respect to ingroup members’ frequency of mentioning outgroup stereotypic attributes and their linguistic abstraction respectively. Specifically, in the personal-identity condition, participants should discuss common attributes more frequently and abstractly than unique attributes, regardless of the valence of the attributes; in the ingroup-identity condition, they should discuss more outgroup-devaluing attributes more frequently and abstractly than outgroup-praising attributes, regardless of whether the attributes were common or unique. Assessing these hypotheses entailed estimation of a series of three-level models, with the type of attributes (0 = common attributes, 1 = unique attributes) as a level-1 repeated, fixed factor, age and sex (1 = male, 2 = female) as level-2 covariates, and the identity condition (0 = personal, 1 = ingroup), profile condition (0 = common devaluing unique praising, 1 = common praising unique devaluing), and their interactions as level-3 fixed factors. The dependent variable was ingroup members’ frequency of mentioning stereotypic attributes about the outgroup for H1, and their linguistic abstraction for H2. The models were constructed incrementally, such that lower-level factors were entered prior to the higher-level factors, followed by within-level and cross-level interactions. Statistical analyses related to H1 and H2 were conducted with SAS 9.4 PROC MIXED (SAS, 2013; Singer, 1998). Visualization of significant interactions were performed with nlme package in R (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2018).
Results for H1 and H2. The final model for frequency (see Table 3.3) revealed that even after controlling for demographic variables, the three-way interaction among type of attributes, identity condition, and profile condition was statistically significant, $B = 3.59$, $SE = 0.56$, $p < .001$, $R^2 = .43$.

Table 3. Three-level model results predicting the frequency of outgroup stereotypic attributes mentioned ($N = 255$)

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ ($SE$)</td>
<td>$t$</td>
<td>$B$ ($SE$)</td>
<td>$t$</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.09 (2.19)</td>
<td>0.50</td>
<td>1.66 (2.20)</td>
<td>0.75</td>
</tr>
<tr>
<td>Age</td>
<td>0.05 (0.11)</td>
<td>0.45</td>
<td>0.05 (0.11)</td>
<td>0.46</td>
</tr>
<tr>
<td>Sex$^a$</td>
<td>0.55 (0.24)$^*$</td>
<td>2.28</td>
<td>0.57 (0.25)$^*$</td>
<td>2.31</td>
</tr>
<tr>
<td>Type$^b$</td>
<td>-1.32 (0.17)$^{**}$</td>
<td>-7.98</td>
<td>-2.83 (0.26)$^{***}$</td>
<td>-11.05</td>
</tr>
<tr>
<td>Identity$^c$</td>
<td>-0.07 (0.25)</td>
<td>-0.29</td>
<td>-1.28 (0.38)$^{***}$</td>
<td>-3.40</td>
</tr>
<tr>
<td>Profile$^d$</td>
<td>0.15 (0.24)</td>
<td>0.61</td>
<td>-1.31 (0.37)$^{***}$</td>
<td>-3.55</td>
</tr>
<tr>
<td>Type × Identity</td>
<td>1.24 (0.30)$^{***}$</td>
<td>4.12</td>
<td>0.78 (0.30)$^{***}$</td>
<td>5.94</td>
</tr>
<tr>
<td>Type × Profile</td>
<td>1.16 (0.48)$^*$</td>
<td>2.41</td>
<td>-0.63 (0.56)</td>
<td>-1.14</td>
</tr>
<tr>
<td>Identity × Profile</td>
<td>3.59 (0.56)$^{***}$</td>
<td>6.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.01</td>
<td>.20</td>
<td>.34</td>
<td>.43</td>
</tr>
</tbody>
</table>

Notes. The proportion of variance explained for each step was compared with the intercept only model.

$^a$ Male = 1, Female = 2;

$^b$ Unique attributes = 1, Common attributes = 0;

$^c$ Ingroup = 1, Personal = 0;

$^d$ Common praising unique devaluing = 1, Common devaluing unique praising = 0.

$p < .05$. $^* p < .01$. $^{**} p < .001$.

The results were essentially the same for linguistic abstraction (see Table 3.4): There was a statistically significant interaction among type of attributes, identity condition, and profile condition, $B = 0.40$, $SE = 0.16$, $p < .001$, $R^2 = .15$. 
### Table 3.4. Three-level model results predicting linguistic abstraction (N = 238)

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE)</td>
<td>t</td>
<td>B (SE)</td>
<td>t</td>
</tr>
<tr>
<td>Intercept</td>
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<td>7.94</td>
<td>1.88</td>
<td>8.03</td>
</tr>
<tr>
<td></td>
<td>(0.23)***</td>
<td></td>
<td>(0.23)***</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.02</td>
<td>1.33</td>
<td>0.02</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td>(0.01)</td>
<td></td>
<td>(0.01)</td>
<td></td>
</tr>
<tr>
<td>Sex(^a)</td>
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<td>0.01</td>
<td>0.30</td>
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<tr>
<td></td>
<td>(0.03)</td>
<td></td>
<td>(0.03)</td>
<td></td>
</tr>
<tr>
<td>Type(^b)</td>
<td>-0.04</td>
<td>-1.36</td>
<td>-0.28</td>
<td>-6.52</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td></td>
<td>(0.04)***</td>
<td></td>
</tr>
<tr>
<td>Identity(^c)</td>
<td>-0.01</td>
<td>-0.56</td>
<td>-0.13</td>
<td>-2.95</td>
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<tr>
<td></td>
<td>(0.03)</td>
<td></td>
<td>(0.04)***</td>
<td></td>
</tr>
<tr>
<td>Profile(^d)</td>
<td>-0.01</td>
<td>-0.36</td>
<td>-0.09</td>
<td>-2.07</td>
</tr>
<tr>
<td></td>
<td>(0.03)</td>
<td></td>
<td>(0.04)*</td>
<td></td>
</tr>
<tr>
<td>Type × Identity</td>
<td>0.28</td>
<td>5.59</td>
<td>0.08</td>
<td>1.08</td>
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<tr>
<td></td>
<td>(0.05)***</td>
<td></td>
<td>(0.07)</td>
<td></td>
</tr>
<tr>
<td>Type × Profile</td>
<td>0.21</td>
<td>4.13</td>
<td>0.01</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>(0.05)***</td>
<td></td>
<td>(0.07)</td>
<td></td>
</tr>
<tr>
<td>Identity × Profile</td>
<td>-0.05</td>
<td>-0.99</td>
<td>-0.25</td>
<td>-3.56</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td></td>
<td>(0.07)***</td>
<td></td>
</tr>
<tr>
<td>Type × Identity × Profile</td>
<td>0.40</td>
<td>4.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.10)***</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**Notes.** The proportion of variance explained for each step was compared with the intercept only model.

\(^a\) Male = 1, Female = 2;

\(^b\) Unique attributes = 1, Common attributes = 0;

\(^c\) Ingroup = 1, Personal = 0;

\(^d\) Common praising unique devaluing = 1, Common devaluing unique praising = 0.

\(^*\) p < .05. \(^**\) p < .01. \(^***\) p < .001.

Collectively, these results suggested that participants’ identity, and the valence and commonality of the stereotypic attributes about the outgroup jointly influenced their frequency of mentioning stereotypic attributes and their linguistic abstraction during group discussion, which provided potential evidence for H1 and H2.

To test further whether or not the specific pattern of interactions was consistent with H1 and H2, a series of two three-level models with planned contrasts were estimated to predict...
frequency and linguistic abstraction. The planned contrasts used in the analyses and the MLM equations with planned contrasts appear in Table 3.5.

Table 3.5. MLM for predicting frequency and linguistic abstraction with planned contrasts

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Contrasts for ingroup vs. personal identity salience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contrast 1</td>
</tr>
<tr>
<td>Ingroup identity</td>
<td>common devaluing unique praising</td>
</tr>
<tr>
<td></td>
<td>common praising unique devaluing</td>
</tr>
<tr>
<td>Personal identity</td>
<td>common devaluing unique praising</td>
</tr>
<tr>
<td></td>
<td>common praising unique devaluing</td>
</tr>
</tbody>
</table>

Levels

<table>
<thead>
<tr>
<th>Level 1: Intra-individual</th>
<th>Regression Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y_{ijk} = \pi_{0jk} + \pi_{1jk}(\text{Type of content}) + e_{ijk}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 2: Individual</th>
<th>Regression Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\pi_{0jk} = \beta_{00k} + \beta_{01k}(Age) + \beta_{02k}(Sex)$</td>
<td></td>
</tr>
<tr>
<td>$\pi_{1jk} = \beta_{10k} + \beta_{11k}(Age) + \beta_{12k}(Sex)$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3: Group</th>
<th>Regression Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_{00k} = \gamma_{000} + \gamma_{001}(\text{contrast1}) + \gamma_{002}(\text{contrast2}) + \gamma_{003}(\text{contrast3})$</td>
<td></td>
</tr>
<tr>
<td>$\beta_{01k} = \gamma_{010} + \gamma_{011}(\text{contrast1}) + \gamma_{012}(\text{contrast2}) + \gamma_{013}(\text{contrast3})$</td>
<td></td>
</tr>
<tr>
<td>$\beta_{02k} = \gamma_{020} + \gamma_{021}(\text{contrast1}) + \gamma_{022}(\text{contrast2}) + \gamma_{023}(\text{contrast3})$</td>
<td></td>
</tr>
<tr>
<td>$\beta_{10k} = \gamma_{100} + \gamma_{101}(\text{contrast1}) + \gamma_{102}(\text{contrast2}) + \gamma_{103}(\text{contrast3})$</td>
<td></td>
</tr>
<tr>
<td>$\beta_{11k} = \gamma_{110} + \gamma_{111}(\text{contrast1}) + \gamma_{112}(\text{contrast2}) + \gamma_{113}(\text{contrast3})$</td>
<td></td>
</tr>
<tr>
<td>$\beta_{12k} = \gamma_{120} + \gamma_{121}(\text{contrast1}) + \gamma_{122}(\text{contrast2}) + \gamma_{123}(\text{contrast3})$</td>
<td></td>
</tr>
</tbody>
</table>

Notes: $Y$ represents the outcome variables of interest (i.e., the frequency of stereotypic attributes mentioned or linguistic abstraction). $e$ represent the error terms at the intra-individual level. $\pi$, $\beta$, and $\gamma$ represent regression coefficients at the intra-individual, individual, and group levels, respectively. A significant slope coefficient $\gamma_{102}$ and a non-significant slope coefficient $\gamma_{103}$ would suggest that the data is consistent with the prediction in H1 and H2.

The results of the planned contrast analyses appear in Table 3.6.

Table 3.6. Planned contrast analyses predicting frequency and linguistic abstraction

---

3 An alternative to testing the specific pattern of interaction was to divide the data into two sets: one with ingroup-identity condition, and the other with personal-identity condition. Then I can test, within each identity condition, whether there was a significant two-way interaction between type of attributes (common vs. unique) and profile condition (common praising unique devaluing vs. common devaluing unique praising). In comparison with the planned contrast analyses, the alternative had two limitations (see Rosenthal & Rosnow, 1985; also see Gonzalez, 2009). First, by dividing the data into two sets, the alternative approach reduced the sample size by half, which decreased the statistical power. Second, the alternative approach may produce biased results. For example, there were several significant two-way interactions on frequency (see Step 3, Table 3.3). However, these two-way interactions were not significant when a higher-order, three-way interaction was included in the model (see Step 4, Table 3.3). Therefore, I used planned contrast analyses to test the interaction patterns of hypotheses one and two.
<table>
<thead>
<tr>
<th></th>
<th>Frequency $N = 255$</th>
<th>Linguistic Abstraction $N = 238$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ ($SE$)</td>
<td>$t$</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.85 (2.17)</td>
<td>0.85</td>
</tr>
<tr>
<td>Age</td>
<td>0.04 (0.11)</td>
<td>0.38</td>
</tr>
<tr>
<td>Sex$^a$</td>
<td>0.60 (0.24)$^*$</td>
<td>2.47</td>
</tr>
<tr>
<td>Type$^b$</td>
<td>-1.35 (0.14)$^{***}$</td>
<td>-9.71</td>
</tr>
<tr>
<td>Contrast1</td>
<td>-0.67 (0.28)$^*$</td>
<td>-2.46</td>
</tr>
<tr>
<td>Contrast2</td>
<td>-1.07 (0.40)$^{**}$</td>
<td>-2.68</td>
</tr>
<tr>
<td></td>
<td>-0.43 (0.39)</td>
<td>-1.12</td>
</tr>
<tr>
<td>Type $\times$ Contrast1</td>
<td>1.20 (0.28)$^{***}$</td>
<td>4.33</td>
</tr>
<tr>
<td>Type $\times$ Contrast2</td>
<td>3.62 (0.40)$^{***}$</td>
<td>9.09</td>
</tr>
<tr>
<td>Type $\times$ Contrast3</td>
<td>0.03 (0.39)</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*Notes.* $^a$ Male = 1, Female = 2; $^b$ Unique attributes = 1, Common attributes = 0; $^c$ CPUD = common praising unique devaluing; $^d$ CDUP = common devaluing unique praising; $^* p < .05$. $^{**} p < .01$. $^{***} p < .001$.

