How we perceive us determines how we like you: Mental representation of the ingroup as predictor of intergroup evaluation

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1 Introduction

It seems to be general knowledge that people tend to favor social groups they belong to (ingroups) over groups they do not belong to (outgroups). There have been many attempts to explain this ubiquitous phenomenon. Interestingly, most of the time the general image (i.e., the mental representation) of the *outgroup* has been considered in order to explain the better evaluation of ingroups relative to outgroups (i.e., ingroup bias) (e.g., Richards & Hewstone, 2001). Consequently, research in this field engaged in trying to find possibilities to change mental representations of outgroups. Much less attention was paid to the fact that mental representations of *ingroups* might be of importance, too. As the judgment about any stimulus is made in relation to another stimulus, outgroups are evaluated in relation to ingroups (Mussweiler, 2003). Thus, it could be argued that mental *ingroup* representations are fundamental for ingroup bias to occur. This conclusion was the origin of the present thesis which aims at investigating in how far the nature of the ingroup representation influences intergroup evaluations.

Intergroup evaluations are the outcome of a comparison process between groups. A basic theory dealing with intergroup comparisons is Self Categorization Theory (Turner, 1987). In accordance with Self Categorization Theory, the present line of research relies on the assumption that ingroup and outgroup members compare each other with respect to a higher order category which includes both ingroup and outgroup. Self Categorization Theory suggests that two groups compare each other with reference to the prototype of a higher order category because it provides a comparison standard. The better the fit of the ingroup to the superordinate category prototype *relative* to the fit of the outgroup to the superordinate category prototype, the better the evaluation of the ingroup *relative* to the outgroup.

The phenomenon of ingroup bias implies that there is in general a better fit between ingroup and superordinate category standard than between outgroup and superordinate category standard. But why is the perceived fit most commonly better for ingroups than for outgroups? The Ingroup Projection Model suggests a convincing mechanism. In short, the Ingroup Projection Model (Mummendey & Wenzel, 1999) assumes that ingroup members transfer the characteristic features of their group onto the superordinate category. As a consequence, the mental representation of the superordinate category is more similar to the mental representation of the ingroup than to the mental representation of the outgroup. That means that the ingroup is relatively more prototypical of the superordinate category. This

leads to a relatively better evaluation of the ingroup because the ingroup fits the standard provided by the prototype of the superordinate category better than the outgroup. The Ingroup Projection Model assumes that peoples' motivation to enhance their positive self-image is causally related to ingroup projection (see, e.g., Wenzel, Mummendey, Weber, & Waldzus, 2003).

In contrast to this motivational understanding of ingroup projection, the Cognitive Model of Ingroup Projection by Meiser, Machunsky, and Mummendey (2005) proposes that primarily cognitive processes can be sufficient to elicit projection. The Cognitive Model assumes that group features are only generalized to the superordinate category to the extent that these features are represented in an abstract manner (i.e., prototype-based). Relying on Rosch's research on basic categories (e.g., Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976) the model suggests that people project group attributes onto higher order categories because higher order categories are less clearly defined and less available than lower order categories. That means that people rely on the representation of subordinate categories in order to generate the prototype of the superordinate category. From social cognition research it is well-known that the usage of abstract mental representations preserves cognitive resources (Macrae, Milne, & Bodenhausen, 1994; Sherman, 1996; for a review see Sherman, Macrae, & Bodenhausen, 2000). Thus, it can be concluded that the reason why people rely on abstract mental representations is primarily to characterize superordinate categories in a resource-saving manner.

The described principle can be transferred into ingroup-outgroup contexts. In general, ingroup and outgroup representations are not fundamentally different. Both groups can be represented either in a prototype-based (i.e., abstract) or in an exemplar-based (i.e., more specific) manner (Park & Hastie, 1987; Smith & Zárate, 1990). However, which of both representation modes is predominant seems to depend on the content. In particular, it has been shown that ingroup representations are primarily abstract when positive attributes are concerned whereas outgroup representations are primarily abstract when negative attributes are concerned (e.g., Sherman, Klein, Laskey, & Wyer, 1998). Linking these assumptions, the Cognitive Model of Ingroup Projection suggests that concerning positively valued contents ingroup attributes instead of outgroup attributes are projected.

In sum, the Cognitive Model of Ingroup Projection proposes that projection is a process which saves cognitive resources and can be understood as a by-product of more general cognitive processes. This approach suggests a new possibility to modify ingroup projection

processes. The possibilities for modification of projection will be the key question of the present thesis. Therefore, properties of prototype-based mental representations need to be identified in order to know what to manipulate to modify cognitive projection.

It has been suggested that prototype-based representations are clearly related to homogeneity of group perceptions (Brewer & Harasty, 1997; Mullen, 1991). Quite obviously, a prototype is only a good summary of a category if there is not too much deviance around the mean (Park & Hastie, 1987; 1992; Park, Judd, & Ryan, 1991). Thus, if the perception of the ingroup is diversified this should diminish the extent to which the prototype of the ingroup is available or usable as a means to characterize the superordinate category. In other words, ingroup projection should be a function of perceived ingroup variability.

Similarly, the concept of complexity of mental representations is related to prototype-based representations. In the present thesis, complexity is understood as a combination of *differentiation* and *integration* (Locke, 2003; Rafaeli-Mor & Steinberg, 2002; Tetlock, 1983). Differentiation refers to the extend to which stimuli are distributed on multiple dimensions whereas integration refers to the formation of clusters of stimuli according to multi-dimensional similarities. This definition also clarifies the difference between variability and complexity: Variability can be conceived as mere differentiation and complexity as differentiation *and* integration. Although it has to be acknowledged that complexity is a much wider concept than variability empirical evidence indicates that complex group representations are related to more perceived variability (Park & Judd, 1990; Park, Ryan, & Judd, 1992).

Prototypes can be used in a heuristic manner (Sherman et al., 2000). That is, they are employed as rules of thumb (as opposed to precise conclusions) when making judgments about a category or its members. This implies that they are simple as opposed to complex. In other words, understanding prototypes as a heuristic tool to navigate through social reality means that prototypes need to be of little complexity.

Apparently, prototypes, low levels of variability, and low levels of complexity go hand in hand. To conclude, relying on the Cognitive Model of Ingroup Projection, I hypothesize that ingroup projection is a function of both variability and complexity of the mental ingroup representation.

The argument delineated so far holds that variability and complexity of mental ingroup representations determine projection tendencies such that more heterogeneous and complex ingroup representations are less easily projected compared to more homogeneous and simple

ingroup representations. However, complexity and variability might as well shape the projection process in a different manner. It is conceivable that even complex and variable ingroup representations are projected. That would imply that complexity and variability as a structural feature are projected onto the superordinate category, too. Hence, the superordinate category would also be characterized by the ingroup's variability and complexity. But how could a variable and complex mental representation serve as a prescriptive standard for subordinate categories? It is the nature of standards that they are clear and unambiguous. Once they loose this quality they are not usable as standards anymore. Therefore, it is likely that ingroup prototypicality only predicts ingroup bias in the case of simple and homogeneous ingroup representations whereas this relation decreases the more the ingroup representation becomes complex and heterogeneous.

The idea to alter cognitive representations of outgroups or superordinate categories in order to change intergroup evaluations has been investigated within several models. The Personalization Model (Brewer & Miller, 1988), for example, suggests that personalized contacts with outgroups reduces the salience and meaning of social categories in such a way that ingroup and outgroup members are not represented as two distinct entities anymore but as singular individuals. This *decategorization* process suggests that group lines are less used for evaluation. Similarly, the Common Ingroup Identity Model (Gaertner & Dovidio, 2000) stresses the role of mental representations inasmuch as a transformation of ingroup and outgroup into one inclusive category reduces ingroup bias. Through this *recategorization* process the former outgroup becomes part of an ingroup at a higher level of categorization and, therefore, the positive evaluation of the ingroup extends to the former outgroup.

Furthermore, Waldzus, Mummendey, Wenzel, and Weber (2003) successfully decreased ingroup projection tendencies by manipulating the mental representation of the superordinate category as either indefinable (Study 1) or complex (Study 2). Indefinable or complex representations of the superordinate category imply that many alternative subordinate category representations are fitting the standard of the superordinate category equally good and the ingroup cannot claim prototypicality for itself. Therefore, both manipulations led to a decrease in perceived ingroup prototypicality which was, as expected, correlated with less ingroup bias. The results of Waldzus et al. (2003) suggest that the alteration of mental category representations is a fruitful approach to change intergroup evaluations.