There was a significant interaction between the type of attributes (common vs. unique) and profile condition (common praising unique devaluing vs. common devaluing unique praising) when ingroup identity was salient, $B = 3.62$, $SE = 0.40$, $p < .001$, but not when personal identity was salient, $B = 0.03$, $SE = 0.39$, $p = .93$. Figure 3.3 plots the three-way interaction on frequency of outgroup stereotypic attributes mentioned.
Three-way interaction on the frequency of outgroup stereotypic attributes mentioned

Specifically, given a common-devaluing-unique-praising profile, participants in the ingroup-identity condition mentioned common attributes ($M = 3.80, SD = 2.14$) more frequently than unique attributes ($M = 1.24, SD = 1.45$). When these participants read a common-praising-unique-devaluing profile, however, they mentioned unique attributes ($M = 3.74, SD = 2.60$) more frequently than common attributes ($M = 2.68, SD = 2.14$). In other words, the frequency of mentioning outgroup stereotypic attributes by the participants in the ingroup-identity condition appeared to be determined by the valence of the attributes, regardless of whether the attributes were commonly known to the entire ingroup or uniquely known to one person only. The findings support Hypothesis 1a.
In contrast, participants in the personal-identity condition mentioned common attributes ($M = 4.06, SD = 3.02$) more frequently than unique attributes ($M = 2.09, SD = 2.07$) when they read a common-devaluing-unique-praising profile. The pattern was the same when the participants read a common-praising-unique-devaluing profile: They still mentioned common attributes ($M = 3.64, SD = 2.65$) more frequently than unique attributes ($M = 1.70, SD = 1.34$). The frequency of mentioning outgroup stereotypic attributes by the participants with the personal-identity condition seems to have been determined by whether the stereotypic attribute was commonly known to the entire group, regardless of the valence of the attribute. These findings support Hypothesis 1b.

With regard to linguistic abstraction in H2, there was a significant interaction between the type of attributes (common vs. unique) and profile condition (common praising unique devaluing vs. common devaluing unique praising) in the ingroup-identity condition, $B = 0.41, SE = 0.07, p < .001$, but not the personal-identity condition, $B = 0.01, SE = 0.07, p = .85$. Figure 3.4 plots the three-way interaction on linguistic abstraction.
Specifically, participants in the ingroup-identity condition used more abstract language to discuss common attributes \((M = 2.23, SD = 0.34)\) than unique attributes \((M = 2.12, SD = 0.04)\), when given a common-devaluing-unique-praising profile. When these participants read a common-praising-unique-devaluing profile, however, they used more abstract language to discuss unique attributes \((M = 2.30, SD = 0.17)\) than common attributes \((M = 1.99, SD = 0.48)\). In other words, for participants in the ingroup-identity condition, the level of linguistic abstraction during the group discussion of outgroup stereotypic attributes seemed to be affected by the valence of the belief, independent from whether the attribute was commonly or uniquely distributed within the ingroup, supporting H2a.
In contrast, participants in the personal-identity condition used more abstract language to discuss common attributes \((M = 2.25, SD = 0.33)\) versus unique attributes \((M = 2.10, SD = 0.04)\), regardless of the profile they read. That is, for participants in the personal-identity condition, their level of linguistic abstraction during group discussion of outgroup stereotypic attribute was determined by whether or not the attribute is commonly known to the entire group, regardless of the valence of the stereotypic attribute. The results were consistent with H2b⁴.

**Post-hoc tests of H1 and H2.** Hypotheses one and two described similar interaction patterns of the same set of predicting variables (i.e., type of attributes, identity condition, and profile condition) for different outcome variables: frequency and linguistic abstraction, respectively. The test involved two separate multilevel models with different dependent variables, which provided evidence consistent with the hypotheses. By fitting separate models, I assumed that the two outcomes (i.e., frequency and linguistic abstraction) were independent. However, this assumption may have been questionable. For example, frequency of mentioning unique attributes was associated with linguistic abstraction for the unique attributes, \(r = .19, p < .01, 95\% \text{ CI}_{\text{bootstrap}} [.05, .34]\); frequency of mentioning common attributes was also associated with linguistic abstraction of describing unique attributes, \(r = -.17, p < .01, 95\% \text{ CI}_{\text{bootstrap}} [-.28, -.05]\). Given the correlated outcomes, it is possible that the similar interaction patterns were not attributable to the theorized mechanisms, but due to method and error variance alone.

To assess the alternative explanation, I used a multivariate multilevel model (Hox, 2010). Multivariate MLM allows for modeling the relationships between two or more outcome variables through the correlations among their random effects and among their residuals (Hox, 2010).

---

⁴ Personality traits (i.e., fear of invalidity and implicit theories) were also included as level-2 covariates in the models for H1 and H2. The personality traits was associated with neither frequency of mentioning stereotypic attributes, nor with linguistic abstraction. Hence, the personality trait variables were not included in the final models.
Following the procedures of Baldwin, Imel, Braithwaite, and Atkins (2014), I estimated a multivariate MLM with the type of attributes (0 = common attributes, 1 = unique attributes), identity condition (0 = personal, 1 = ingroup), profile condition (0 = common devaluing unique praising, 1 = common praising unique devaluing), and the interactions among them as predicting variables, with frequency and linguistic abstraction as dependent variables. Age and sex were entered as covariates. The parameter estimates did not change from univariate MLMs to the multivariate MLM (see Table 3.7), which suggested that the similar interaction patterns for frequency of stereotypic attributes mentioned and linguistic abstraction were unlikely attributable to the correlation between the outcome variables. The results using multivariate MLM replicated the support for Hypothesis 1 and 2.

Table 3.7. Univariate and multivariate multilevel models for discussion outcomes

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Univariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Abstraction</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.41 (2.19)</td>
<td>—— 2.41 (2.19)</td>
</tr>
<tr>
<td>Age</td>
<td>0.04 (0.11)</td>
<td>—— 0.04 (0.09)</td>
</tr>
<tr>
<td>Sex(^a)</td>
<td>0.60 (0.24)*</td>
<td>—— 0.60 (0.20)**</td>
</tr>
<tr>
<td>Type(^b)</td>
<td>-1.97 (0.27)**</td>
<td>—— -1.97 (0.38)**</td>
</tr>
<tr>
<td>Identity(^c)</td>
<td>-0.37 (0.40)</td>
<td>—— -0.37 (0.40)</td>
</tr>
<tr>
<td>Profile(^d)</td>
<td>-0.43 (0.39)</td>
<td>—— -0.43 (0.39)</td>
</tr>
<tr>
<td>Type × Identity</td>
<td>-0.59 (0.40)</td>
<td>—— -0.59 (0.56)</td>
</tr>
<tr>
<td>Type × Profile</td>
<td>0.03 (0.39)</td>
<td>—— 0.03 (0.55)</td>
</tr>
<tr>
<td>Identity × Profile</td>
<td>-0.63 (0.56)</td>
<td>—— -0.63 (0.56)</td>
</tr>
<tr>
<td>Type × Identity × Profile</td>
<td>3.59 (0.56)**</td>
<td>—— 3.59 (0.79)**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LA</th>
<th>Univariate</th>
<th>Multivariate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Abstraction</td>
</tr>
<tr>
<td>Intercept</td>
<td>—— 1.92 (0.22)**</td>
<td>1.92 (0.22)**</td>
</tr>
<tr>
<td>Age</td>
<td>—— 0.02 (0.01)</td>
<td>0.02 (0.01)</td>
</tr>
<tr>
<td>Sex(^a)</td>
<td>—— 0.01 (0.02)</td>
<td>0.01 (0.02)</td>
</tr>
<tr>
<td>Type(^b)</td>
<td>—— -0.18 (0.05)**</td>
<td>-0.18 (0.05)**</td>
</tr>
<tr>
<td>Identity(^c)</td>
<td>—— -0.03 (0.05)</td>
<td>-0.03 (0.05)</td>
</tr>
<tr>
<td>Profile(^d)</td>
<td>—— 0.01 (0.05)</td>
<td>0.01 (0.05)</td>
</tr>
<tr>
<td>Type × Identity</td>
<td>—— 0.08 (0.07)</td>
<td>0.08 (0.07)</td>
</tr>
<tr>
<td>Type × Profile</td>
<td>—— 0.01 (0.07)</td>
<td>0.01 (0.07)</td>
</tr>
<tr>
<td>Identity × Profile</td>
<td>—— -0.25 (0.07)**</td>
<td>-0.25 (0.07)**</td>
</tr>
<tr>
<td>Type × Identity × Profile</td>
<td>—— 0.40 (0.10)**</td>
<td>0.40 (0.10)**</td>
</tr>
</tbody>
</table>

Residuals

| Frequency | —— | —— 4.92 (0.31)**|
| LA        | —— | —— 0.07 (0.01)**|
Achieving collective endorsement: H3 and H4. H3 and H4 described cross-level causal models linking an ingroup’s discussion of outgroup stereotypic attributes to its members’ endorsement of outgroup stereotype. Specifically, H3 stated that an ingroup’s frequency of mentioning stereotypic attributes about the outgroup (Level-2 antecedent) would be predictive of the ingroup members’ perceived validity of the attribute (Level-1 mediator), which would in turn predict their own endorsement of the attributes (Level-1 outcome). H4 described that an ingroup’s level of linguistic abstraction during the discussion of stereotypic attributes about the outgroup (Level-2 antecedent) would be predictive of the ingroup members’ perceived representativeness of the attribute (Level-1 mediator). This would, in turn, be predictive of their own endorsement of the attributes (Level-1 outcome). In multilevel settings, the testing of mediation depends on the level of measurement of the antecedent, the mediator, and the outcome variables (Bauer, Preacher, & Gill, 2006; Krull & MacKinnon, 2001). With regard to H3 and H4, a series of 2-1-1 mediation models were estimated for each of the two outgroup stereotypes: competence and arrogance.

The procedures for testing multilevel mediation have been developed with multilevel modeling (MLM; Krull & MacKinnon, 2001) and multilevel structural equation modeling (MSEM; Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010). Although scholars have argued that MSEM is preferred to investigate the multilevel mediation (see Preacher et al., 2010 for discussion), MSEM relies on large sample procedures (Hox, Maas, &
Brinkhuis, 2010). Simulation studies suggested that MSEM may produce unreliable estimates with upper-level sample size lower than 100 (McNeish, 2017), and tend to lead to increased non-convergence rate (Hox & Maas, 2001). Given that this study had a small number of groups ($N_g = 66$), H3 and H4 were tested using MLM in Mplus 8.0 (L. Muthén & B. Muthén, 2017).

Following Zhang et al.’s (2009) procedure, I partitioned the mediators (i.e., perceived validity and perceived representativeness) into member- and group-level components by group-mean centering and aggregating the variables, respectively. This procedure reduces the risk of confounding member- and group-level mediation effects. The model included ingroup members’ endorsement of outgroup stereotypes (i.e., competence or arrogance) as the dependent variable, using the ingroup’s frequency of outgroup stereotypic attributes (or linguistic abstraction) as a level-2 antecedent, and perceived validity (or perceived representativeness) of the outgroup stereotypic attributes as a level-1 mediator. Age, sex, and stereotype endorsement prior to the group discussion were entered as covariates. The slopes of perceived validity (or perceived representativeness) on personal endorsement of outgroup stereotypes were allowed to vary across ingroup members. The MLM equations for testing 2-1-1 mediation appear in Table 3.8.

**Table 3.8.** MLM equations for testing 2-1-1 mediation models

<table>
<thead>
<tr>
<th>Levels</th>
<th>Regression Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: Individual</td>
<td>$Y_{ij} = \beta_0 + \beta_1 (M_{ij} - M_j) + e_{ij}$</td>
</tr>
<tr>
<td>Level 2: Group</td>
<td>$\beta_{0j} = \gamma_{00} + \gamma_{01}X_j + \gamma_{02}M_{j} + \mu_{0j}$</td>
</tr>
<tr>
<td></td>
<td>$\beta_{1j} = \gamma_{10} + \mu_{1j}$</td>
</tr>
</tbody>
</table>

*Notes: Y represents the outcome variables of interest (i.e., the frequency of stereotypic attributes mentioned or linguistic abstraction). e and u represent the error terms at the individual and group levels, respectively. $\beta$ and $\gamma$ represent regression coefficients at the individual and group levels, respectively. $X_j$ represents predicting variables at group level (i.e., the frequency of stereotypic attributes mentioned or linguistic abstraction). $M_{j}$ represents group means of the mediating variables (i.e., perceived validity or representativeness of outgroup stereotypic attributes).*
Indirect effects were further estimated with the Monte Carlo (MC) simulation using 10,000 trials. The MC method is preferred over the Sobel-type test because it does not require a priori assumption of the distributional properties regarding the indirect effects (MacKinnon, Lockwood, & Williams, 2004; Preacher & Selig, 2012). The MC simulation was conducted with RMediation package in R (Tofighi & MacKinnon, 2011). In short, a variable appeared to mediate the antecedent and the outcome if the antecedent (e.g., frequency of discussion) caused the change in the mediator (e.g., perceived validity), which, in turn, caused change in the outcome (e.g., stereotype endorsement). Furthermore, the effect of the antecedent on the outcome through the mediator should be significant, as showed by a MC confidence interval that excluded zero. The key results of the mediation models were illustrated in figures 3.5 to 3.11. For complete results including covariates and their confidence intervals, see Tables 3.10 to 3.13 at the end of this chapter.

Perceived validity mediated the relationship between frequency and endorsement of the competence stereotype about the outgroup. Stereotypic attributes about the outgroup’s competence mentioned more frequently were also perceived to be more valid, $B = 0.16, SE = 0.03, p < .001$. Ingroup members’ perceived validity of stereotypic attributes about the outgroup’s competence was positively associated with their own endorsement of the competence stereotype about the outgroup, $B = 0.32, SE = 0.11, p < .001$ (see Figure 3.5).
The indirect effect of the ingroup’s frequency of mentioning stereotypic attributes relating to the outgroup’s competence on the ingroup members’ endorsement of the competence stereotypes was positive and significant (see Figure 3.6), $B = 0.15$, $SE = 0.03$, $p < .001$, $95\%$ CI $[0.09, 0.22]$\(^5\). Furthermore, frequency did not appear to have a direct effect on endorsement of the competence stereotype, $B = 0.01$, $SE = 0.02$, $p = .64$, $95\%$ CI [-0.03, 0.05]\(^6\). The confidence intervals for the direct effect and the indirect effect did not overlap, which suggested

\(^5\) The MC distribution for indirect effect of perceived validity of competent attributes was simulated with the following variance-covariance matrix (i.e., asymptotic covariance matrices for the fixed effects; Preacher & Selig, 2012):

\[
\begin{pmatrix}
V(b_w) & Cov(b_w, b_b) & Cov(a, b_w) \\
Cov(b_w, b_b) & V(b_b) & Cov(a, b_b) \\
Cov(a, b_w) & Cov(a, b_b) & V(a)
\end{pmatrix}
= \begin{pmatrix}
0.01172 & 0.00170 & -0.00007 \\
0.00170 & 0.00584 & -0.00015 \\
-0.00007 & -0.00015 & 0.00064
\end{pmatrix}
\]

where $a$ is the regression coefficient of the mediator on the antecedent ($a = 0.16$), $b_w$ is the regression coefficient of the outcome on the mediator at the member level ($b_w = 0.32$), and $b_b$ is the regression coefficient of the outcome on the mediator at the group level ($b_b = 0.62$).

\(^6\) Confidence intervals for fixed, random, and direct effects were tested with a Sobel-type test in Mplus 7.0 by deriving standard errors and confidence intervals of indirect effects under the assumption that the product terms of the fixed effects are normally distributed (Bauer et al., 2006).
that perceived validity fully mediated the frequency-endorsement relationship for competence stereotype about the outgroup (Baron & Kenny, 1986).

**Figure 3.6.** Monte Carlo confidence intervals of the cross-level indirect effects of the frequency of stereotypic attributes about the outgroup’s competence mentioned on the members’ endorsement of outgroups’ competence stereotype.

Similarly, the stereotypic attributes concerning the outgroup’s arrogance that were mentioned more frequently were perceived to be more valid, \( B = 0.08, SE = 0.03, p < .01 \). The ingroup members’ perceived validity of arrogance attributes were positively associated with their endorsement of the arrogance stereotype, \( B = 0.35, SE = 0.09, p < .001 \) (see Figure 3.7).
The indirect effect of the ingroup’s frequency of mentioning stereotypic attributes about outgroup’s arrogance on their endorsement of arrogance stereotype was positive and significant (see Figure 3.8), $B = 0.05$, $SE = 0.02$, $p < .05$, 95% CI [0.01, 0.10]. Perceived validity was also a mediator between frequency and endorsement of the arrogance stereotype relating to the outgroup. The direct effect was not significant, $B = 0.02$, $SE = 0.02$, $p = .09$, 95% CI [-0.01, 0.05]. The confidence intervals for the direct effect and the indirect effect overlapped, which suggested that perceived validity partially mediated the frequency-endorsement relationship for arrogance stereotype about the outgroup (Baron & Kenny, 1986).

The MC distribution for indirect effect of perceived validity of arrogant attributes was simulated with the following variance-covariance matrix (i.e., asymptotic covariance matrices for the fixed effects; Preacher & Selig, 2012):

$$
\begin{pmatrix}
V(b_w) & \text{Cov}(b_w, b_b) & \text{Cov}(a, b_w) \\
\text{Cov}(b_w, b_b) & V(b_b) & \text{Cov}(a, b_b) \\
\text{Cov}(a, b_w) & \text{Cov}(a, b_b) & V(a)
\end{pmatrix} =
\begin{pmatrix}
0.00595 & 0.00100 & 0.00029 \\
0.00100 & 0.00891 & 0.00054 \\
0.00029 & 0.00054 & 0.00075
\end{pmatrix}
$$

where $a$ is the regression coefficient of the mediator on the antecedent ($a = 0.08$), $b_w$ is the regression coefficient of the outcome on the mediator at the member level ($b_w = 0.31$), and $b_b$ is the regression coefficient of the outcome on the mediator at the group level ($b_b = 0.35$).
Figure 3.8. Monte Carlo confidence intervals of the cross-level indirect effects of the frequency of mentioning stereotypic attributes about outgroup’s arrogance on the members’ endorsement of outgroup’s arrogance stereotype

Finally, the effect of perceived validity of the stereotypic attributes did not significantly differ across the groups for either the competence stereotypes, $B = 0.16$, $SE = 0.10$, $p = .11$, or the arrogance stereotypes, $B = 0.12$, $SE = 0.13$, $p = .13$, which suggested a lack of heterogeneity of indirect effects across groups (i.e., moderated mediation). These results were consistent with the theoretical assumption that the stereotype endorsement was a generic process independent of identity salience (personal vs. ingroup) and attribute distribution (common vs. unique). These results were consistent with H3: The more frequently that specific stereotypic attributes were mentioned, the more they were endorsed, because they were perceived as more valid.

Contrary to the prediction, as stereotypic attributes about outgroup’s competence were mentioned more abstractly, they were not perceived as more representative of the outgroup, $B = -1.29$, $SE = 0.68$, $p = .06$. As expected, perceived representativeness of the competence stereotype
was positively related to endorsement, \( B = 0.30, SE = 0.10, p < .01 \). The indirect effect of the ingroup’s linguistic abstraction on their members’ endorsement of competence stereotype was nonsignificant, \( B = -1.29, SE = 0.71, p = .07, 95\% CI [-2.68, 0.10] \), as was the direct effect, \( B = 0.09, SE = 0.48, p = .84, 95\% CI [-0.84, 1.03] \). Perceived representativeness of the stereotypic attributes about the outgroup did not mediate the linguistic abstraction-endorsement relationship for competence stereotype (see Figure 3.9).

Figure 3.9. Multilevel 2-1-1 mediation of personal endorsement of outgroup’s competence stereotype through perceived representativeness

As to arrogance stereotypes, the association between linguistic abstraction and perceived representativeness was positive but nonsignificant, \( B = 1.16, SE = 1.25, p = .36 \). The more the participants judged the stereotypic attributes about outgroup’s arrogance as representative of the outgroup, the more they endorsed the arrogance stereotype, \( B = 0.29, SE = 0.07, p < .001 \). The indirect effect of the ingroup’s linguistic abstraction on their members’ endorsement of arrogance stereotype was nonsignificant, \( B = 0.75, SE = 0.84, p = .38, 95\% CI [-0.91, 2.40] \), as
was the direct effect, $B = -0.61$, $SE = 0.61$, $p = .32$, $95\%$ CI $[-1.81, 0.60]$. Hence, perceived representativeness of the stereotypic attributes about the outgroup did not appear to mediate the linguistic abstraction-endorsement relationship for arrogance stereotype (see Figure 3.10).

**Figure 3.10. Multilevel 2-1-1 mediation of personal endorsement of outgroup’s arrogance stereotype through perceived representativeness**

Furthermore, the effect of perceived representativeness of the stereotypic attributes did not vary across the experimental groups for competence stereotype, $B = 0.11$, $SE = 0.09$, $p = .22$, and for arrogance stereotype, $B = 0.05$, $SE = 0.04$, $p = .21$. This indicates a lack of heterogeneity of indirect effects across groups (i.e., moderated mediation). Overall, the results were not consistent with H4: Perceived representativeness predicted endorsement, but it did not mediate the association between linguistic abstraction and endorsement.

**Post-hoc tests of H3 and H4.** H3 and H4 predicted cross-level mediations between the ingroup’s discussion (frequency and linguistic abstraction) of the stereotypic attributes on the ingroup members’ endorsement of outgroup stereotypes through their own judgment (i.e., perceived validity and representativeness) of the stereotypic attributes. I estimated a series of 2-
1-1 mediation models to test these hypotheses. To test the robustness of these findings, I further explored the mediating mechanisms at member level only. That is, does individual ingroup members’ judgment of the stereotypic attributes about the outgroup mediate the relationship between their discussion of the stereotypic attributes and their endorsement of the outgroup stereotypes, controlling for group-level variance? This question was probed by a series of 1-1-1 mediation models predicting ingroup members’ endorsement of outgroup stereotypes, with discussion (frequency or linguistic abstraction) and judgment of the stereotypic attributes (perceived validity or representativeness) as the predicting variables. Age, sex, and pre-discussion endorsement of the outgroup stereotypes were entered as covariates. Table 3.9 presents the MLM equations for testing 1-1-1 mediation, and Figure 3.11 shows a conceptual model of 1-1-1 mediation analysis with covariates.

**Table 3.9. MLM-based 1-1-1 mediation models**

<table>
<thead>
<tr>
<th>Levels</th>
<th>Regression Equations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1:</td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>( Y_{ij} = \beta_{0j} + \beta_{1j}(X_{ij} - X_{.j}) + \beta_{2j}(M_{ij} - M_{.j}) + e_{ij} )</td>
</tr>
<tr>
<td>Level 2:</td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>( \beta_{0j} = \gamma_{00} + \gamma_{01}X_{.j} + \gamma_{02}M_{.j} + \mu_{0j} )</td>
</tr>
<tr>
<td></td>
<td>( \beta_{1j} = \gamma_{10} )</td>
</tr>
<tr>
<td></td>
<td>( \beta_{2j} = \gamma_{20} )</td>
</tr>
</tbody>
</table>

*Notes: Y represents the outcome variables of interest (i.e., the amount of stereotypic attributes discussed or linguistic abstraction). e and u represent the error terms at the individual and group levels, respectively. \(\beta\) and \(\gamma\) represent regression coefficients at the individual and group levels, respectively. \(X_j\) represents predicting variables at group level (i.e., the amount of stereotype discussed or linguistic abstraction). \(M_{.j}\) represents group means of the mediating variables (i.e., perceived validity or representativeness).*
After controlling for group-level variance, demographic variables (sex and age), and pre-discussion endorsement, no significant indirect effect of frequency of competent attributes mentioned on endorsement of competence stereotype through perceived validity, \( B = -0.01, SE = 0.08, p = .92, 95\% CI: [-0.17, 0.15] \) emerged, nor did one for the direct effect, \( B = 0.01, SE = 0.12, p = .92, 95\% CI: [-0.22, 0.24] \). Likewise, there was no significant indirect effect of frequency of arrogant attributes mentioned on participants’ endorsement of arrogant stereotype through perceived validity, \( B = 0.03, SE = 0.06, p = .66, 95\% CI: [-0.09, 0.14] \), nor was the direct effect, \( B = 0.01, SE = 0.09, p = .91, 95\% CI: [-0.16, 0.18] \). Hence, the participants’ perceived validity of the stereotypic attributes about the outgroup did not appear to mediate their frequency of mentioning the attributes and their own endorsement of the outgroup stereotype.

Likewise, after controlling for group-level variance, demographic variables (sex and age), and pre-discussion endorsement, the indirect effects of linguistic abstraction on endorsement of outgroup stereotypes were not significant for competence stereotype, \( B = -0.03, SE = 0.15, p \)
= .85, 95% CI [-0.32, 0.26], and arrogance stereotype, \( B = 0.002, SE = 0.002, p = .37, 95\% \text{ CI} [-0.003, 0.007] \). In addition, the direct effects were nonsignificant for either competence stereotypes, \( B = -0.01, SE = 0.54, p = .80, 95\% \text{ CI} [-1.06, 1.04] \), or arrogance stereotypes, \( B = 0.34, SE = 0.58, p = .56, 95\% \text{ CI} [-0.79, 1.47] \). In short, participants’ perceived representativeness of the stereotypic attributes about the outgroup did not appear to mediate their linguistic abstraction of describing the attributes and their own endorsement of the outgroup stereotypes.

Altogether, perceived validity mediated the effects of an ingroup’s discussion on its members’ endorsement of outgroup stereotypes; It did not mediate the effects of members’ discussion on their own endorsement of outgroup stereotypes. Furthermore, perceived representativeness was not a mediator linking ingroup’s linguistic abstraction to the members’ endorsement, either did it link the member’s linguistic abstraction to their own endorsement of outgroup stereotypes.

**Post Hoc Exploration: Own- and Other-Unique Attributes**

Despite the fact that participants overall were subject to common information bias, the results pertaining to H1 highlighted one special case in which common information bias was eliminated: When common attributes praised the outgroup and unique attributes devalued the outgroup, participants with a salient ingroup identity mentioned the unique attributes more frequently than they did the common attributes. Because the unique attributes consist of the stereotypic attributes known by oneself only (i.e., own unique), and unique attributes known by another ingroup member only (i.e., other unique), it was unclear as to whether participants with an ingroup identity overcame the common information bias by focusing on their own or other unique attributes. As an illustration, consider in a four-member group in which each participant
received 10 pieces of information pertaining to common attributes, and 5 to unique attributes. For the group as a whole, they have 20 pieces of information pertaining to unique attributes, of which 5 are unique own and 15 are unique other. If a participant mentions 3 common attributes, he or she may overcome the common information bias by mentioning 5 own unique attributes, or by mentioning 5 other unique attributes, or a mixture of the both. Exploring which type of unique attributes (own vs. other) the participant uses can add insights into how ingroup members use unique knowledge about an outgroup to create a common corpus of the stereotypic attributes about the outgroup.

I conducted post-hoc analyses to explore the percentages of own and other unique attributes mentioned during the group discussion, and compared them with the percentage of common attributes. A two-level model with percentage of unique attributes mentioned as the dependent variable, and with the type of unique attributes (0 = other unique, 1 = own unique) as a level-1 repeated, fixed factor, and with age and sex as level-2 covariates. Participants discussed greater percentage of unique attributes known to themselves (own unique; $M = 31.36\%, SD = 26.02\%$) than that of unique attributes known to the others (other unique; $M = 2.60\%, SD = 5.86\%$), $B = 0.29, SE = 0.02, p < .01^8$.

To compare the percentage of own unique attributes with that of common attributes, a three-level model was estimated, using the type of attributes (1 = own unique, 0 = common) as a fixed, repeated level-1 factor, age and sex as level-2 covariates, and identity condition (1 = ingroup, 0 = personal), profile condition (1 = common praising unique devaluing, 0 = common

---

8 Because the percentage of other unique attributes deviated from normal distribution (skewness = 3.32, kurtosis = 12.66), the square roots transformed variable was used (Fink, 2009) in the multilevel model. The transformed variable had skewness of 1.84 and kurtosis of 2.38. Because type of unique attributes (1 = own, 0 = other) was included as a level-1 repeated, fixed factor, the percentage of own unique information (square roots) was also used, even if it did not deviate from normality (skewness = 0.72, kurtosis = -0.13). To facilitate interpretation, the descriptive statistics were based on non-transformed variables.
devaluing unique praising), and interactions as level-3 fixed factors. After controlling for demographic variables, there was a significant three-way interaction among type of attributes, identity condition, and profile condition, $B = 0.38$, $SE = 0.06$, $p < .001$ (see Figure 3.12).