To my knowledge, the possibility that modifications of mental *ingroup* representations might be effective means to change intergroup evaluation has never been considered. The

Cognitive Model of Ingroup Projection provides the theoretical background for the assumption developed here that projection tendencies or the relation between projection and intergroup evaluation might be a function of the complexity and variability of the mental ingroup representation.

The following chapters investigate this proposition. This dissertation encompasses seven chapters. Because the Ingroup Projection Model represents the theoretical basis of the present line of research, it is introduced in more detail in the second chapter. Besides, the Cognitive Model of Ingroup Projection is discussed and some first empirical evidence for cognitive projection is presented.

In the third chapter the literature on mental representations in terms of complexity and variability is reviewed. I argue that prototype representations, variability and complexity are clearly related. As the mode of mental representations in terms of prototypes and exemplars is a function of target group and trait valence, so should variability and complexity. In reviewing the relevant literature on category variability, I delineate the so-called outgroup homogeneity effect that reflects the usual finding that the ingroup is, relative to the outgroup, perceived as inherently more diverse and variable. However, some research suggests a convergence with the findings on abstract representations such that both the abstractness of mental representations and variability of mental representations are a function of target group and trait valence. Similarly, research on complexity seems to unambiguously show that ingroup representations are more complex than outgroup representations. However, I demonstrate that the conclusions from the complexity research are not that clear-cut as it seems at first glance. In a forth chapter I draw conclusions from the literature review and deduce the hypotheses of the present thesis. The theoretical part closes with an overview.

The empirical section of this thesis is divided into two parts. In the first part (chapter 5), I report Experiment 1 and 2 in which complexity manipulations were used in order to manipulate mental ingroup representations. Furthermore, Experiment 2 focuses on the role of interindividual differences and their role in intergroup evaluations. In particular, Personal Need for Structure (PNS), which is a motivated cognition and refers to interindividual differences in the need to mentally structure (social) information (Neuberg & Newsome, 1993), and diversity beliefs, which refer to the appreciation of diverse categories, were employed. Experiment 3 and 4, in which variability manipulations were employed, are presented in Part II (chapter 6). With distinctiveness threat, another motivated process is introduced in the second part. Distinctiveness threat signifies the phenomenon that groups

whose boundaries are not clearly defined react with ingroup bias (Jetten & Spears, 2003). Distinctiveness threat might be triggered if high levels of variability and complexity are induced. In chapter 7, the results are summarized and discussed. Limitations of the presented experiments and implications for further research are considered.

2 Models of ingroup projection

2.1 The original Ingroup Projection Model

The ubiquitous phenomenon that people favor ingroups over outgroups was and still is predominantly explained in terms of motivational factors. For example, Social Identity Theory (e.g., Tajfel & Turner, 1979) assumes that biased intergroup evaluation serves the creation or maintenance of a positive (social) identity. Similarly, the more recent Ingroup Projection Model (Mummendey & Wenzel, 1999; Wenzel et al., 2003), which has its roots in Social Identity Theory and Self Categorization Theory (Turner, 1987), supposes that ingroup members project typical ingroup features onto a superordinate category encompassing ingroup and outgroup in order to make the ingroup more prototypical of this superordinate category. According to Self Categorization Theory, the superordinate category provides the standards and norms for intergroup comparison, therefore, higher ingroup prototypicality leads to a better evaluation of the ingroup relative to the outgroup. In other words, people project features of their own ingroup onto the superordinate category so that the ingroup is more prototypical of the superordinate category in order to evaluate ingroups better than outgroups. In line with Social Identity Theory, the Ingroup Projection Model assumes that people are motivated to obtain a positive ingroup evaluation and that they instrumentally engage in ingroup projection to attain this goal. Wenzel et al. (2003) emphasized the motivational character of the Ingroup Projection Model as follows:

> This is the first assumption of SCT [Self Categorization Theory] on which Mummendey and Wenzel (1999) based their analysis: Ingroup and outgroup are evaluated in terms of their relative prototypicality for a salient inclusive self-category. A second relevant SCT assumption is "that self-categories tend to be evaluated positively" (Turner, 1987a, p. 57), which has its roots in SIT [Social Identity Theory] (Tajfel & Turner, 1979) and its proposition that group members strive towards a positive social identity. Mummendey and Wenzel (1999) took these assumptions to the logical conclusion that group members would tend to perceive their own group as more prototypical for the inclusive category than the outgroup. (…) Because both groups want to be considered as the more (or not much less) prototypical subgroup, group members tend to perceive their own group's attributes as relatively prototypical and thus project their ingroup's attributes onto the

> inclusive category. Through projection, each group tries to increase its relative social status. (p. 462)

The Ingroup Projection Model was supported by research showing that the ingroup is perceived as more prototypical of a superordinate category relative to an outgroup (Waldzus, Mummendey, Wenzel, & Boettcher, 2004; Wenzel et al., 2003). A perspective divergence is the inevitable result if members of two groups belonging to the same superordinate category perceive their respective ingroup as relatively more prototypical than it is perceived by the outgroup. And indeed, Wenzel et al. (2003) demonstrated that two subgroups belonging to the same superordinate category disagree about each others prototypicality. Wenzel et al. (2003) assessed the perceived prototypicality of both psychology and business students. The results showed that psychology students perceive psychology students as more prototypical of students in general than did business students. In contrast, business students perceived business students as more prototypical of students in general than did psychology students.

Two conditions have been specified which have to be met simultaneously for ingroup projection to occur: High ingroup identification and high superordinate category identification. Only if members are highly identified with their ingroup and, thus, have internalized group membership as an aspect of their identity, they are motivated to enhance their social identity. Consequently, only high ingroup identifiers should engage in ingroup projection. In addition, high superordinate category identification is a precondition for projection because without superordinate category identification the standard is of no normative relevance. In fact, research has shown that only dual identifiers (i.e., members who are highly identified with both the ingroup and the superordinate category) perceive the ingroup as relatively more prototypical of the superordinate category (Waldzus et al., 2003; Wenzel et al., 2003).

From Self Categorization Theory, the Ingroup Projection Model adopted the assumption that the superordinate category provides standards for comparison. Hence, more perceived ingroup prototypicality should be related to more negative outgroup evaluations. Evidence for this reasoning has been provided by Waldzus and Mummendey (2004), Waldzus et al. (2003), and Wenzel et al. (2003). Similarly, perceived ingroup prototypicality predicts the legitimization of low outgroup status (Weber, Mummendey, & Waldzus, 2003). However, the positive relation between relative ingroup prototypicality and negative outgroup evaluations is limited to cases in which the superordinate category is valued positively and, thus, is a positive reference standard. If the reference standard (i.e., the superordinate category) has

negative valence, relative ingroup prototypicality should be related to more positive attitudes towards the outgroup. In such a case, where the ingroup fits a negative standard better than the outgroup the outgroup must be evaluated better. This hypothesis was confirmed by Wenzel et al. (2003, Study 3). The authors found that valence of the superordinate category significantly moderated the relation between relative ingroup prototypicality and outgroup evaluations.

Convincing evidence that it is the mental representation of the ingroup that is projected onto the superordinate category was provided by Waldzus, Mummendey, and Wenzel (2005). Waldzus et al. (2005) demonstrated that the characterization of the superordinate category varied with the ingroup stereotype. In this study, the ingroup stereotype was manipulated by varying only the reference outgroup across experimental conditions while the ingroup was kept constant. Through this manipulation the distinctiveness of ingroup attributes varies with the respective reference outgroup. In particular, in one condition Germans (the ingroup) compared themselves with Italians; in the other condition Germans compared themselves with the British. The characterization of the superordinate category depended on the reference outgroup: Europeans were perceived as more orderly and disciplined when the reference outgroup were Italians whereas Europeans were perceived as more easygoing and sociable if the reference outgroup were the British. By adapting the mental representation of the superordinate category, ingroup members ensured their own relative prototypicality.