![Interaction plot comparing percentage of common and own unique stereotypic attributes about outgroups](image)

**Figure 3.12.** Interaction plot comparing percentage of common and own unique stereotypic attributes about outgroups

Given a common-praising-unique-devaluing profile, the participants in the ingroup-identity condition discussed a greater percentage of common compared to own unique attributes given a common-devaluing-unique-praising profile ($M_{\text{diff}} = 12.71\%$, $SD_{\text{diff}} = 22.04\%$), but a greater percentage of own unique compared to common attributes ($M_{\text{diff}} = -24.24\%$, $SD_{\text{diff}} = 25.42\%$). In contrast, participants in the personal-identity condition discussed greater percentage...
of common over own unique attributes, regardless of whether common attributes devalued \((M_{\text{diff}} = 3.88\%, \ SD_{\text{diff}} = 20.59\%)\) or praised the outgroup \((M_{\text{diff}} = 4.79\%, \ SD_{\text{diff}} = 24.00\%)\).

The analyses were repeated to compare the percentage of common attributes with that of other unique attributes mentioned. Similarly, there was a significant three-way interaction among type of attributes \((1 = \text{other unique}, \ 0 = \text{common})\), identity condition, and profile condition, \(B = 0.18, \ SE = 0.06, \ p < .01\), after controlling for demographic variables. However, the specific pattern of interaction differed (see Figure 3.13). Participants discussed a greater percentage of common attributes than other unique attributes across ingroup and personal-identity conditions, even though this difference was larger when common attributes devalued \((M_{\text{diff}} = 32.15\%, \ SD_{\text{diff}} = 17.43\%)\), as opposed to praised \((M_{\text{diff}} = 19.04\%, \ SD_{\text{diff}} = 16.95\%)\), the outgroup.

![Interaction plot comparing percentage of common and other unique stereotypic attributes about outgroup](image)

**Figure 3.13.** Interaction plot comparing percentage of common and other unique stereotypic attributes about outgroup

Bar’s width represents 95% CI.
These results indicated a boundary condition for the findings on the discussion of stereotypic attributes about the outgroup. In the ingroup-identity condition, although ingroup members defended their ingroup by mentioning more stereotypic attributes that devalued the outgroup, they did so by focusing more on their own unique knowledge about the outgroup than on the other ingroup members’ unique knowledge.
<table>
<thead>
<tr>
<th></th>
<th>Perceived validity</th>
<th>Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td></td>
<td>B (SE)</td>
<td>LL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B (SE)</td>
</tr>
<tr>
<td><strong>Member-level effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Intercept</td>
<td>4.63 (0.27)**</td>
<td>4.11</td>
</tr>
<tr>
<td>Age</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sex&lt;sup&gt;b&lt;/sup&gt;</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pre-endorsement</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Perceived validity</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Group-level effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>0.16 (0.03)**</td>
<td>0.11</td>
</tr>
<tr>
<td>Perceived validity</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Random effects: Perceived validity</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Residual variance</td>
<td>1.75 (0.26)**</td>
<td>—</td>
</tr>
<tr>
<td>Direct effect</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Indirect effect</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Notes:** Standard errors were reported in parentheses.

<sup>a</sup> Confidence intervals for fixed, random, and direct effects were tested with a Sobel-type test in *Mplus* 7.0 by deriving standard errors and confidence intervals of indirect effects under the assumption that the product terms of the fixed effects are normally distributed (Bauer et al., 2006); confidence intervals for indirect effects were based Monte Carlo (MC) simulation (MacKinnon, Lockwood, & Williams, 2004; Preacher & Selig, 2012), which does not require *a priori* assumption of the distributional properties regarding the indirect effects.

<sup>b</sup> Male = 1, Female = 2;  
<sup>†</sup>p = .06.  
<sup>•</sup>p < .05.  
<sup>••</sup>p < .01.  
<sup>•••</sup>p < .001.
### Table 3.11. Multilevel mediation models of arrogance-stereotype endorsement through perceived validity ($N = 256$)

<table>
<thead>
<tr>
<th></th>
<th>Perceived validity</th>
<th>Endorsement</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$ ($SE$)</td>
<td>95% CI$^a$</td>
<td>$B$ ($SE$)</td>
<td>95% CI$^a$</td>
</tr>
<tr>
<td></td>
<td>LL</td>
<td>UP</td>
<td>LL</td>
<td>UP</td>
</tr>
<tr>
<td>Mean Intercept</td>
<td>6.66 (0.40)$^{***}$</td>
<td>5.88 - 7.43</td>
<td>0.78 (1.47)</td>
<td>-2.09 - 3.65</td>
</tr>
<tr>
<td>Age</td>
<td>—</td>
<td>—</td>
<td>0.02 (0.07)</td>
<td>-0.12 - 0.16</td>
</tr>
<tr>
<td>Sex$^b$</td>
<td>—</td>
<td>—</td>
<td>-0.33 (0.17)$^*$</td>
<td>-0.66 - 0.01</td>
</tr>
<tr>
<td>Pre-endorsement</td>
<td>—</td>
<td>—</td>
<td>0.57 (0.07)$^{***}$</td>
<td>0.44 - 0.70</td>
</tr>
<tr>
<td>Perceived validity</td>
<td>—</td>
<td>—</td>
<td>0.31 (0.08)$^{***}$</td>
<td>0.16 - 0.46</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.08 (0.03)$^{**}$</td>
<td>0.03 - 0.13</td>
<td>0.02 (0.02)</td>
<td>-0.01 - 0.05</td>
</tr>
<tr>
<td>Perceived validity</td>
<td>—</td>
<td>—</td>
<td>0.35 (0.09)$^{***}$</td>
<td>0.17 - 0.54</td>
</tr>
<tr>
<td>Random effects: Perceived validity</td>
<td>—</td>
<td>—</td>
<td>0.08 (0.06)</td>
<td>—</td>
</tr>
<tr>
<td>Residual variance</td>
<td>1.54 (0.23)$^{***}$</td>
<td>—</td>
<td>0.12 (0.13)</td>
<td>—</td>
</tr>
<tr>
<td>Direct effect</td>
<td>—</td>
<td>—</td>
<td>0.02 (0.02)</td>
<td>-0.01 - 0.05</td>
</tr>
<tr>
<td>Indirect effect</td>
<td>—</td>
<td>—</td>
<td>0.05 (0.02)$^*$</td>
<td>0.01$^{MC}$ - 0.10$^{MC}$</td>
</tr>
</tbody>
</table>

Notes: Standard errors were reported in parentheses.

$^a$Confidence intervals for fixed, random, and direct effects were tested with a Sobel-type test in *Mplus* 7.0 by deriving standard errors and confidence intervals of indirect effects under the assumption that the product terms of the fixed effects are normally distributed (Bauer et al., 2006); confidence intervals for indirect effects were based Monte Carlo (MC) simulation (MacKinnon, Lockwood, & Williams, 2004; Preacher & Selig, 2012).

$^b$ Male = 1, Female = 2;

$^*$ $p < .05$. $^{**}p < .01$. $^{***}p < .001$. 
Table 3.12. Multilevel mediation models of competence-stereotype endorsement through perceived representativeness (N = 256)

<table>
<thead>
<tr>
<th></th>
<th>Perceived validity</th>
<th>Endorsement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (SE)</td>
<td>95% CI⁴</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LL</td>
</tr>
<tr>
<td>Member-level effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Intercept</td>
<td>8.65 (1.55)***</td>
<td>5.62</td>
</tr>
<tr>
<td>Age</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Sex⁵</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Pre-endorsement</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Group-level effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linguistic abstraction</td>
<td>-1.29 (0.68)†</td>
<td>-2.62</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Random effects: Representativeness</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Residual variance</td>
<td>2.07 (0.25)***</td>
<td>——</td>
</tr>
<tr>
<td>Direct effect</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Indirect effect</td>
<td>——</td>
<td>——</td>
</tr>
</tbody>
</table>

Notes: Standard errors were reported in parentheses.

⁴Confidence intervals for fixed, random, indirect, and direct effects were tested with a Sobel-type test in Mplus 7.0 by deriving standard errors and confidence intervals of indirect effects under the assumption that the product terms of the fixed effects are normally distributed (Bauer et al., 2006).

⁵Male = 1, Female = 2;

†p = .06. *p < .05. ***p < .001.
<table>
<thead>
<tr>
<th></th>
<th>Perceived validity</th>
<th>95% CI&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Endorsement</th>
<th>95% CI&lt;sup&gt;a&lt;/sup&gt;</th>
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<tr>
<td></td>
<td></td>
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<td>UP</td>
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<tr>
<td><strong>Member-level effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Intercept</td>
<td>4.57 (2.79)</td>
<td>-0.91</td>
<td>10.05</td>
<td>1.32 (1.85)</td>
</tr>
<tr>
<td>Age</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.08 (0.08)</td>
</tr>
<tr>
<td>Sex&lt;sup&gt;b&lt;/sup&gt;</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>-0.26 (0.17)</td>
</tr>
<tr>
<td>Pre-endorsement</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.58 (0.06)&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.29 (0.07)&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Group-level effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linguistic abstraction</td>
<td>1.16 (1.25)</td>
<td>-1.30</td>
<td>3.62</td>
<td>-0.61 (0.61)</td>
</tr>
<tr>
<td>Perceived representativeness</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.36 (0.07)&lt;sup&gt;***&lt;/sup&gt;</td>
</tr>
<tr>
<td>Random effects: Representativeness</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.05 (0.04)</td>
</tr>
<tr>
<td>Residual variance</td>
<td>2.60 (0.37)&lt;sup&gt;***&lt;/sup&gt;</td>
<td>—</td>
<td>—</td>
<td>0.06 (0.13)</td>
</tr>
<tr>
<td>Direct effect</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>-0.61 (0.61)</td>
</tr>
<tr>
<td>Indirect effect</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.75 (0.84)</td>
</tr>
</tbody>
</table>

Notes: Standard errors were reported in parentheses.
<sup>a</sup>Confidence intervals for fixed, random, direct, and indirect effects were tested with a Sobel-type test in *Mplus* 7.0 by deriving standard errors and confidence intervals of indirect effects under the assumption that the product terms of the fixed effects are normally distributed (Bauer et al., 2006)<sup>b</sup> Male = 1, Female = 2;
<sup>†</sup>p = .06.  <sup>*</sup>p < .05.  <sup>***</sup>p < .001.
CHAPTER FOUR: DISCUSSION

This dissertation was motivated by my desire to illuminate the role of intragroup communication in shaping devaluing, consensual stereotypes about an outgroup. Such consensual stereotypes often have detrimental intergroup consequences (Klein et al., 2008; Lyons et al., 2008), including humanitarian tragedies such as Rwanda genocide (Klein et al., 2008), and the recent refugee crisis in Europe (Esses, Hamilton, & Gaucher, 2017). In my research for this dissertation, I considered why and how stereotypes against an outgroup become consensual through ingroup communication.

To advance our understanding of these matters, I developed a novel model of consensual stereotype formation, framed by the input-process-output framework (Gouran, 1973). The novel model focused on two phases: 1) building a common core of stereotypic attributes (i.e., why are some stereotypic attributes spoken, but not others?), and 2) achieving collective endorsement of the common core (i.e., how does the conversation shape endorsement?). To create a common core, ingroup members scan what they and others know about the attributes of the outgroup and select a subset of those attributes in the repertoire. Put differently, the common core represents the communal knowledge about what outgroup members are characterized in terms of selected attributes. Because the subset often alludes to partial image of the outgroup, stereotypes consist of a fixed, simplified conception about an outgroup and its members. Creating common core underlies an integration of positive ingroup bias and communication information bias, with a consideration of linguistic abstraction. However, not all selected attributes in the communal repertoire are equally evaluated. To achieve collective endorsement, ingroup members determine some attributes to be more valid and representative of the outgroup, and accordingly assign greater endorsement to these attributes. Hence, collective endorsement reflects the communal
(dis)belief in the selected attributes about the outgroup. Achieving collective endorsement, then, includes heuristic-based mechanisms by which exposure to specific stereotypic attributes, expressed more or less abstractly, influence ingroup members’ endorsement of outgroup stereotypes. Findings from the lab-based group experiment supported the common core predictions, and provided partial support for the collective endorsement phase. In the remainder of this chapter, I discuss these findings in detail, theoretical implications, future directions for research, and limitations of the experiment.

**Theoretical Model: Empirical Findings and Inferences**

The two-phase model rested on three assumptions. First, consensual stereotypes are socially constructed: They are acquired, developed, maintained, and transformed through interaction. Second, distinct theoretical mechanisms underlie the processes of building a common core and achieving collective endorsement. Third, the two phases are interlocking in nature, such that the output factors of the common core processes become the input factors of collective endorsement processes.

**Common core phase.** In the common core phase, I assumed that social comparisons underlie how people make sense of their personal knowledge concerning stereotypic attributes about an outgroup (Festinger, 1954a; Hogg, 2000). Following social identity theory (Tajfel, & Turner, 1986), I proposed that identity salience determines whether people compare themselves with the other ingroup members (intragroup social comparison) or compare their ingroup as a whole with other outgroups (intergroup social comparison). The two types of social comparisons differentially affect what stereotypic attributes ingroup members share during group discussion and the degree of linguistic abstraction as they verbalize the attributes. I predicted that people with a personal identity would mention common (vs. unique) stereotypic attributes more
frequently and abstractly; intragroup social comparison and common information bias prevail. In contrast, people with an ingroup identity should mention outgroup-devaluing (vs. outgroup-praising) stereotypic attributes more frequently and abstractly; intergroup social comparison and positive information bias prevail.

The results of the study supported these predictions. Participants in the personal-identity condition mentioned common (vs. unique) stereotypic attributes more frequently, in a greater percentage, and with more abstract language, regardless of whether the attributes praised or devalued the outgroup. In contrast, participants in the ingroup-identity condition mentioned outgroup-devaluing (vs. outgroup-praising) stereotypic attributes more frequently, in a greater percentage, and with more abstract language, regardless of whether the attributes were commonly or uniquely known prior to group discussion. Post-hoc analyses revealed insights into the ingroup-identity results: although members defended their ingroup by mentioning more stereotypic attributes that devalued the outgroup, they did so by focusing more on their own unique knowledge about the outgroup rather than other ingroup members’ unique knowledge.

As predicted, the results for the personal-identity condition replicated empirical research on common information bias, although the magnitude of the effect sizes (e.g., when the common attributes devalued \(d = 0.71\) or praised \(d = 0.89\) the outgroup) were much smaller than the other studies employing a hidden-profile design \(d = 2.03, k = 33; \) Lu et al., 2012). The small effect sizes reported in the current study may be attributable to discussion time and task requirements. Most groups spent a relatively short period discussing stereotypic attributes about the outgroup \(M = 10\) minutes. Other studies have found that in short discussions group members tend to search for relevant information that is not repetitive of what others has mentioned (Karau & Kelly, 1992), and exchange information at a faster rate (Kelly & Karau,
These factors may have attenuated the effects of the common information bias in this study. Furthermore, participants were asked to consider only two stereotypes: competence and arrogance. Kelly and Karau (1999) have argued that providing two (versus more) stereotypes “might facilitate direct comparisons in a way that would heighten attention to unshared information” (Kelly & Karau, 1999, p. 1351). Indeed, meta-analytical evidence have shown an average effect size of .54 among the groups who had less than 30 minutes discussion time and made decisions between two alternatives (T. Reimer et al., 2010). In comparison to the meta-analytic findings, the effect size of common information bias in this study was actually larger than that reported in other studies with similar discussion time and task requirement.

In the ingroup-identity condition, this dissertation provided the first demonstration of positive ingroup bias related to sharing of stereotypic attributes about an outgroup in a lab-based experiment. The ingroup members’ bias toward discussing outgroup-devaluing attributes was comparable with that in non-interactive settings (Mullen et al., 1992). Of note, the magnitude of biases revealed in my dissertation findings almost tripled when devaluing attributes were commonly known to the entire ingroup ($d = 1.33$) as compared to when they were uniquely known to one member only ($d = 0.44$). This suggests that the positive ingroup bias may be quite strong when the valence of commonly known stereotypic attributes coincides with the identity needs of the salient reference groups.

The current findings on discussion bias were interpretively consistent with the broader scholarship on groupthink. People engage in groupthink “when they are deeply involved in a cohesive in-group, when the members’ strivings for unanimity override their motivation to realistically appraise alternative course of action” (Janis, 1972, p. 9). Group members focus on certain stereotypic attributes at the cost of others either because they aim to construct a
prototypically cohesive ingroup or because they strive for social confirmation via unanimous knowledge about the outgroup. Typically, groupthink, in conjunction with communicative influences (Gouran, 1986), was considered as a defective decision-making process that led to erroneous outcomes such as the Challenger disaster (Hirokawa, Gouran, & Martz, 1988) and the Watergate cover-up (Gouran, 1976). Biased discussion may lead to reducing the outgroup to a simplified and fixed set of stereotypic attributes, which are endorsed by ingroup members. The processes by which the shared set of attributes receive ingroup endorsement is discussed next.

**Collective endorsement phase.** The collective endorsement phase focused on the attitudinal consequences related to the selective sharing and linguistic abstraction of stereotypic attributes. I proposed that collective endorsement of stereotypic attributes discussed in group-settings occurs through heuristic processing. Based on the familiarity heuristic (Boehm, 1994), as stereotypic attributes are mentioned more frequently, they are perceived to be more valid. Also, based on the representativeness heuristic (Kahneman & Tversky, 1972), as specific stereotypic attributes are mentioned more abstractly, they are perceived to be more representative of the outgroup. Perceived validity and representativeness were hypothesized to predict ingroup members’ endorsement of outgroup stereotypes.

The findings provided support for the familiarity heuristic, but not the representativeness heuristic. The more frequently an ingroup mentioned stereotypic attributes about the outgroup, the more strongly the ingroup members judged the attributes as valid. Stronger perceived validity of the outgroup stereotypic attributes, in turn, was predictive of greater ingroup members’ endorsement of the outgroup stereotypes. As expected, perceived validity mediated the discussion-endorsement relationship for both outgroup-praising (competence) and outgroup-devaluing (arrogance) stereotypes, which suggested that the proposed mechanism was
generalizable across outgroup stereotypes having different valence. In contrast, and counter to the prediction, the results showed no association between linguistic abstraction and perceived representativeness of the attributes for outgroup-praising (competence) and outgroup-devaluing (arrogance) stereotypes. Perceived representativeness of the stereotypic attributes was positively associated with ingroup members’ endorsement, but it did not mediate the relationship between ingroups’ linguistic abstraction and the members’ endorsement of outgroup stereotypes.

The lack of a relationship between linguistic abstraction and perceived representativeness for outgroup stereotypes deserves further attention. Kahneman and Tversky (1972) argued that people judge a sample to be representative if 1) the sample “is similar in essential attributes to its parent population” (p. 430), and 2) it reflects “the properties of the uncertain process by which it is generated, that is it should appear random” (p. 430). Although linguistic abstraction may suggest that attributes may be generalizable across groups and stable over time (Wigboldus et al., 2000, 2006; Yzerbyt & Rogier, 2001), it may not suggest anything about the randomness of these attributes. Indeed, randomness may be inhibited by the hidden profile design, where the same valanced stereotypical attributes about an outgroup are commonly known to the whole ingroup. Common knowledge may suggest that the attributes are essential, but not random, thereby producing no association between linguistic abstraction and perceived representativeness.

Theoretical Implications and Future Directions

The proposed theoretical mechanisms and empirical findings speak to several related lines of research. In the next paragraphs, I discuss theoretical implications for research involving 1) self-conception, 2) linguistic abstraction, 3) social influence in groups, and 4) norm formation.

Self-conception. The results have implications for how people merge personal and social identities: Is it group in the self or self in the group? According to social identity theory (Tajfel,
1981), people connect the self to the group through “a cognitive redefinition of the self—from unique attributes and individual differences to shared social category memberships and associated stereotypes” (Turner, 1984, p. 528). This mechanism, commonly referred to as depersonalization, suggests that people reconfigure their self-concepts to conform to the prototypical attributes of their reference group, thereby embodying *the group in the self*. A critical implication of this mechanism is that group members thoroughly explore the perspectives, values, and resources of the reference group so that they can better anchor the self toward the group prototypes (Abrams, Hogg, Hinkle, & Otten, 2005). Specific to the discussion of outgroup stereotypic attributes, members with a salient ingroup identity should not only mention more outgroup-devaluing attributes, but also search for the outgroup-devaluing attributes uniquely known to the other ingroup members and mention it during the discussion. They are expected to make full use of the stereotypic attributes that favor their ingroup, regardless of whether they uniquely know the attributes or hear about the attributes from other ingroup members.

An opposite mechanism is *self in the group*. Instead of configuring the self into the reference group, people may use self-knowledge as a basis from which to infer a group’s prototypical traits. In line with this reasoning, people should focus primarily on their personal knowledge in inferring what the other ingroup members think of the outgroup and form stereotypes about the outgroup accordingly. The post-hoc results were consistent with the self-in-the-group explanation. Although participants in the ingroup condition mentioned more outgroup-devaluing than outgroup-praising attributes, they did so by mentioning and repeating what they knew but rarely referenced what the other ingroup members had to say. This finding was also consistent with the self-anchoring effect (Cadinu & Rothbart, 1996): people “use the individual
self as a judgmental anchor to which they assimilate the cognitive representation” of their ingroup (Otten & Epstude, 2006, p. 959). Traditionally, scholar have argued that self-anchoring effects occur because people lack opportunities to acquire information about ingroup prototypes such as in minimal-group settings (Cadinu & Rothbart, 1996). The results in this study, however, suggested that ingroup members were still prone to use self-knowledge to determine outgroup stereotypes, even when they heard others’ opinions via face-to-face interaction. Future research should aim at identifying factors that determine whether people merge the self with the group or vice versa.

Linguistic abstraction. In addition to explicit biases toward sharing certain stereotypic attributes, I investigated subtle linguistic biases, which refer to “a systematic asymmetry in word choice as a function of social category to which target belongs” (Beukeboom, 2014, p. 314). Evidence linking subtle linguistic variations to consensual stereotype formation was important because overt expression of stereotypes and especially stigma would be met with social disapproval and moral sanctions. In particular, my study focused on language use along a concrete-abstract dimension, commonly referred to as linguistic abstraction (Semin & Fiedler, 1998).

The current study extended the literature concerning linguistic abstraction by providing evidence on why the interplay between linguistic abstraction and the valence of stereotypic attributes occurs. Previous studies advanced two competing explanations for linguistic abstraction. The first explanation, referred to as linguistic intergroup bias (Maass et al., 1989), grew from social identity theory. It posited that abstract language served to defend ingroup identity because it implied that the behavior of interest was an inherent and stable attribute of the group. Hence, using abstract language for outgroup-devaluing attributes suggests that the
outgroup is inherently inferior to the ingroup, thereby enhancing the positive distinctiveness of
the ingroup. The second explanation, referred to as linguistic expectancy bias (Wigboldus et al.,
2000), reflected the idea that expectancies guide language production. It posited that abstract
language is used to describe expectancy-consistent attributes, and concrete language is used for
expectancy-inconsistent attributes, regardless of their valence.

Previous studies (e.g., Maass et al., 1995, 1996) have attempted to pit the two
explanations against each other, but used problematic research designs. For example, Maass et
al. (1995) found evidence in support of linguistic expectancy biases, but was criticized for not
inducing strong ingroup motivations to produce linguistic intergroup bias (Wenneker &
Wigboldus, 2007). A later study (Maass et al., 1996) managed to induce strong ingroup
motivation with a “highly competitive, hostile, or ingroup-threatening” encounter (p. 513), and
discovered support for linguistic intergroup bias; yet, the study fell short of generating different
expectancies to test the other explanation.

The present study appeared to be the first to vary both ingroup motivation, through
identity salience induction, and pre-discussion expectancy about the outgroups’ attributes,
through hidden-profile tasks, which allowed me to test the two competing explanations from
linguistic intergroup bias (Maass et al., 1989) and linguistic expectancy biases (Wigboldus et al.,
2000) simultaneously. The results demonstrated that linguistic intergroup bias predominated
language production among people in the ingroup-identity condition, while linguistic expectancy
bias was dominant among people in the personal-identity condition. As people shift from
personal to ingroup identity, they change the abstractness of their language from maintaining
their own impression-consistency to defending their ingroups’ positive distinctiveness.

In addition, this study demonstrated that variation in linguistic abstraction occurs in
natural, interactive settings. Earlier studies of linguistic abstraction (e.g., Maass et al., 1989) used a multiple-choice paradigm, in which participants were shown cartoons depicting stereotypic attributes about an outgroup. Subsequently, participants were asked to choose from multiple descriptions that varied in the level of linguistic abstraction. Essentially, the multiple-choice paradigm does not include communication. Later studies (e.g., Wigboldus et al., 2000) overcame this limitation by adopting a free-verbalization paradigm. For example, Wigboldus and colleagues (2000) had participants to read a story about an outgroup containing stereotypic attributes, and then to tell the story to their friends. Linguistic abstraction was coded on the basis of the participants’ re-telling of the story. Despite the inclusion of message production, the source and audience still did not interact. The current results replicated the findings of the previous studies that used non-interactive paradigms, suggesting that variations in linguistic abstraction extend to interpersonal interactions in zero-history groups.

**Social influence in groups.** I proposed a two-phase system in which social comparisons determined what and how stereotypic attributes were mentioned, and heuristic principles determined how the discussion shaped endorsement. The argument for a two-phase system converged with several existing models on social influence in small groups (e.g., Boster & Mayer, 1984; Smith & Boster, 2009). For example, the phase model (Boster & Mayer, 1984) posits that social comparison processes dominate when group members exchange their preferences during the discussion, and then persuasion (argumentation in particular) dominates when group members make decisions. Smith and Boster’s (2009) two-step model describes how public opinion shapes message perceptions, and then persuasion predicts attitude change.

One assumption of the two-phase perspective is that the process driving the initial phase would be independent from that driving the second phase. In this dissertation, it suggests that the
endorsement should be a generic process, independent from the predictors of building a common core. That is, such variables as identity salience and attribute commonality found to predict common core presumably do not moderate the relationship between discussion and endorsement. Indeed, the results showed no heterogeneity in the indirect effects of frequency of outgroup stereotypic attributes mentioned on ingroup members’ endorsement of outgroup stereotypes through perceived validity.

Another assumption in my two-phase model is that stereotype endorsement is heuristically driven. The logic is that volume, diversity, and complexity of social stimuli make the social categorization—cognitive underpinnings of stereotypes (Tajfel, 1957)—“computationally intractable” (Seymour & Dolan, 2008, p. 667). The taxing nature of social categorization was even more pronounced in interactional settings due to the existence of multiple competing goals among interlocutors (Hertwig & Hoffrage, 2013). Hence, ingroup members rely on economical, effortless, and heuristic processing to shape their endorsement of the outgroup stereotypes. In prior literature, heuristic processing can be inferred by the correlation between message-relevant thoughts and attitude change, with a non-significant correlation suggesting heuristic processing (Todorov, Chaiken, & Henderson, 2002). Indeed, the results showed no significant direct effect of frequency of stereotypic attributes mentioned on the members’ endorsement of outgroup stereotypes.