As already outlined, for both the Ingroup Projection Model and the Common Ingroup Identity Model the representation of the superordinate category plays a crucial role. Yet, while the Common Ingroup Identity Model postulates that the inclusion of ingroup and outgroup in one higher order category dissolves ingroup favoritism, the Ingroup Projection Model argues that the inclusion of ingroup and outgroup in one superordinate category is precisely the condition in which ingroup favoritism should emerge. Meiser, Mummendey, and Waldzus (2004) suggested that these effects are moderated by the relevance of the superordinate category. A superordinate category is relevant if it completely encompasses ingroup and outgroup. Studies investigating the Ingroup Projection Model always used relevant superordinate categories. So, for example, all Germans (ingroup) and all Poles (outgroup) exhaustively belong to the superordinate category of Europeans. In contrast, the Common Ingroup Identity Model employed cross-cutting categories like, for example, Democrats and Republicans belonging to the same superordinate category of “participants” in an experimental study. Obviously, not all Democrats and Republicans belong to the superordinate category of participants in an experimental study. In addition to the structure of

the intergroup setting, relevance is determined by the content of intergroup comparison. A superordinate category is relevant to the extent that social categorization and the content of the intergroup scenario correspond. The authors found evidence that highly relevant inclusive categories produce ingroup bias (Ingroup Projection Model) whereas categories of low relevance lead to an improvement in intergroup evaluations (Common Ingroup Identity Model).

As the superordinate category is fundamental for intergroup evaluations, the authors of the Ingroup Projection Model modified the mental representation of the superordinate category in order to increase tolerance. Waldzus and colleagues (2003) suggested that if the superordinate category is indefinable (Study 1) or complex (Study 2) neither subgroup could claim to be more prototypical. The results confirmed the hypothesis: Manipulations of undefineability and complexity led to a decrease in perceived ingroup prototypicality which was, as expected, correlated with better outgroup evaluations. However, considering the path model in the 2003 study in more detail, there was no total effect of complexity on outgroup evaluations. That is, regressing outgroup evaluations on experimental manipulation (complexity versus simplicity condition and definable versus indefinable condition, respectively) did not show the expected increase in outgroup evaluations. Recently, Waldzus et al. (2005) could provide evidence for a main effect of complexity manipulations on outgroup evaluations such that more complex superordinate category representations are related to more positive outgroup evaluations. This main effect was clearly mediated by the perception of ingroup prototypicality. Still, further research seems necessary to clarify when and when not direct effects from complexity to outgroup evaluation can be expected.

The review of the relevant research on the Ingroup Projection Model should have contributed to the understanding of mental group representations as fundamental for intergroup evaluations. Especially the research by Meiser et al. (2004) and Waldzus et al. (2003, 2005) corroborates that the mental representation of the intergroup setting is essential for projection and evaluation.

2.2 Mental representation as cognitive basis of ingroup projection

The Cognitive Model of Ingroup Projection emphasizes the role of mental group representations for intergroup evaluations and suggests a more cognitive mechanism of ingroup projection. More precisely, it assumes that mental representations of ingroup and outgroup (as opposed to the superordinate category representation) play a major role for projection and intergroup evaluations. Derived from this assumption, the present thesis

investigates the hypothesis that the mental representation of the ingroup leads to changes in the projection and evaluation process. Before the Cognitive Model of Ingroup Projection and the theoretical ideas of the present thesis are introduced in more detail, I review some relevant research on mental representations of social categories.

Cognitive and social psychological theories of category acquisition and representation distinguish abstraction or prototype-based processes from a representation on the basis of exemplars (see, e.g., Medin, Altom, & Murphy, 1984; Smith & Zárate, 1990). Prototype models assume that information about a group is stored as a sort of vector that captures the relevant information about a group. Exemplar models, in contrast, assume that exemplars of a category are stored and that a sample of exemplars is retrieved from memory once a judgment is required. It has been suggested that exemplar-based representations and abstract representations coexist (see also Judd & Park, 1988; Park & Hastie, 1987; Smith & Zárate, 1990). That is, some groups might be represented in one mode, other groups in the other mode. Furthermore, the same group might be represented exemplar-based with regard to one content and prototype-based with regard to another content.

Several fields of research indicate that ingroup and outgroup information are represented differently in long-term memory. Research on attributions within an intergroup context revealed that positive behaviors of ingroup members and negative behaviors of outgroup members are explained in terms of internal causality (i.e., the person's personality), stability over time and controllability by the acting person whereas negative behaviors of ingroup members and positive behaviors of outgroup members are explained in terms of external causality (i.e., the situation), variability over time and a cause which is not under the control of the acting person (ultimate attribution error; Islam & Hewstone, 1993; Pettigrew, 1979). Likewise, research on the linguistic intergroup bias (e.g., Maass, Salvi, Arcuri, & Semin, 1989) has shown that in order to describe positive behaviors of the ingroup and negative behaviors of the outgroup, people use more abstract terms compared to descriptions of negative behaviors of the ingroup and positive behaviors of the outgroup. This indicates that the former behaviors are encoded in a more generalized, trait-like form compared to the latter. Finally, Otten and Moskowitz (2000) demonstrated that participants spontaneously infer traits from behaviors only in the case of positive ingroup information but not negative ingroup or positive outgroup information. Thus, again positive ingroup information is encoded in a more abstract manner as compared to positive outgroup or negative ingroup information.

Most direct evidence for the assumption of different storage modes depending on the ingroup-outgroup distinction and valence stems from research by Sherman et al. (1998) who used a task facilitation paradigm to assess abstract, prototype-based representations as opposed to singular, exemplar-based representations of social information. The participants of Sherman and collaborators (1998) were assigned to two novel, arbitrary, minimally important groups following the procedure of the minimal group paradigm by Tajfel, Billig, Bundy, and Flament (1971). Thereafter, participants read either positive or negative trait-relevant behaviors of ingroup and outgroup members and afterwards had to perform two tasks in succession. The first task that required participants to make a judgment whether a trait was describing the group (e.g., "Does the word intelligent describes group A?"), facilitated the second task which required participants to recall a specific trait-relevant behavior (e.g., "Remember a specific incident in which a member of group A behaved in an intelligent manner."). However, the facilitation in terms of reaction times only occurred when the mental representation of the respective group was exemplar-based because only then the judgment task already activated knowledge about specific exemplars relevant for the recall task. In contrast, when the group was represented prototype-based the first task activated abstract trait knowledge which did not activate specific exemplars and, thus, no relevant knowledge for the recall task. Sherman et al.'s (1998) results confirmed the expectation that positive ingroup and negative outgroup behaviors are stored in an abstract prototype-based representation, whereas negative ingroup and positive outgroup behaviors are stored in an exemplar-based representation.

To summarize, research provided convergent evidence that positive ingroup and negative outgroup information is represented in an abstract manner, whereas negative ingroup information and positive outgroup information is stored on the basis of exemplars.

2.3 The Cognitive Model of Ingroup Projection

According to the Ingroup Projection Model, two groups compare each other with respect to the prototype of a higher order category. As Rosch et al. (1976) have demonstrated, higher order categories are less clearly defined than so-called basic categories and are less readily available. Thus, if members of two groups compare each other on the basis of a superordinate category they first have to *generate* a representation of this more inclusive category. The Cognitive Model of Ingroup Projection assumes that group members generate a prototype of a superordinate category by means of heuristic, resource-saving processes. Research has suggested that prototype-based representations are very efficient and resource preserving

(Macrae et al., 1994; Sherman, 1996). It is proposed that people use prototype-based representations of more basic categories and project these onto the superordinate category to form a mental image of that category. Concerning positive contents, it is the abstract mental representation of the ingroup that is available and, thus, used to characterize the superordinate category. Thereby, the phenomenon of ingroup projection may result from largely cognitive processes. Concerning negative contents on the other hand, an abstract mental representation of the outgroup is accessible and can be used in order to characterize the superordinate category. In these cases, the relations reverse such that less ingroup prototypicality leads to more ingroup bias.

Two experiments provided evidence for the Cognitive Model of Ingroup Projection. A first experiment demonstrated that people heuristically use prototype information to characterize the superordinate category. A category learning paradigm was employed. Participants were asked to build an impression of two artificial groups which supposedly had been identified by recent psychological research. Participants were told that one group's performance improved in cognitive tasks if there was high pitch background noise, the other group's performance improved if there was a low pitch background noise. However, both groups were introduced to belong to an inclusive superordinate category whose performance improves under background noise (as opposed to a group whose performance degrades under background noise). Importantly, the participants themselves were not categorized to preclude any motivational concerns in this paradigm. In principle, both groups were characterized by three traits which were reflected in behavioral descriptions. To learn about the groups, participants read trait-relevant behaviors of members of both groups in the same way (i.e., "Peter, member of the group 'improved performance under high pitch background noise', helped an old lady to cross the street").