Of note, the absence of direct effect of frequency of discussion on endorsement was, at best, indirect evidence for heuristic processing because the frequency of mentioning stereotypic attributes was not equivalent to message-relevant thoughts. Ingroup members may generate many stereotype-relevant thoughts without mentioning many stereotypic attributes about the outgroup. Given that I did not code the message-relevant thoughts, the data were not available to
make definitive inferences.

More convincing evidence on the role of heuristic processing in stereotype formation comes from Rothbart and colleagues (1978). In multiple experiments, participants were presented with the attributes of individuals, and were asked to make judgments about the attributes of a group consisting of the individuals. The experiments varied the number of attributes each participant received, with more attributes indicating higher memory load. The results revealed that participants were better at distinguishing individual attributes from group attributes when the memory load was low than when it was high. It is possible that the high memory load compromises participants’ ability or motivation to evaluate systematically stereotypic attributes and leads them to use heuristics to generalize individuals’ attributes to the group as a whole.

Assuming that heuristic judgments guide endorsement, I posited that familiarity heuristic was particularly relevant in the context of consensual stereotype formation. The more frequently stereotypic attributes were mentioned during the discussion, the more familiar the ingroup members felt about the attributes; therefore they judged the familiar stereotypic attributes as valid. A competing explanation for this reasoning was self-fulfilling prophesy (Snyder, Tanke & Berscheid, 1977; also see saying-is-believing effect, Higgins & Rholes, 1978; Kopietz, Hellmann, Higgins, & Echterhoff, 2010): Stereotypic attributes came across as valid because people mentioned them frequently and expected them to be valid. Although both familiarity-heuristic and self-fulfilling explanations linked frequency of discussion with validity judgment, they yielded different predictions regarding how the mediating mechanism should be. According to the heuristic explanation, the sense of familiarity does not arise from ingroup members’ own behavior, but instead from the behavior of the entire group. As such, perceived validity should
mediate the relationship between an entire ingroup’s discussion and its members’ endorsement of outgroup stereotypes. Conversely, the self-fulfilling explanation locates the causality strictly within ingroup members. People infer validity from their own behavior, and independently from others’ behavior. Therefore, perceived validity should mediate the relationship between the ingroup members’ frequency of mentioning outgroup stereotypic attributes and their own endorsement of the stereotypes. Mediation of perceived validity appeared at the group-member level, but not the within-member level, which appears to rule out the self-fulfilling explanation.

**Norm formation.** My research also speaks to the scholarship concerning norm formation. In contemporary theorizing of social norms, scholars typically acknowledged the distinction between collective and perceived norms (e.g., Lapinski & Rimal, 2005; Rimal & Lapinski, 2015), with collective norms existing at the level of the group, community, and society, and perceived norms locating in people’s minds as their understanding of collective norms. The discussion quickly shifted into one of two directions: methodological pitfalls of measuring collective norms through aggregating individual perceptions (Rimal & Lapinski, 2015), or the distinction between descriptive and injunctive norms (Lapinski & Rimal, 2005; Nolan, 2017). Some scholars attempted to separate perceived norms linked to personal or societal beliefs (e.g., Park & Smith, 2007). Although these emphases on measurement and theoretical nuances among perceived norms are laudable, they direct the scholarly attention away from fundamental questions regarding the overarching construct of social norms (cf. Nolan, 2017). Two questions are particularly relevant for this dissertation: 1) How are consensual stereotype different from collective norms? 2) How do collective norms emerge?

Social norms are “rules and standards that are understood by members of a group, and that guide and/or constrain social behavior without the force of laws” (Cialdini & Trost, 1998, p.
Collective norms are a “social entity’s code of conduct” that operates at the level of the social system (Lapinski & Rimal, 2005, p. 129). According to these definitions, consensual stereotypes are essentially collective norms. They represent a constellation of stereotypic attributes about an outgroup that are shared within an ingroup and that prescribe the ingroup members’ behavior. Indeed, Sherif (1936) adopted the view of the exchangeable nature of collective norms and consensual stereotypes, in arguing that both shared the same psychological basis of formation (see p. 106-107).

The premise of equating consensual stereotypes with collective norms overlooks two fundamental distinctions between the constructs. First, consensual stereotypes are inherently value-laden, but social norms are not. Consensual stereotypes are value-laden in the sense that they represent what is deemed as socially desirable or undesirable by the ingroups. In Sherif’s (1936, p. 117) parlance, they are “group fixations” that justify what a loyal member of the ingroup should be. In contrast, collective norms may or may not be linked to social values. For example, the majority of residents in a community may go grocery shopping by bus. This may be considered as normative because it indicates a typical behavioral choice that similar others would make in that situation (Blanton & Christie, 2003). Such a norm may represent the values of environmental protection and energy conservation, or the fact that most residents cannot afford a car. The former may express social values upheld by the community; the latter reflects social reality, or “prevailing base rates for action” (Blanton & Christie, 2003, p.117).

Second, collective norms may connect to a broad range of social values, such as achievement, benevolence, and power (cf. Schwartz, 1994). In contrast, consensual stereotypes focus narrowly on acceptance and inclusion, separating ingroups (us) from outgroups (them). Hence, consensual stereotypes are considered as normative to the extent that the categorization
accounts for similarities and differences between ingroups and outgroups, and prototypical attributes account for why ingroup and outgroup members behave as they do (Haslam, 1997). Together, consensual stereotypes are a unique type of collective norms that are inherently connected to social values of acceptance and inclusion by the ingroups due to identity needs.

Given the uniqueness, the traditional view that “collective norms emerge through shared interaction among members of a social group or community” (Lapinski & Rimal, 2005, p. 129) is not enough to predict consensual stereotype formation. Instead, theorists must also consider the identity implications of group members, prototypicality and valence of stereotypic attributes, and message and linguistic manifestations of group identity. This dissertation marks the start of a larger program into the formation of consensual stereotypes as a unique type of collective norms.

Furthermore, the formation of collective norms, including consensual stereotypes, can be viewed as emergence—a dynamic process of “stable macroscopic patterns arising from local interaction of agents” (Epstein, 1999, p. 53). Kozlowski and Klein (2000) argued that mechanisms leading to emergence range on a continuum from composition to compilation. Composition focuses on group-level observations as the accumulation of individual processes: it involves “the coalescence of identical lower-level properties—that is, the convergence of similar lower-level attributes” (Kozlowski & Klein, 2000, p. 9). Most models of group consensus, including the one in this dissertation, assume composition emergence, in attempting to predict emergence as a function of individual cognitions, affect, and behavior.

At the other end of the continuum is compilation: antecedents and processes leading to collective phenomena are qualitatively different from those at lower-level. In my study, frequency of mentioning stereotypic attributes predicted personal endorsement through perceived validity, but only a subset of groups actually achieved collective endorsement. Less than 50% of
the groups achieved collective endorsement of outgroup-praising (competence) or outgroup-devaluing (arrogance) stereotypes. Only about one fifth of the groups achieved collective endorsement of the both stereotypes. The proposed model that assumed a composition emergence did not succeed in predicting collective outcomes, suggesting that the consensual stereotype formation may be compilational. Future research should explore the qualitatively different antecedents and mechanisms from those at the individual level to predict collective endorsement of outgroup stereotypes.

**Practical Implications**

Viewed as deeply ingrained and highly resistant to change (Allport, 1954), negative stereotypes against an outgroup are often considered to require intensive, large-scale interventions such as media-based campaigns or education programs (Paluck & Green, 2009a). For example, a decade after the genocide, a Rwanda-based organization broadcasted a radio soap opera to teach listeners about common humanity and to reduce negative stereotypes about Tutsis and Hutus (Paluck & Green, 2009b). The research for this dissertation suggests another method for brief but potentially effective interventions: promoting the sharing of unique, positive stories about an outgroup that counter the consensually-held stereotypes about it. These unique stories may change stereotypic beliefs because they contain novel argument that has been linked with suasory power (Morley & Walker, 1987) and because they may encourage the ingroup members to view the outgroup from a different vantage point (Galinsky & Moskowitz, 2000). Indeed, a recent field experiment in South Florida (Broockman & Kalla, 2016) demonstrated that 10-minute conversation, known as deep canvassing, about transgender rights led to a significant reduction in the negative stereotypes against transgender people for at least 3 months. However, the results from this dissertation highlighted the obstacles for sharing the unique, positive stories...
about an outgroup: ingroup members were pressured to defend their ingroup’s positivity by means of focusing on outgroup-devaluing attributes, whereas individuals were compelled to fit-in through emphasizing what was commonly known. Future interventions are encouraged to identify the factors that promote the interpersonal sharing of unique, positive stories about an outgroup.

The research for this dissertation further alluded to the importance of raising awareness about the role of language in creating and perpetuating consensual stereotypes about an outgroup. The ingroup bias can manifest itself by means of varying the level of abstractness in describing stereotypic attributes about an outgroup. More alarmingly, the linguistic bias was documented in national coverage of controversial intergroup issues such as immigration. For example, Dragojevic and colleagues (2017) analyzed all print newspaper articles involving immigration from Mexico in four states in the U.S. during a one-year period. The results showed that the media were over 3 times more likely to use abstract language to describe negative incidence related to undocumented immigrants than positive incidence. Despite that this study failed to show an association between linguistic abstraction and stereotype endorsement, future efforts in stereotype reduction should address this subtle and covert form of bias.

**Limitations**

The experimental study has at least six limitations: the frequency measure, the collective endorsement measure, the identity induction, the induction check for task perception, ingroup stereotypes, and zero-history groups. First, in adopting a selective perspective of neodiffusionism (Dawkins, 1976), I did not examine the variations in the interpretive meaning of the stereotypic attributes. Selective sharing of stereotypic attributes about an outgroup is not the only strategy for ingroup members to enhance their positive ingroup identity. Social comparisons may
motivate people to take various routes to claim their positive distinctiveness of their ingroup (Hogg & Abrams, 1988). An alternative strategy is social creativity: People may change interpretations of the relevant information in order to maintain favorable comparisons for the ingroup (Tajfel, 1981). For example, ingroup members read stereotypic attributes that the outgroup members were humorous and were skilled at using interesting anecdotes to help others understand their point. During the group discussion, however, some ingroup members re-framed the message such that outgroup members used funny stories to make fun of the others so as to make their own point across. Stereotypic attributes that praised outgroups’ competence was creatively re-packaged as devaluing attributes that signaled the outgroups’ arrogance during the group discussion. Hence, counting the frequency of specific stereotypic attributes mentioned in the group discussion may underestimate the positive ingroup bias.

Despite this risk, social creativity was expected to be rare in the current project. Tajfel (1981) argued that perceived status of the outgroup relative to the ingroup determined whether or not ingroup members engaged in social creativity to manage their identity. Specifically, ingroup members tended to use social creativity strategies when they perceived a clear status differentiation between the ingroup and the outgroup and viewed any challenge to the status hierarchy as futile. Because participants in this study were primed to believe that they were competing with another group of students performing the same decision-making task, they were less likely to perceive status differences between themselves and the outgroup.

Second, the collective endorsement measure—the variance ratio index (James et al., 1984)—is limited in its conservative threshold. Like other measures of dispersion, the variance ratio index was affected by the group size. The smaller the group size is, the higher the threshold is to make the index above the chance alone. With groups of three to four members, the threshold
was around .80, which was conservative for an index that ranged from -1 to 1. As Conway and Schaller (1998) noted, “this limitation is not trivial for researchers who are interested in very small groups or dyads” (p. 246). Such a conservative standard may explain why only less than one fifth of the experimental groups reached consensual stereotypes after the discussions.

Third, this study did not include an induction check for whether participants in different identity conditions perceived the experimental task differently. It is possible that participants judged the task to be more involved, interesting, and important when they worked as a group to compete with another group from a rival Big Ten institution (ingroup-identity condition) than when they worked as an individual to compete with the other individuals from the same institution (personal-identity condition). As such, the observed differences in selective sharing and language use may be attributable to the unmeasured factors that co-vary with the identity manipulation and created threats to the internal validity of the study.

Fourth, this study induced identity salience through intergroup competition. This tactic was used in the classic Robbers Cave experiment (M. Sherif et al., 1954). I chose it for this study to control for preexisting stereotypes about a social group. Previous stereotype studies have primed identity salience by asking participants to identify the attributes that most people from the particular group possess (e.g., listing three things that most other Australians do often; Haslam et al., 1999; also see McGlone & Aronson, 2006; Shih et al., 1999). Without priming identity salience based on existing social categories, I may have overestimated the extent to which ingroup members rely on conversation to form consensual stereotypes about an outgroup.

Fifth, this study did not examine the formation of consensual stereotypes about ingroups (i.e., self-stereotyping; Hogg & Turner, 1988). The experimental induction included only stereotypic attributes about an outgroup, even though ingroup members may develop conceptions
of their ingroup during the interactions with the other members. Social identity theorists have argued that people may defend their ingroups by devaluing the outgroup, as it was tested in the current study, or by praising the ingroup. It then follows that ingroup members may selectively share outgroup-devaluing attributes or ingroup-praising attributes, regardless of whether or not the attributes were commonly known. However, prior research suggested that self-stereotyping needed more than the salience of an ingroup identity. For example, Mullen et al.’s (1992) meta-analysis revealed that the members from an ingroup with lower status than the outgroup revealed significantly less self-stereotyping than the members from an ingroup with equal or higher status than the outgroup. Without the data on discussion and perceptions about the ingroup, it remains unclear whether or not the proposed mechanism for outgroup stereotypes is generalizable to self-stereotyping.

Finally, the use of zero-history groups limited the ecological validity of this study. It is difficult to generalize the conclusions drawn from the experimentally-created groups with no prior history, no future as a group, and restricted time for interaction to natural, real-world, or so-called bona fide, groups (Putnam & Stohl, 1990).