In order to manipulate mental representations in terms of exemplars and prototypes, trait information was provided for one group before participants learned about the specific behaviors. Trait information summarizes relevant information and is related to prototype-based representation of social categories (for a similar procedure see, e.g., Park & Hastie, 1987). After the impression formation task participants indicated how prototypical each group was of the superordinate category of performance improvers under background noise. As predicted, the group for which a prototype-based representation was induced was perceived to be significantly more prototypical of the superordinate category ($t(39) = 2.45$, $p < .05$). The results are illustrated in Figure 1a.

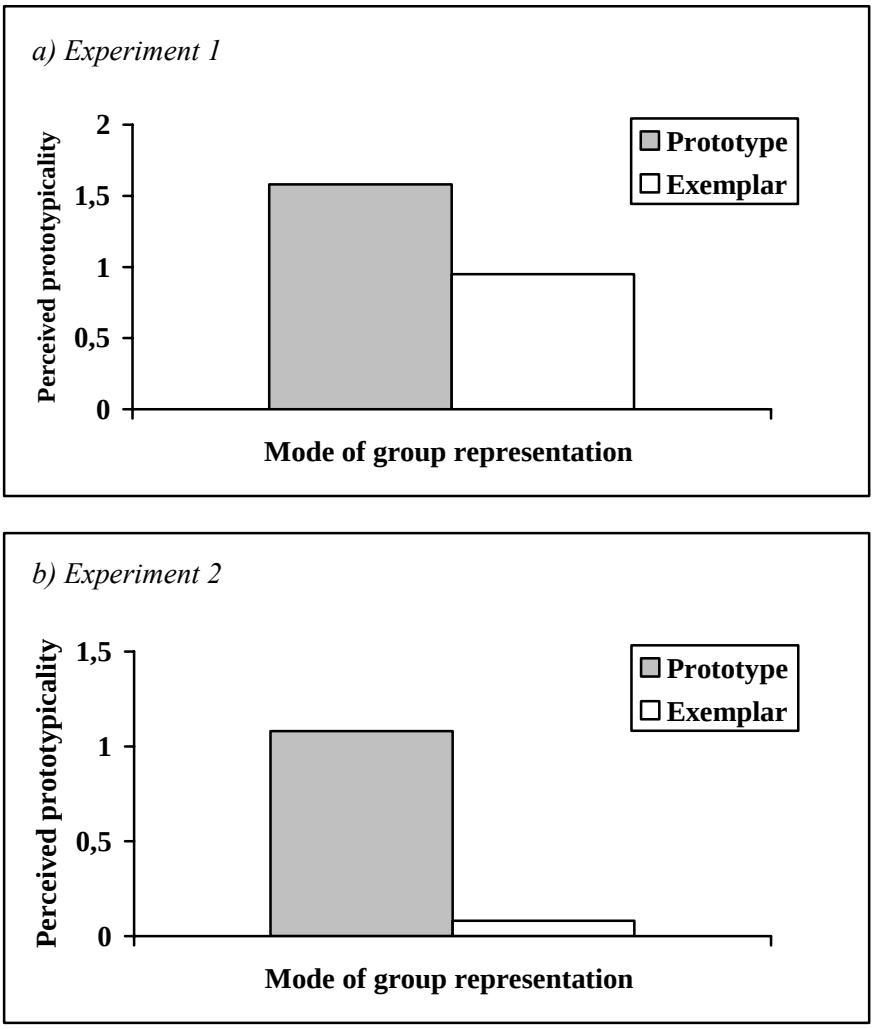

Figure 1a, b. Perceived prototypicality of the superordinate category as a function of mode of mental representation (Experiment 1, 2).

A second experiment replicated these results with a slightly different procedure. Instead of providing trait information prior to the presentation of behavioral information, the prototype was induced by presenting three times more trait-relevant behaviors in the prototype-group as compared to the exemplar-group because higher numbers of trait-relevant behaviors facilitate the formation of abstract information (for a similar procedure see Klein, Loftus, Trafton, & Fuhrmann, 1992). Again, the group that was represented prototype-based was perceived to be more prototypical of the superordinate category as compared to the group that was represented exemplar-based ($t(35) = 3.11$, $p < .01$, see Figure 1b). Apparently, participants used information from the prototype-based representation of one subgroup in a heuristic fashion to define the superordinate category. These two studies provided convergent evidence for the notion that subgroup features are projected onto superordinate categories to the extent that the features are represented prototype-based. However, it still needs to be demonstrated how prototype-projection relates to evaluation. A critical test would include

both positive and negative behavioral information to demonstrate that group prototypicality is related to better evaluation concerning positive information whereas group prototypicality is related to worse evaluation concerning negative information.

3 Complexity and variability of mental representation

The present thesis relies on the Cognitive Model of Ingroup Projection with the focus on alterations of projection and evaluation processes concerning positive group characteristics. Concerning positive characteristics, the Cognitive Model of Ingroup Projection predicts that it is the easily available, abstract mental representation of the ingroup (i.e., the ingroup prototype) that is projected onto the superordinate category. Furthermore, at the level of the superordinate category, the projected ingroup prototype serves as a comparison standard which necessarily leads to a better match between ingroup and superordinate category than between outgroup and superordinate category, and, finally, to a better evaluation of the ingroup relative to the outgroup. Therefore, it seems very likely that alterations of the *ingroup* representation are highly effective for modifications of projection and evaluation processes. In particular, I hypothesize that conditions that interfere with or facilitate the availability of an ingroup prototype should decrease or increase projection, respectively. Thus, the properties of prototype-based representations need to be identified.

It has been argued that prototype representations go together with restricted variability perceptions (Brewer & Harasty, 1997; Mullen, 1991; Ford & Stangor, 1992). Similarly, Park and Hastie (1987) demonstrated that stereotypes (i.e., prototypes) are only useful and diagnostic to the extent that the deviance around the mean is small. Therefore, projection should not only depend on prototype-based representations but should be a function of perceived variability, too.

Next to variability I suggest that complexity is negatively related to the abstractness of mental representations. As will be outlined later, complexity consists of two components, namely differentiation and integration (Locke, 2003; Rafaeli-Mor & Steinberg, 2002; Tetlock, 1983). Differentiation signifies the discrimination of stimuli within a category whereas integration denotes the formation of clusters of these stimuli according to multi-dimensional similarities. Similar to the previous argument concerning the relation between variability and prototypes, I suggest that a prototype can only be used in a heuristic manner if the prototype is of little complexity.

In conclusion, prototypes, variability, and complexity are clearly related although they are different constructs. Changes in variability and complexity should therefore affect projection given that projection is a function of prototype accessibility (as suggested by the Cognitive Model of Ingroup Projection). Since the change of mental ingroup representations

in terms of variability and complexity is a major concern of the present thesis, I briefly review the literature concerning mental representations with the focus on variability and complexity. Because I argue that variability, complexity, and abstractness of mental representation are clearly related, it is of major interest whether variability and complexity are functions of trait valence and target group as is the case for the abstractness of mental representations.

However, an alternative process is conceivable. This second hypothesis involves the mental representation of the superordinate category. I discuss the possibility that complexity and variability of the ingroup are projected onto the superordinate category as structural features. From previous literature I derive the hypothesis that this has consequences for the usability of the superordinate category representation as a prescriptive standard.

3.1 Variability of ingroup and outgroup representations

Variability refers to the dispersion of category elements on multiple dimensions. Perceived variability of groups was measured with a number of different methods. Park and Judd (1990) analyzed the different measurement methods and extracted two intercorrelated factors, stereotypicality and dispersion. Stereotypicality was assessed with a rating of how many members out of a hundred show stereotypical and counterstereotypical attributes. Dispersion was assessed with a distribution of members on stereotypic and counterstereotypic attributes from which a standard deviation was calculated. A range measure in which participants marked the two most extreme members of a target group on several dimensions also belonged to the dispersion measures. A global similarity measure asking for the overall similarity of group members loaded on both factors.

Regarding perceived group variability, the outgroup homogeneity effect is probably one of the best investigated phenomena in social psychology (Voci, 2000) and seems to be in contradiction with the reasoning of the present thesis at first glance. The outgroup homogeneity effect describes the tendency to perceive a group one does not belong to as more homogeneous than a group one is member of (Judd & Park, 1988; Linville, Fischer, & Salvoy, 1989; Park & Rothbart, 1982; Quattrone & Jones, 1980). The social cognition literature provided convergent evidence for the outgroup homogeneity effect although there is much less agreement concerning the underlying causes. Linville et al. (1989) proposed that this effect is based on higher familiarity with the ingroup. Their model relies on an exemplar-based model of mental group representation. In contrast, Park and Judd (Judd & Park, 1988; Park & Judd, 1990; Park et al., 1991) proposed a dual-storage model. This model suggests that information about a group is primarily stored in the form of abstract summaries.

Regarding the outgroup, judgments of variability are only based on the abstract representation. In contrast, for judgments about the ingroup additional exemplar information is used. The additional information regarding the ingroup leads to relatively more perceived variability. Both models share the assumption that the outgroup homogeneity effect depends on retrieval processes.

This social cognition line of research can be contrasted with research that showed that the outgroup homogeneity effect is not a global effect. Indeed, other researchers demonstrated that the effect depends very much on contextual features (Castano & Yzerbyt, 1998; Haslam, Oakes, Turner, & McGarty, 1995; Rothgerber, 1997; Simon, 1992a; Simon & Mummendey, 1990; Simon & Pettigrew, 1990). One of the most influencing variables is the minority-majority context: If the ingroup forms a minority in relation to an outgroup the effect reverses and the ingroup is perceived as more homogeneous than the outgroup (e.g., Mullen & Hu, 1989; Simon & Brown, 1987). Other variables influencing the outgroup homogeneity effect are status (Brauer, 2001; Lorenzi-Cioldi, 1998), absence or presence of comparative context (Castano & Yzerbyt, 1998; Haslam et al., 1995), reference to the individual self (Park & Judd, 1990) and the attribute dimensions in terms of relevance and valence (Haslam et al., 1995). Given the heterogeneity of results Voci (2000) concluded that the occurrence of the outgroup homogeneity effect is frequent but not general (see also Mullen & Hu, 1989; Ostrom & Sedikides, 1992).

In order to dissolve the inconsistent effects concerning the outgroup homogeneity effect, researchers have looked for moderators. An interesting moderator of homogeneity which matches very well the research on the linguistic intergroup bias, spontaneous trait inferences, intergroup attributions, and Sherman et al.'s (1998) work with the task-facilitation paradigm was suggested by Haslam and collaborators (1995). They found an ingroup homogeneity effect when the judgment was made on positive traits whereas a traditional outgroup homogeneity effect emerged when the judgment was made on negative traits. Similarly, Ostrom and Sedikides (1992) reasoned that the outgroup homogeneity effect might even reverse to an ingroup homogeneity effect if only positive traits are used to assess the perceived variability of the ingroup and the outgroup (see Simon, 1992b, for a similar reasoning).

Apparently, as the mode of representation in terms of prototypes and exemplars perceived homogeneity is a function of both target group and trait valence. In particular, the Cognitive Model of Ingroup Projection proposes that positive ingroup and negative outgroup

attributes are represented abstraction-based whereas negative ingroup and positive outgroup attributes are represented on the basis of exemplars. Similarly, research by Haslam et al. (1995) on variability has shown that the pattern of variability in the 2 × 2 matrix of ingroup versus outgroup and positive versus negative attributes matches the prototype versus exemplar distribution such that in the positive ingroup and negative outgroup cells the perceived variability is more limited than in the negative ingroup and positive outgroup cells (see Table 1). This substantiates the reasoning that the abstractness of mental representation goes hand in hand with restricted variability perceptions.

Table 1. Variability and abstractness of mental representation as a function of trait valence and target group.

		Trait valence	
		Positive	Negative
Target group	Ingroup	Prototype Low variability	Exemplar High variability
	Outgroup	Exemplar High variability	Prototype Low variability

3.2 Complexity of ingroup and outgroup representations

Complexity has been a topic in social psychology since decades. As diverse as the definition of complexity in different sciences is the definition within different sub-disciplines of social psychology. In the 1950s, a complexity-simplicity scale (Berkowitz, 1957) measured a construct of interindividual differences which closely resembles what we call Personal Need for Structure (Thompson, Naccarato, Parker, & Moskowitz, 2001) or Need for Closure (Webster & Kruglanski, 1994) nowadays. In contrast to this trait conception of complexity, Linville (1982) presented complexity as a domain specific issue. In this view, people can have complex knowledge structures regarding one category or set of stimuli but rather simple knowledge structures regarding another category or set of stimuli. Linville (1982) defined complexity as the number of different aspects or features which are used to characterize a stimulus set and the semantic differences among them (see also Judd & Lusk, 1984; Linville & Jones, 1980).

Like Linville, most studies in social psychology used card sorting tasks and Scott's *H* to measure the complexity of the cognitive representation of a category (Brewer & Lui, 1984;

Linville, 1985, 1987; Neuberg & Newsom, 1993; Niedenthal, Setterlund, & Wherry, 1992). For example, Neuberg and Newsom (1993) asked participants to sort 33 index cards that contained trait words on the basis of how they were related to elderly people. Furthermore, participants were to sort the cards into groups based on similarities. Participants could use as many cards as they wanted and could also use traits more than once. From this sorting *H* was calculated which increases with the number of traits used, the number of subgroups formed and the number of times the same trait was used for different subgroups. [1]

Originally, Scott's *H* was a measure of unpredictability which was derived from information theory (Locke, 2003). A response conveys more information the more *unpredictable* it is. This is the most critical point about *H*: Randomness in assignment of features to subgroups leads to an artificial increase in *H* expressing chaos and complete unpredictability (Scott, 1962), but randomness should be the opposite of complexity.

In order to understand the measurement problem of Scott's *H*, the definition of complexity needs to be considered once again. Although there was only little consensus about how to define complexity (Locke, 2003; Rafaeli-Mor & Steinberg, 2002), most authors refer to a combination of *differentiation* and *integration* (see e.g., Tetlock, 1983). Differentiation and integration was defined by Suedfeld, Tetlock, and Steufert (1992) as followed:

> Differentiation refers to the perception of different dimensions within a stimulus domain, and to the taking of different perspectives when considering the domain. It is a necessary but not sufficient prerequisite for integration, which is the development of conceptual connections among differentiated dimensions or perspectives. (p. 393)

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[1] $H = \log_2 n - (\sum_{i=1}^{C} n_i \log_2 n_i)/n$ whereby *n* is the total number of attributes and n_i is the number of attributes that appear in a given response category, $n = \sum n_i$. *C* is the number of possible response categories. *C* is determined by *R* which is the number of subgroups formed, $C = 2^R$. So for example, if participants are asked to sort traits into two groups, Group A and Group B, four response categories are possible. Participants can sort a trait into either Group A (C_1), Group B (C_2), Group A and Group B (C_3) or neither group (C_4). Thus, n_1 is the number of traits sorted into response category C_1, n_2 is the number of traits sorted into response category C_2 etc.

Locke (2003) also defined complexity by the two components of differentiation and integration. According to him, differentiation is to distinguish elements within a stimulus domain and integration is to link or organize the differentiated elements. These definitions clarify the problem of Scott's *H*: *H* increases with differentiation but tends to decrease with integration (Locke, 2003). Therefore, *H* is a suitable measure for differentiation as long as no integration is encouraged.

If Linville's (1982) definition of complexity is reconsidered, it becomes clear that the focus on the number of features which are used to describe a category emphasized differentiation whereas integration is neglected. Therefore, Scott's *H* might be a suitable measure for her work. However, in the present thesis both components should be considered. Moreover, I suggest that the two component-definition of complexity makes it possible to distinguish the concepts of variability and complexity. I suggest that a set of stimuli is *variable* if its components are highly differentiated. If these stimuli are also integrated, the set of stimuli is variable as well as *complex*. In other words, complexity refers to the formation of meaningful clusters among stimuli which have been recognized as highly differentiated on multiple dimensions. As variability includes only one step, it is the more parsimonious concept.

This definition of complexity has obviously a structural similarity to the formation of subgroups within a social category (Brewer & Lui, 1984; Brewer & Miller, 1988; Park et al., 1991; Richards & Hewstone, 2001). Subgrouping is a process which has been identified by the stereotyping literature and refers to the mental organization of information about a group into several clusters of individuals who are similar to one another in some way and different from members of other subgroups (Maurer, Park, & Rothbart, 1995). A subgroup can contain stereotype-consistent and -inconsistent members at the same time. Importantly, all subgroups still belong to the category as a whole. So, for example, the group of psychologists can be divided into subgroups of scientists, therapists, work psychologists, consultants etc. Less typical examples like consultants are still perceived as psychologists which leads to an increase in complexity. Because complexity and variability are related constructs, subgrouping also leads to an increase in perceived variability. As a result, the stereotypic perception of group members decreases (Park & Judd, 1990; Park et al., 1992). Therefore, subgrouping is conceived of as a process that weakens existing stereotypes and has the potential for stereotype change (Richards & Hewstone, 2001).