**Future Directions**

Lying at the heart of scholarship on social influence the relationship between the influencer and the target (Gaffney, & Hogg, 2017), or more precisely, “an attempt to understand and explain how the thought, feeling, and behavior of individuals are influenced by the actual, imagined, or implied presence of other human beings” (Allport, 1954, p. 3). Despite its invaluable contribution to the scientific understanding of social influence, the very focus on intra-individual and interpersonal psychological processes retarded the development of theories concerning societal-level phenomena (Jung, Bramson, & Crano, 2018) such as consensual
stereotypes, stigma, and collective norms. Explicating the societal-level phenomena will benefit from a closer look of social influence processes that involve multiple agents (e.g., messages, individuals, groups) interacting simultaneously, that are embedded in diverse patterns of connections (e.g., social networks), and that evolve overtime through linear or nonlinear feedback loops (e.g., spiral reinforcement; Mason, Conrey, & Smith, 2007). Re-examining the classic theories of social influence through the multi-agent, structural, and dynamic perspective, in conjunction with statistical analyses that purport to model such complexities, marks a promising area for future research.

**Conclusion**

In the eight decades since Katz and Braly (1933) first demonstrated that stereotypes are shared, research into consensual stereotype formation has been sliced into several disciplinary divisions and different levels of theorizing (Reid & Anderson, 2010). This dissertation presented a two-phase model in accounting for why and how consensual stereotypes at the societal level emerge from communication in small groups. Such stereotypes emerge as people selectively share certain stereotypic attributes and endorse them on the basis of heuristic judgments that are cued by group discussion and language use. The two-phase model bridges the division between intergroup and small-group theories and synthesizes the elements and processes that connect individual and collective levels. “The merger of the intergroup context with the internal dynamics of groups” (Putnam & Stohl, 1990, p. 260), along with “integration of levels (Chaffee & Berger, 1987, p. 108), may lead to a better understanding of the communicative etiology of consensual stereotypes.
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APPENDIX A

Pre-Discussion Questionnaire: Linking Questions and Demographic Information

We would like to begin by asking you a few questions so that we can link your responses to this survey with your other responses.

Please enter the FIRST TWO letters of your LAST NAME _________

Please enter the FIRST TWO letters of your mother’s maiden name ________

On what date were you born? For example, if you were born on September 15th, then enter “15.” _____

Next, we have a few questions about your demographic background.

1. What is your sex? Male Female

2. What was your age on your last birthday? ________________ (Please fill in a number)

3. What is your year in school? Freshman Sophomore Junior Senior Other

4. What is your ethnicity? (Please mark all that apply)

_____ Black or African American _____ Asian

_____ White or Caucasian _____ Native Hawaiian and other Pacific Islander

_____ Hispanic or Latino _____ Native American or Alaska Native

_____ Other

5. Are you an international student? Yes No
APPENDIX B

Pre-Discussion Questionnaire: Fear of Invalidity

The next set of questions asks about how you see yourself. Please rate how much you agree or disagree with the following statements by checking the corresponding circles.

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<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
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<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

1. I may struggle with a few decisions, but not very often.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

2. I never put off making important decisions.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

3. Sometimes I become impatient over my indecisiveness.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

4. Sometimes I see so many options to a situation that it is really confusing.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

5. I can be reluctant to commit myself to something because of the possibility that I might be wrong.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

6. I tend to struggle with most decisions.
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○

7. Even after making an important decision, I continue to think about
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○
   - ○


the pros and cons to make sure that I am not wrong.

8. Regardless of whether others see an event as positive or negative, I don’t mind committing myself to it.
9. I prefer situations where I don’t have to decide immediately.
10. I rarely doubt that the course of action I have selected will be correct.
11. I tend to continue to evaluate recently made decisions.
12. I wish I didn’t worry so much about making errors.
14. I find myself reluctant to commit to new ideas but find little comfort in remaining with the tried and true.
APPENDIX C

Pre-Discussion Questionnaire: Implicit Theories of Personality

We also would like to learn how you see others’ attributes. Please rate how much you agree or disagree with the following statements by checking the corresponding circles.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>1</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>2</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>3</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>4</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>5</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>6</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>7</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>8</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>9</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
<tr>
<td>10</td>
<td>⭕</td>
<td>⭕</td>
<td>⭕</td>
</tr>
</tbody>
</table>

1. The kind of person someone is, is something basic about them, and it can't be changed very much.
2. People can do things differently, but the important parts of who they are can't really be changed
3. Everyone is a certain kind of person, and there is not much that they can do to really change that.
APPENDIX D

Identity Salience Manipulation

[Ingroup Identity]

**The Goal:** The goal of this task is to evaluate efficiency of a group to solve problems and make decisions. We want to explore if there are any group differences in the way that they communicate during a decision-making task.

**General Introduction:** In this activity, you will be given a decision task to solve as a group. The decision task is designed to test how well your group work together to solve a problem. Your group will compete against another group with the same number of people who have finished the task. Group performance will be judged upon whether your group solves the problem correctly. The group who works out more correct answers wins.

**Remember:** The result depends on how your group as a whole perform.

[Personal Identity]

**The Goal:** The goal of this task is to evaluate efficiency of an individual to solve problems and make decisions in group settings. We want to explore if there are any differences in the way that individuals make decisions.

**General Introduction:** In this activity, you will be given a decision task to solve as an individual. The decision task is designed to test your individual ability to solve a problem. You will compete with other individuals on a decision-making task. Your individual performance will be evaluated upon your own ability to think logically and make correct decisions. The individual with most correct answers wins.

**Remember:** The results depend on how you as an individual perform.
Choosing a Group Name: Before the competition, please work together to choose a name for your group from the following list.

Possible group names:
- Group Unity
- Group Crushers
- Group Elite
- Group NO. ONE
- Group Fighters

Your group will have 3 minutes to decide a group name.

Your group decided to be referred as ____________________________________________

After your group choose a group name, please write the group name on the card in front of you.

____________________________________________________________________________

Reflecting about your unique attributes: Before the competition, we would like you to think about your unique, individual attributes. Please identify and describe three unique attributes that will help you stand out in the task.

You will have 3 minutes to identify and describe your unique attributes.

1. ____________________________________________________________________________

2. ____________________________________________________________________________

3. ____________________________________________________________________________

After describing your individual attributes, please write down your first name on a card.
Group Decision Task: “Lost at Sea”

A group of friends have chartered a yacht for a holiday trip across the Atlantic Ocean. Because none of them have any previous sailing experience, they have hired an experienced skipper and two-person crew.

Unfortunately in mid Atlantic a fierce fire breaks out in the ships galley and the skipper and crew have been lost whilst trying to fight the blaze. Much of the yacht is destroyed and is slowly sinking.

The location is unclear because vital navigational and radio equipment have been damaged in the fire. The best estimate is that they are many hundreds of miles from the nearest landfall. They have managed to save 8 items, undamaged and intact after the fire. In addition, they have salvaged a four-man rubber life craft and a box of matches.

Your task is to rank the 8 items in terms of their importance for them, as they wait to be rescued. Place the number 1 by the most important item, the number 2 by the second most important and so forth until you have ranked all 8 items.

[Ingroup Identity]: Your group’s responses will be judged based on the answers from the experts in the US Coastguard. The group who work out more correct answers will win.

[Personal Identity]: Your responses will be judged based on the answers from the experts in the US Coastguard. The individual who works out most correct answers will win.

The following is a list of 8 items which have been saved from the fire. You will have 3 minutes to get familiar with the items. When you read the items, please do not discuss with the other individuals. Please feel free to ask the researcher if you do not know what an item is.

- A shaving mirror
- A 25 liter container of water
- A case of army rations
- A liter can of oil/petrol mixture
- 20 square feet of opaque plastic sheeting
- 15 feet of nylon rope
- 2 boxes of chocolate bars
- An ocean fishing kit & pole
[Ingroup Identity]
You are going to discuss with your group members to agree on a group ranking. To help your group win, you are encouraged to share your thoughts, ideas, and reasons with the other group members. Remember, the group with most correctly ranked items wins. Your group will have 10 minutes to work on the task.

When your group reach an agreement, please place your group decision in the following table. Write the number 1 by the most important item, the number 2 by the second most important and so forth until you have ranked all 8 items.

<table>
<thead>
<tr>
<th>Items</th>
<th>Group Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A shaving mirror</td>
<td></td>
</tr>
<tr>
<td>A 25 liter container of water</td>
<td></td>
</tr>
<tr>
<td>A case of army rations</td>
<td></td>
</tr>
<tr>
<td>A liter can of oil/petrol mixture</td>
<td></td>
</tr>
<tr>
<td>20 square feet of opaque plastic sheeting</td>
<td></td>
</tr>
<tr>
<td>15 feet of nylon rope</td>
<td></td>
</tr>
<tr>
<td>2 boxes of chocolate bars</td>
<td></td>
</tr>
<tr>
<td>An ocean fishing kit &amp; pole</td>
<td></td>
</tr>
</tbody>
</table>

[Personal Identity]
You are going to compete with the other individuals to make an individual ranking. For you to win, you are encouraged to think carefully about the decision items. Remember, the individual who works out most correct answers wins. You will have 10 minutes to work on the task.

When you make a decision, please place your ranking in the following table. Write the number 1 by the most important item, the number 2 by the second most important and so forth until you have ranked all 8 items.

<table>
<thead>
<tr>
<th>Items</th>
<th>Individual Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A shaving mirror</td>
<td></td>
</tr>
<tr>
<td>A 25 liter container of water</td>
<td></td>
</tr>
<tr>
<td>A case of army rations</td>
<td></td>
</tr>
<tr>
<td>A liter can of oil/petrol mixture</td>
<td></td>
</tr>
<tr>
<td>20 square feet of opaque plastic sheeting</td>
<td></td>
</tr>
<tr>
<td>15 feet of nylon rope</td>
<td></td>
</tr>
<tr>
<td>2 boxes of chocolate bars</td>
<td></td>
</tr>
<tr>
<td>An ocean fishing kit &amp; pole</td>
<td></td>
</tr>
</tbody>
</table>
[Ingroup Identity]

**Group Reflection:** We ask you to reflect as a group. What are some practices during the discussion that you find most proud of your group? Please take 5 minutes to discuss with your group members, and choose three practices to write them down in the following blanks.

We are most proud of the group because:

1. ____________________________________________________________________________

2. ____________________________________________________________________________

3. ____________________________________________________________________________

**Individual Reflection:** We ask you to reflect your individual performance. Please identify three reasons why you believe that you would win in this decision task. You will have 5 minutes to write them down in the following blanks.

I will win the task because:

1. ____________________________________________________________________________

2. ____________________________________________________________________________

3. ____________________________________________________________________________
APPENDIX E

Identity Salience Manipulation Check

A group is a set of people who work together with each other to achieve a common goal. With this definition in mind, please indicate how much you agree or disagree with the following statements by checking the corresponding circles.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To what extent do you identify yourself as a member of the group?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>2. How much will you assess yourself, positively or negatively, in terms of your group?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>3. To what extent do you find yourself “fit in” with the group?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>4. How much is being a member of the group foremost in your thoughts?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>5. How important do you think your group is to yourself?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>6. How much do you have a sense of belongingness to the group?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
<tr>
<td>7. To what extent do you consider yourself as a part of the group?</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
<td>Ø</td>
</tr>
</tbody>
</table>
APPENDIX F

Attribute Distribution Manipulation

[Ingroup Identity]

**Instruction:** Now we are in the second phase of the study. In this phase, we would like you to evaluate the performance of the group that you are competing against. Upon the completion of the task, we asked each of the members to reflect their group performance. Each of them privately wrote down what they had observed during the group discussion. We collected their observations in a profile. Because each member wrote his or her own observations about the group, you may encounter contradictory statements in the profile.

We would like you to take 5 minutes to read carefully their observations in the profile. Then you will discuss with the members from your group about your impressions and evaluations. The profile will not be accessible during the discussion. Please feel free to take notes as you read through the profile.

[Personal Identity]

**Instruction:** Now we are in the second phase of the study. In this phase, we would like you to evaluate the performance of another set of individuals who worked on the same task. Instead of making their own decisions, these individuals discussed the task and made a group decision. Upon the completion of the task, we asked each of the individuals to reflect their group performance. Each of them privately wrote down what they had observed during the group discussion. We collected their observations in a profile. Because each member wrote his or her own observations about the group, you may encounter contradictory statements in the profile.