In contrast to subgrouping, subtyping is a process that serves stereotype conservation (Hewstone, Hassebrauck, Wirth, & Waenke, 2000; Johnston & Hewstone, 1992; Rothbart & John, 1985; Weber & Crocker, 1983). Subtyping is defined as the process by which stereotype-inconsistent group members are mentally excluded from the rest of the group (Maurer et al., 1995). The "refencing" process described by Allport (1954) refers to the same idea. Think for example about mathematically talented women. As they do not fit the overall stereotype about women they are conceived as more man-like and their female features are denied. As a consequence they are mentally excluded from the group of women, which simplifies the mental representation of women.

Weber and Crocker (1983) were the first who experimentally investigated subtyping. They showed that stereotype-inconsistent information that is concentrated within a few group members leads to the mental exclusion of these disconfirming members, leaves the stereotype of the remaining group relatively unchanged and still lets the group appear homogeneous (for similar results, see Johnston & Hewstone, 1992). In terms of the definition of complexity, differentiation of stimuli only takes place on the basis of the consistency-inconsistency dichotomy. Thus, in the process of integration, only two clusters are formed: One cluster contains the inconsistent stimuli, the other cluster contains the consistent stimuli. Furthermore, after the exclusion of inconsistent stimuli, only the consistent stimuli remain to represent the category. The remaining stimuli are necessarily neither very differentiated (all stimuli are consistent) nor are they integrated in more than one sub-cluster. Although this is a very ideal description of subtyping, it should have exemplified the process. To conclude, the process of subtyping leads to a reduction of complexity.

Several studies compared subgrouping and subtyping directly and confirmed that subgrouping and subtyping have the predicted opposite effects on perceived homo- and heterogeneity of groups (Maurer et al., 1995; Park, Wolsko, & Judd, 2001; for a review, see Richards & Hewstone, 2001). Sophisticated models have been developed in order to specify the relation between subgroups and perceived variability. Kraus, Ryan, Judd, Hastie, and Park (1993) proposed that perceivers create mental distributions when observing behaviors of group members. From these mental distributions they deduce the central tendency and variability of a group when judgment is required. The authors reasoned that the higher the resolution of the distribution in terms of subgroups, the more variability is perceived within a group. Similarly, Park and Judd (1990) showed that a higher number of generated self-subgroups goes hand in hand with an increase in variability perceptions. Moreover, more subgroups were generated for the ingroup than for the outgroup (Park & Judd, 1990,

Experiment 2). Park et al. (1992) showed that outgroup homogeneity (i.e., low perceived outgroup variability relative to high perceived ingroup variability) is mediated by the larger number of subgroups generated for the ingroup relative to the outgroup. These results demonstrated two things: Firstly, complexity and variability of social categories are strongly interwoven constructs although complexity is a wider concept. Secondly, the mental representation of ingroups seems to be more complex than the mental representation of outgroups.

Although the reported research converges such that ingroup representations are represented by more subgroups and are therefore more complex than outgroup representations, it can be questioned whether this effect is as general as it appears to be. To my knowledge subgrouping for ingroups and outgroups has never been controlled for trait valence. Furthermore, Kraus et al. (1993) found that participants construed significantly more subgroups on counterstereotypic dimensions. Assuming that stereotypicality in an ingroup-outgroup context is related to the valence of the considered dimensions, the results of Kraus et al. (1993) might suggest that participants have more complex ingroup representations if negative traits are concerned and more complex outgroup representations if positive traits are concerned. But certainly more research is needed in this field to come to a conclusion.

3.3 The effects of ingroup variability and complexity on superordinate category representation

So far, I have focused on mental ingroup and outgroup representations. Relying on the Cognitive Model of Ingroup Projection that suggests that features of subordinate groups are projected to the extent that they are represented prototype-based, I looked for properties of prototype-based representations because modifications of these properties should change the abstractness of the mental representation and, thus, the projection process. I identified low levels of complexity and variability as two properties of abstract, prototype-based mental representations. Therefore, changes in complexity or variability of mental ingroup representations should affect the magnitude of the projection of ingroup features.

However, in addition to the outlined process concerning the magnitude of projection, a second process is conceivable when complexity or variability of the mental ingroup representation is changed. Judd and Park (1988) argued that variability information, as information about the central tendency, might be represented in an abstract form. Abstract variability information about a social category might be imagined as a tag that is fixed to the category and contains the relevant information concerning variability. Thus, variability or

complexity is not deduced from the distribution of category members any time a judgment is needed. Instead, complexity and variability information are stored in an abstract manner and are readily available when judgment is needed. So what if this abstract tag is also projected onto the superordinate category as any other feature? If complexity or variability information is projected onto the superordinate category as a structural feature the question of consequences of more or less complex or variable superordinate category representations arises. The projection of variability and complexity information onto the superordinate category should influence the way the prototype of the superordinate category is used as a standard for judgment of subordinate groups.

Some insights of how variability or complexity of judgmental standards might influence evaluation derive from research on intragroup processes. Hogg, Cooper-Shaw, and Holzworth (1993) showed that prototypicality serves as a basis for liking only among those ingroup members who perceived the group as cohesive and having a clear prototype. Thus, the ingroup prototype as a reference for evaluation of ingroup members was useless if the group was not homogeneous. Transferring this result to the domain of intergroup processes means that only a superordinate category with a prototype of little complexity and variability provides comparison standards which can be used for judgment. Interestingly, already Waldzus et al. (2003) mentioned the possibility that concerning variability "different representations can affect the extent to which a category prototype is used as a prescriptive standard for prototypicality and attractiveness judgments" (p. 32). Though Waldzus et al. (2003) mentioned this possibility, it was not tested.

Because only a clearly defined ingroup prototype should serve as a prescriptive standard at the level of the superordinate category, I expect that relative ingroup prototypicality is a strong predictor of ingroup bias only if the mental representation of the ingroup is of little complexity and variability, respectively. In more technical terms, variability and complexity of the ingroup representation interacts with relative ingroup prototypicality and ingroup bias such that the predicted relation between relative ingroup prototypicality and ingroup bias only occurs if the ingroup and, thus, the superordinate category is of little complexity or variability.

3.4 Conclusion

It has been shown that on positive traits the ingroup is perceived as more homogeneous than the outgroup (Haslam et al., 1995). The dependence of perceived variability on trait valence and target group matches the cited literature on the linguistic intergroup bias, spontaneous trait inference, intergroup attributions and the results of Sherman et al. (1998) in

showing that perceived variability decreases on positive traits when rating the ingroup and on negative traits when rating the outgroup. Thus, considering the results of Haslam et al. (1995) as well as other research (e.g., Simon & Brown, 1987) it can be concluded that the well-known outgroup-homogeneity effect is not as stable as it appears at first glance.

Complexity is defined by differentiation and integration. Within the stereotyping literature two processes have been identified which I consider to be related to complexity: Subgrouping is related to higher levels of complexity whereas subtyping is related to lower levels of complexity. Although complexity is a broader concept, it is clearly related to variability perceptions. Research on complexity converges such that the ingroup is perceived as relatively complex compared to the outgroup. But to my knowledge research on complexity did never control for the contents of judgment (i.e., trait valence). It is conceivable that complexity of mental representations is a function of trait valence and target group, too.

Finally, I have reasoned that complexity and variability of the ingroup representation might affect complexity and variability of the superordinate category representation. At the level of the superordinate category, complexity and variability influences the extent to which the superordinate category prototype is usable as a prescriptive standard for intergroup evaluations because standards should be clear and homogeneous to fulfill their functions for judgments.

4 The role of complexity and variability of the ingroup representation for projection and evaluation

The Cognitive Model of Ingroup Projection assumes that ingroup features are projected to the extent that they are represented in a prototype-based manner. Accordingly, projection is a function of mental representation in terms of prototypes versus exemplars. I have argued so far that prototype representations, variability, and complexity are clearly related constructs. The reviewed literature and logical considerations amount to the conclusion that the projection of group features is a function of the complexity and variability, respectively, of the mental group representation, too. Thus, a first hypothesis concerns the magnitude of ingroup projection.

The second hypothesis relies on the idea that complexity and variability information is projected as a structural feature onto the superordinate category. This idea stems from the suggestion that variability information might be stored in an abstract manner (Judd & Park, 1988). From research on intragroup processes (Hogg et al., 1993) it was deduced that category representations can only serve as prescriptive standards to the extent that a clear prototype is available. Linking these assumptions, changing mental ingroup representations in terms of complexity and variability should change the superordinate category representation in terms of variability and complexity and accordingly the suitability of the superordinate category as a prescriptive standard. As superordinate category representations only serve as prescriptive standards if they are of little complexity and variability, relative ingroup prototypicality should be related to ingroup bias only if the mental representation of the ingroup is of little complexity and variability. Thus, a second hypothesis specifies the conditions under which a link between prototypicality and ingroup bias should occur.

Previous approaches (Waldzus et al., 2003, 2005) directly manipulated the superordinate category representation in order to change the projection process and, thus, the comparison standard itself. The present research in contrast manipulated the representation of the ingroup and, therefore, the starting point of projection. I expect that high levels of complexity and variability decrease relative ingroup prototypicality and/or weaken the link between relative ingroup prototypicality and ingroup bias whereas low levels of complexity and variability increase relative ingroup prototypicality and/or strengthen the link between relative ingroup prototypicality and ingroup bias. In statistical terms, the first hypothesis relates to a main effect of variability and complexity on the magnitude of relative ingroup prototypicality

whereas the second hypothesis relates to an interaction effect in which the relation between relative ingroup prototypicality and ingroup bias is moderated by complexity and variability of the mental ingroup representation.

Both hypotheses are not necessarily exclusive. Theoretically and statistically they can occur in parallel. Concerning low levels of complexity and variability of the mental ingroup representation, higher levels of relative ingroup prototypicality and/or a stronger ingroup prototypicality-ingroup bias link are expected. However, it is only possible to obtain a strong ingroup prototypicality-ingroup bias link if both variables have sufficient variance. This means that the induction of low complexity and variability should not lead to a ceiling effect for ingroup prototypicality because under this condition a strong prototypicality-evaluation link is impossible to occur. Similarly, it is expected that high levels of complexity and variability lead to low levels of relative ingroup prototypicality and/or a weaker ingroup prototypicality-ingroup bias link. Following the reasoning of this doctoral thesis, a weaker prototypicality-ingroup bias link is expected after the information of complexity or variability of the ingroup representation was projected onto the superordinate category as a structural feature. Therefore, to weaken the ingroup prototypicality-ingroup bias link a certain amount of information concerning complexity or variability needs to be projected onto the superordinate category. Furthermore, a floor effect of relative ingroup prototypicality in the high complexity and variability conditions would not confirm the hypothesis concerning the weakened ingroup prototypicality-ingroup bias link because a non-significant relation between ingroup prototypicality and ingroup bias due to a floor effect represents an artifact and does not allow the conclusion that a variable and complex ingroup representation cannot serve as a standard at the superordinate category level. In sum, it is possible that both hypotheses are confirmed simultaneously unless low complexity and variability lead to a ceiling effect and high complexity and variability do not allow any projection and, thus, lead to a floor effect.

To change the mental representation of the ingroup in terms of complexity, subgrouping and subtyping manipulations were employed (Park et al., 1992). Subtyping of the ingroup simplifies the prototype because members who do not fit the ingroup as a whole are excluded from the mental representation. Subgrouping enhances complexity by clustering the ingroup into multiple subgroups that represent the category equally well.

The manipulations of Waldzus et al. (2003, 2005) were adopted to manipulate variability. Waldzus and collaborators realized different levels of variability by asking participants to

think either about the unity or the diversity of a group. Although Waldzus et al. claimed to induce complexity instead of variability, I would rather suggest that unity and diversity manipulations change variability perceptions rather than complexity. Relying on the complexity and variability distinction outlined in the present thesis, I propose that to think about diversity increases the differentiation of stimuli within a set (i.e., increase in variability) but does not necessarily trigger integration (i.e., increase in complexity).

4.1 Main Hypotheses

4.1.1 Hypothesis concerning the level of projection

It is predicted that increased levels of complexity and variability of the mental ingroup representation decrease the perception of relative ingroup prototypicality whereas decreased levels of complexity and variability of the mental ingroup representation increase the perception of relative ingroup prototypicality.

4.1.2 Hypothesis concerning the usability of the superordinate category as a comparison standard

It is predicted that increased levels of complexity and variability of the mental ingroup representation decrease the relation between relative ingroup prototypicality and ingroup favoritism whereas the relation between relative ingroup prototypicality and ingroup favoritism increases with decreasing complexity or variability levels.

4.2 Overview of the experiments

In Experiment 1, subgrouping and subtyping instructions were used in order to manipulate the complexity of the mental ingroup representation of natural groups. Participants were asked to generate subgroups or subtypes, respectively, within their own ingroup. These open-ended instructions were adopted from Park et al. (1992). In Experiment 2 I adopted a sorting-task from self-complexity research (Halberstadt, Niedenthal, & Setterlund, 1996) which was intended to vary ingroup-complexity. After manipulating the mental representation of the ingroup, projection and intergroup evaluation were measured. Furthermore, the role of interindividual differences in the process of projection and evaluation was considered. For this reason, a German version of the Personal Need for Structure scale (Machunsky & Meiser, in press) and the diversity beliefs construct (van Knippenberg & Haslam, 2003) were employed.

In both Experiment 3 and Experiment 4 diversity and unity manipulations of Waldzus et al. (2003, 2005) were employed to manipulate homogeneity and heterogeneity of the mental ingroup representation of natural groups. In addition to the cognitive processes discussed earlier, the role of distinctiveness threat (Jetten & Spears, 2003) was investigated as a negative side effect of increased variability of mental ingroup representations in Experiment 4. In particular, it was hypothesized that distinctiveness threat mediates the relation between variability of the ingroup representation and ingroup bias.

5 Part I: The role of complexity of mental ingroup representation in ingroup projection

5.1 Experiment 1

5.1.1 Introduction

The main goal of the first experiment was to examine how complexity of the mental ingroup representation shapes ingroup projection and the ingroup prototypicality-ingroup bias link. In particular, I assumed that a complex ingroup representation decreases relative ingroup prototypicality whereas a simple ingroup representation increases relative ingroup prototypicality. Additionally, I have argued that the ingroup prototypicality-ingroup bias link will change such that complex ingroup representations will weaken the relation between relative ingroup prototypicality and ingroup bias whereas simple ingroup representations will strengthen the relation between relative ingroup prototypicality and ingroup bias. The experimental procedures were adopted from Park and colleagues (Judd, Park, Ryan, Brauer, & Kraus, 1995; Park et al., 1992). In particular, open-ended subgrouping and subtyping instructions were used in order to establish complex and simple mental ingroup representations. The effects of subgrouping and subtyping manipulations were compared to a control condition. The intergroup setting consisted of students of business administration as ingroup (in German: “Studierende der Betriebswirtschaftslehre”. Among students they are called “BWLer”) and students of economics as outgroup (in German: “Studierende der Volkswirtschaftslehre”. Among students they are called “VWLer”). In the German university system students of business administration and students of economics usually belong to a joint faculty and thereby to one superordinate category which is a salient group at German universities. In the German language there is a special term for this category (“Wirtschaftswissenschaften”) which has no equivalent in English.

5.1.2 Method

Pretest. In order to measure perceived prototypicality of the ingroup and the outgroup, participants did a number of trait ratings for the ingroup, the outgroup, and the superordinate category. From these trait ratings Euclidean Distances were calculated in order to assess prototypicality perceptions. The selected traits should meet two criteria. Firstly, the traits

should be balanced such that half of them are associated with the ingroup and half of them are associated with the outgroup so that ingroup and outgroup projection have at least the same initial conditions with regard to trait stereotypicality. Secondly, the typical ingroup and outgroup traits should be equally positive in valence. Because this dissertation project focused on positively valued superordinate category representations traits associated with the ingroup and the outgroup should be of positive valence.

Pretests with $N = 14$ and $N = 15$ students of business administration were conducted to select appropriate traits for Experiment 1. 41 traits were selected which I perceived as being related to either the ingroup or the outgroup. 14 participants majoring in business administration were asked to rate all 41 traits on a rating scale ranging from -3 (*very negative*) to +3 (*very positive*). Another 15 students with a major in business administration rated the same 41 attributes for stereotypicality on a scale ranging from +3 (*applies to students of business administration*) via 0 (*applies to both*) to +3 (*applies to students of economics*)[2]. Six traits were chosen that were according to the ratings stereotypical of one of the two groups and slightly positive at the same time. After the rating scales were transformed into scales ranging from -3 (*applies to students of business administration*) to +3 (*applies to students of economics*), the three typical attributes chosen for students of business administration (e.g., "focus on occupational career") received a mean typicality value of $M = -1.80$ ($SD = 1.15$) and the three typical attributes chosen for students of economics (e.g., "scientific mindset") received a mean typicality value of $M = 1.40$ ($SD = 0.91$). The six selected items were moderately positive, $M = 1.60$ ($SD = 0.82$) for the outgroup traits and $M = 1.79$ ($SD = 1.12$) for the ingroup traits and all $M \geq 1.0$.