We would like you to take 5 minutes to read carefully their reflections and observations in the profile. Then you will discuss with the other individuals about your impressions and evaluations about that group. The profile will not be accessible during the discussion. Please feel free to take notes as you read through the profile.
Condition One
Outgroup-Devaluing Stereotypic Attributes as Common Knowledge
Outgroup-Praising Stereotypic Attributes as Unique Knowledge

Profile 1

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People rolled their eyes toward the speaker whose opinions differed from theirs. [c]
2. Members in my group acted as if they had nothing to learn from the other group members. [c]
3. People made demeaning remarks about others’ performance during the discussion. [c]
4. People cut off others during the discussion, even if what they said repeated the previous discussion. [c]
5. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong. [c]
6. Members in this group tended to adopt "know it all" attitudes. [c]
7. People let out a deep sigh when someone asked for more explanations. [c]
8. People tended to lean toward and stare at the person when they disagreed with them. [c]
9. People laughed at others who made some mistakes. [c]
10. People in my group got mad or irritated when the center of attention moved away from them. [c]
11. People were humorous, and used interesting anecdotes to help others understand their point. [u]
12. People in my group valued others’ opinion even when it differed from their own. [u]
13. We left time to reflect as a group what we had achieved together by the end of the discussion. [u]
14. Group members tried to avoid using expressions that may hurt others’ feelings. [u]
15. Group members were sensitive to time management, and they knew when it was necessary to move on. [u]

The order of the statements is randomized: c = common knowledge; u = unique knowledge
Flesch reading ease scores: 73
Flesch-Kincaid grade level: 5
Condition One
Outgroup-Devaluing Stereotypic Attributes as Common Knowledge
Outgroup-Praising Stereotypic Attributes as Unique Knowledge

Profile 2

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People rolled their eyes toward the speaker whose opinions differed from theirs. [c]
2. Members in my group acted as if they had nothing to learn from the other group members. [c]
3. People made demeaning remarks about others’ performance during the discussion. [c]
4. People cut off others during the discussion, even if what they said repeated the previous discussion. [c]
5. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong. [c]
6. Members in this group tended to adopt "know it all" attitudes. [c]
7. People let out a deep sigh when someone asked for more explanations. [c]
8. People tended to lean toward and stare at the person when they disagreed with them. [c]
9. People laughed at others who made some mistakes. [c]
10. People in my group got mad or irritated when the center of attention moved away from them. [c]
11. People in this group were knowledgeable about the decision task and items. [u]
12. People illustrated their arguments with concise language and concrete examples. [u]
13. People in this group had excellent listening skills. [u]
14. People took ample notes to keep the discussion organized. [u]
15. We were devoted to the task, and actively contributed to the discussion throughout an entire session. [u]

The order of the statements is randomized: c = common knowledge; u = unique knowledge

Flesch reading ease scores: 70
Flesch-Kincaid grade level: 5
Profile 3

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People rolled their eyes toward the speaker whose opinions differed from theirs. [c]
2. Members in my group acted as if they had nothing to learn from the other group members. [c]
3. People made demeaning remarks about others’ performance during the discussion. [c]
4. People cut off others during the discussion, even if what they said repeated the previous discussion. [c]
5. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong. [c]
6. Members in this group tended to adopt "know it all" attitudes. [c]
7. People let out a deep sigh when someone asked for more explanations. [c]
8. People tended to lean toward and stare at the person when they disagreed with them. [c]
9. People laughed at others who made some mistakes. [c]
10. People in my group got mad or irritated when the center of attention moved away from them. [c]
11. People were attentive to what other group members said, and maintained eye contacts with the speakers. [u]
12. People in this group helped each other to understand the task, and explained with patience how a decision item can be used. [u]
13. People shared their expertise when it was relevant. [u]
14. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions. [u]
15. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion. [u]

The order of the statements is randomized: c = common knowledge; u = unique knowledge
Flesch reading ease scores: 74
Flesch-Kincaid grade level: 5
Condition Two
Outgroup-Praising Stereotypic Attributes as Common Knowledge
Outgroup-Devaluing Stereotypic Attributes as Unique Knowledge

Profile 1

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People in my group valued others’ opinion even when it differed from their own. [c]
2. Group members tried to avoid using expressions that may hurt others’ feelings. [c]
3. People illustrated their arguments with concise language and concrete examples. [c]
4. We were devoted to the task, and actively contributed to the discussion throughout an entire session. [c]
5. People took ample notes to keep the discussion organized. [c]
6. People in this group were knowledgeable about the decision task and items. [c]
7. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions. [c]
8. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion. [c]
9. People were attentive to what other group members said, and maintained eye contacts with the speakers. [c]
10. People in this group helped each other to understand the task, and explained with patience how a decision item can be used. [c]
11. Members in my group acted as if they had nothing to learn from the other group members. [u]
12. People rolled their eyes toward the speaker whose opinions differed from theirs. [u]
13. People made demeaning remarks about others’ performance during the discussion. [u]
14. People cut off others during the discussion, even if what they said repeated the previous discussion. [u]
15. Members in this group tended to adopt "know it all" attitudes. [u]

The order of the statements is randomized:  c = common knowledge;  u = unique knowledge
Flesch reading ease scores: 75
Flesch-Kincaid grade level: 5
Condition Two
Outgroup-Praising Stereotypic Attributes as Common Knowledge
Outgroup-Devaluing Stereotypic Attributes as Unique Knowledge

Profile 2

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People in my group valued others’ opinion even when it differed from their own. [c]
2. Group members tried to avoid using expressions that may hurt others’ feelings. [c]
3. People illustrated their arguments with concise language and concrete examples. [c]
4. We were devoted to the task, and actively contributed to the discussion throughout an entire session. [c]
5. People took ample notes to keep the discussion organized. [c]
6. People in this group were knowledgeable about the decision task and items. [c]
7. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions. [c]
8. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion. [c]
9. People were attentive to what other group members said, and maintained eye contacts with the speakers. [c]
10. People in this group helped each other to understand the task, and explained with patience how a decision item can be used. [c]
11. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong. [u]
12. People let out a deep sigh when someone asked for more explanations. [u]
13. People tended to lean toward and stare at the person when they disagreed with them. [u]
14. People laughed at others who made some mistakes. [u]
15. People in my group got mad or irritated when the center of attention moved away from them. [u]

The order of the statements is randomized: c = common knowledge; u = unique knowledge
Flesch reading ease scores: 73
Flesch-Kincaid grade level: 5
Condition Two
Outgroup-Praising Stereotypic Attributes as Common Knowledge
Outgroup-Devaluing Stereotypic Attributes as Unique Knowledge

Profile 3

Here are the reflections and observations written by the members of your competing group (by the individuals in that group) about their performance

1. People in my group valued others’ opinion even when it differed from their own. [c]
2. Group members tried to avoid using expressions that may hurt others’ feelings. [c]
3. People illustrated their arguments with concise language and concrete examples. [c]
4. We were devoted to the task, and actively contributed to the discussion throughout an entire session. [c]
5. People took ample notes to keep the discussion organized. [c]
6. People in this group were knowledgeable about the decision task and items. [c]
7. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions. [c]
8. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion. [c]
9. People were attentive to what other group members said, and maintained eye contacts with the speakers. [c]
10. People in this group helped each other to understand the task, and explained with patience how a decision item can be used. [c]
11. People looked past one person for someone else to talk to. [u]
12. People increased volume of their voice when the others expressed doubts about their choice. [u]
13. People bragged about their experience with the decision task during the discussion. [u]
14. People in this group argued against with the others just for the sake of argument. [u]
15. People denied to admit that they made self-conflicting arguments. [u]

The order of the statements is randomized: c = common knowledge; u = unique knowledge
Flesch reading ease scores: 72
Flesch-Kincaid grade level: 5
Now, based on the members’ observations of their group discussion, please rate how much you agree or disagree with the following statements by checking the corresponding circles.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0. The group is competent.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>1. The group is capable.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>2. The group is skillful.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>3. The group is accomplished.</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>4. The group is arrogant.</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>5. The group is egocentric</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>6. The group is conceited.</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>7. People in that group are self-important</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

1. The group is competent.

2. The group is capable.

3. The group is skillful.

4. The group is accomplished.

5. The group is arrogant.

6. The group is egocentric

7. The group is conceited.

8. People in that group are self-important
Now, please sit at the circular table. You may bring your notes about the profile.

We would like you to discuss with the other members (the other individuals) about your impressions of that group. We are interested in how you make use of the information in the profile to form impressions and evaluations about your competing group (about that group). Hence it is critical to discuss the statements that you just read in the profile. We also want to emphasize that, in real life, when people discuss about another group, they rarely possess the same information. It is therefore crucial that you exchange the information you possess during discussions. You will have 10 minutes for the discussion.
APPENDIX G

Post-Discussion Questionnaires

Thank you for your participation! Please go back to the computer stations.

First, please answer the following questions so that we can link your responses to this survey with your other responses.

Please enter the FIRST TWO letters of your LAST NAME ________

Please enter the FIRST TWO letters of your mother’s maiden name ________

On what date were you born? For example, if you were born on September 15\textsuperscript{th}, then enter “15.”

Now that you have talked with your fellow group members (the other individuals) about another group. Based on your conversation, please rate how you think of each of your discussion partners. Write down the group member number (first name) in the blank, and then indicate your opinion by checking the corresponding circles.

<table>
<thead>
<tr>
<th>Group Member # (Enter a number shown on the name card)</th>
<th>I think he or she is</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>uncreditable</td>
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<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>uninformative</td>
<td></td>
<td>○</td>
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<td>○</td>
<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>untrustworthy</td>
<td></td>
<td>○</td>
<td>○</td>
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<td>○</td>
<td>○</td>
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</tbody>
</table>
Next, we would like to learn what you know about that group based on your reading of the profile and group discussion. Please write down all the descriptions that come to mind when you think about that group, regardless of whether you agree or disagree with the descriptions. List each description separately using a numbered box. If you have more descriptions about that group than there are number boxes, please enter all of them in the last box. You may list as many descriptions as you want.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
<td></td>
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<td>3</td>
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<td>8</td>
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<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
Next, please mark your opinions about the following observations about the group that you just evaluated.

**Description: People rolled their eyes toward the speaker whose opinions differed from theirs.**

In my view, this description is__________

<table>
<thead>
<tr>
<th>Not at all valid</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all accurate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all representative of that group</td>
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<td></td>
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</tr>
<tr>
<td>Not at all typical in that group.</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

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Extremely valid

Extremely accurate

Extremely representative of that group

Extremely typical in that group.
All the descriptions that are collectively accessible to each group will be assessed with the same four items on the same 11-point Likert-type scales. The descriptions are listed separately for each condition of attribute distribution

Condition One
Outgroup-Devaluing Stereotypic Attributes as Common Knowledge
Outgroup-Praising Stereotypic Attributes as Unique Knowledge
1. People rolled their eyes toward the speaker whose opinions differed from theirs.
2. Members in my group acted as if they had nothing to learn from the other group members.
3. People made demeaning remarks about others’ performance during the discussion.
4. People cut off others during the discussion, even if what they said repeated the previous discussion.
5. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong.
6. Members in this group tended to adopt "know it all" attitudes.
7. People let out a deep sigh when someone asked for more explanations.
8. People tended to lean toward and stare at the person when they disagreed with them.
9. People laughed at others who made some mistakes.
10. People in my group got mad or irritated when the center of attention moved away from them.
11. People were humorous, and used interesting anecdotes to help others understand their point.
12. People in my group valued others’ opinion even when it differed from their own.
13. We left time to reflect as a group what we had achieved together by the end of the discussion.
14. Group members tried to avoid using expressions that may hurt others’ feelings.
15. Group members were sensitive to time management, and they knew when it was necessary to move on.
16. People in this group were knowledgeable about the decision task and items.
17. People illustrated their arguments with concise language and concrete examples.
18. People in this group had excellent listening skills.
19. People took ample notes to keep the discussion organized.
20. We were devoted to the task, and actively contributed to the discussion throughout an entire session.
21. People were attentive to what other group members said, and maintained eye contacts with the speakers.
22. People in this group helped each other to understand the task, and explained with patience how a decision item can be used.
23. People shared their expertise when it was relevant.
24. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions.
25. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion.

*The order of the descriptions will be randomized.*
Condition Two
Outgroup-Praising Stereotypic Attributes as Common Knowledge
Outgroup-Devaluing Stereotypic Attributes as Unique Knowledge

1. People in my group valued others’ opinion even when it differed from their own.
2. Group members tried to avoid using expressions that may hurt others’ feelings.
3. People illustrated their arguments with concise language and concrete examples.
4. We were devoted to the task, and actively contributed to the discussion throughout an entire session.
5. People took ample notes to keep the discussion organized.
6. People in this group were knowledgeable about the decision task and items.
7. People shared credit for good ideas with others, and were willing to acknowledge others’ skills, experience and contributions.
8. People in this group gave others time to think, speak, and respond, and tried to avoid cutting others off during the discussion.
9. People were attentive to what other group members said, and maintained eye contacts with the speakers.
10. People in this group helped each other to understand the task, and explained with patience how a decision item can be used.
11. Members in my group acted as if they had nothing to learn from the other group members.
12. People rolled their eyes toward the speaker whose opinions differed from theirs.
13. People made demeaning remarks about others’ performance during the discussion.
14. People cut off others during the discussion, even if what they said repeated the previous discussion.
15. Members in this group tended to adopt "know it all" attitudes.
16. When they disagreed with others, members in this group explicitly told the others that they were absolutely wrong.
17. People let out a deep sigh when someone asked for more explanations.
18. People tended to lean toward and stare at the person when they disagreed with them.
19. People laughed at others who made some mistakes.
20. People in my group got mad or irritated when the center of attention moved away from them.
21. People looked past one person for someone else to talk to.
22. People increased volume of their voice when the others expressed doubts about their choice.
23. People bragged about their experience with the decision task during the discussion.
24. People in this group argued against with the others just for the sake of argument.
25. People denied to admit that they made self-conflicting arguments.

*The order of the descriptions will be randomized.*
Next, please rate how much do you think **the members of your group** agree or disagree with the following statements by checking the corresponding circles.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

1. The group is competent.

2. The group is capable.

3. The group is skillful.

4. The group is accomplished.

5. The group is arrogant.

6. The group is self-centered

7. The group is cocky.

8. People in that group are condescending.
Now please rate how much **YOU** agree or disagree with the following statements by checking the corresponding circles.

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Neutral</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
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Xun Zhu

Curriculum Vitae

EDUCATION

Ph.D Communication Arts & Sciences, Pennsylvania State University 2018
MA Communication Arts & Sciences, Michigan State University 2014
BA English, Ocean University of China 2012

HONORS AND AWARDS

2017 Carroll C. Arnold Award Communication Arts & Sciences, Penn State
2016 Top Four Student Paper Award Applied Communication Division, NCA
2013 Top Three Paper Award Social Cognition Division, NCA

SELECTED PUBLICATIONS


SELECTED TEACHING EXPERIENCE

Instructor CAS302: Social Influence Fall & Spring, 2017
Instructor CAS100A: Public Speaking Fall, 2014
Instructor CAS100B: Group Communication Fall, 2017
Teaching Assistant CAS202: Communication Theory Fall, 2015; Spring, 2015, 2016