Participants. Participants in Experiment 1 were students from the University of Jena majoring in business administration. The study was advertised in lectures of business administration as a study on group perception. Participants received 5 Euros for their services. They were randomly assigned to one of three conditions, namely a subgrouping, a subtyping, and a control condition. Ten participants were dropped from the analyses for not being

[2] The scale ranged from +3 (*applies to students of business administration*) via 0 (*applies to both*) to +3 (*applies to students of economics*) because I wanted to avoid that one end of the scale (and, therefore, the group associated with that end of the continuum) got a negative connotation by using negative values.

members of the group of business administration students. The final sample consisted of 75 students of business administration, 25 in each condition.

Procedure. The experiment was run in a laboratory with up to five participants in one session. Participants filled in a questionnaire on which they worked individually. The intergroup situation consisted of students of business administration as the ingroup, students of economics as the outgroup and the joint faculty of both majors as the superordinate category. The questionnaire started with a short introduction about the purpose of the study. To make the intergroup setting salient from the beginning, participants were told that large parts of the study are concerned with their perception of the group of students of business administration to which they belong themselves, and that the study is also concerned with the perception of the group of students of economics and the joint faculty which encompasses both. Following the general instructions participants described their own group of students of business administration with a few sentences. This procedure was the same for all three conditions and was meant to activate the representation of the ingroup. After the general introduction, the experimental manipulation of ingroup representation that differed between the three conditions was realized.

In the *subgrouping condition*, an open-ended task from Park et al. (1992) and Judd et al. (1995) was adopted.[3] Participants were provided with a definition of subgroups. Participants learned that members within one subgroup are more similar to each other compared to members who belong to other subgroups. At the same time, the common ground of all subgroups, that is, the common ingroup, was emphasized. Participants then generated subgroups within their ingroup, gave a name to every subgroup, and described each subgroup with a few sentences. Furthermore, they were asked to list three characteristic attributes for each subgroup. In the *subtyping condition*, subjects were instructed to name subtypes after they have received a definition of subtypes. It was pointed out that in almost any group there are individuals who do not fit the group because of their personality traits and behaviors. As in the subgrouping condition, participants were asked to name subtypes, to describe them and to list three characteristic attributes for each subtype. Participants in the *control condition* did not receive any instructions concerning subgroups or subtypes. To summarize, high levels of complexity were established in the first experimental condition through a decomposition into

[3] I gratefully acknowledge that Bernadette Park provided me with the original instructions used in her previous research.

subgroups which still belong to the same group. In contrast, low levels of complexity were established through exclusion of non-fitting subtypes.

Dependent Variables. Following the manipulation, the rest of the questionnaire was administered which was identical for all three experimental conditions. First, *identification* with the ingroup and with the superordinate category was measured with four items each (e.g., "I identify with the group of students of [business administration, of the joint faculty]"). These questions were answered on 5-point scales ranging from 1 (*does not apply at all*) to 5 (*applies completely*). Identification was an important control variable as identification is strongly related to ingroup bias (for reviews see Brown, 2000; Hewstone, Rubin, & Willis, 2002). Thus, it was important to control that identification does not increase or decrease with experimental condition so that the expected effects cannot be attributed to different levels of identification. Furthermore, identification with the ingroup and the superordinate category should be rather high to make sure that both are relevant categories for self-categorization.

Next, participants were asked for group ratings on six pre-selected (see *pretest*) attributes. In particular, participants rated the ingroup, the outgroup, and the superordinate category on a scale ranging from 0 to 20. The scale ends were anchored with, for instance, "Minimal focus on occupational career" and "Maximal focus on occupational career". From these ratings I calculated Euclidean Distances (Hand, 1981) which measure the proximity of two stimuli. In particular, Euclidean Distances reflect the dissimilarities between profiles of the superordinate category and the ingroup and outgroup, respectively. Euclidean Distances take on smaller values the closer two groups are. Importantly, Euclidean Distances should be affected by projection processes. The difference between ingroup-superordinate category distance and outgroup-superordinate category distance can be taken as an *indirect* measure of perceived *prototypicality* of the ingroup relative to that of the outgroup. Positive values indicate more ingroup projection than outgroup projection.

Furthermore, *direct* measures of perceived *prototypicality* were assessed. Participants judged how typical they perceived the ingroup and the outgroup of the superordinate category on 7-point scales from -3 (*not at all*) to +3 (*completely*). Similarly to the indirect relative measure of prototypicality, the direct measure of prototypicality is the difference between ingroup and outgroup prototypicality. Direct relative prototypicality should also increase the more participants project attributes of the ingroup onto the superordinate category relative to the projection of outgroup attributes onto the superordinate category.

Finally, the evaluation of the ingroup and the outgroup was assessed with seven items each (e.g., "I like the group of students of [business administration, economics]") on 7-point scales ranging from -3 (*does not apply at all*) to +3 (*applies completely*). The difference between ingroup evaluation and outgroup evaluation is referred to as *ingroup bias*.

5.1.3 Results and discussion

Identification. The items of identification with the ingroup formed a reliable scale (Cronbach's $\alpha = .82$). After exclusion of one item, the remaining items of identification with the superordinate category showed sufficient reliability, too (Cronbach's $\alpha = .86$). A 2 × 3 mixed-model analysis of variance (ANOVA) with target group (i.e., identification with the ingroup versus superordinate category) as within-participants factor and experimental condition as between-participants factor revealed a marginal significant effect of target group, $F(1,72) = 3.18$, $p = .08$, $\eta^2 = .042$. [4] Participants showed lower mean identification scores for the ingroup ($M = 3.57$, $SD = .89$) than for the superordinate category ($M = 3.76$; $SD = .82$). The effect of experimental condition and the interaction were not significant, $F < 1$ and $F(2,72) = 1.14$, $p > .1$. Mean identification with the ingroup and mean identification with the superordinate category differed significantly from the scale midpoint of 3, $t(74) = 5.53$, $p < .001$ and $t(74) = 8.06$, $p < .001$. Thus, identification with both the ingroup and the superordinate category was consistently high across experimental manipulations.

Indirect and direct measures of prototypicality. The means and standard deviations of the Euclidean distance measures between ingroup and superordinate category and between outgroup and superordinate category are displayed in Table 2. An 2 × 3 ANOVA with target group (i.e., *indirect prototypicality* of ingroup versus outgroup) as within-participants factor and experimental condition as between-participants factor revealed a main effect of target group, $F(1,68) = 14.61$[5], $p < .001$, $\eta^2 = .117$. Overall, the ingroup profile is less dissimilar to that of the superordinate category ($M = 8.09$, $SD = 3.12$) than the outgroup profile ($M = 10.31$, $SD = 5.51$). No further main effect or interaction occurred, Fs < 1. Similarly, the *direct prototypicality* measures were subjected to 2 × 3 ANOVA. Again, the effect of target group

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4 η^2 refers to the partial eta-square which is defined as partial $\eta^2 = SSfactor/(SSfactor + SSerror)$ (Pierce, Block, & Aguinis, 2004).

5 Due to missing values this test was based on a sample of $N = 71$ so that the error term has only 68 degrees of freedom.

was significant, $F(1,72) = 19.23$, $p < .001$, $\eta^2 = .211$, indicating that the ingroup was perceived as more prototypical of the superordinate category ($M = 1.69$, $SD = 0.96$) than the outgroup ($M = 0.96$, $SD = 1.24$). The main effect of experimental condition and the interaction were not significant, $F < 1$ and $F(2,72) = 2.77$, $p > .05$.

Thus, independent of whether the measurement of perceived prototypicality was direct or indirect, the results confirmed the general assumption of the Ingroup Projection Model that the ingroup is perceived as being more prototypical of the superordinate category than the outgroup but the experimental manipulation did not influence the magnitude of relative prototypicality.

Table 2. Means and standard deviations of indirect prototypicality, direct prototypicality, and evaluation of the ingroup and outgroup as a function of experimental condition (Experiment 1).

	Subgrouping		Control		Subtyping	
Dependent variable	*M*	*SD*	*M*	*SD*	*M*	*SD*
Euclidean distance						
d(IG-SC)	8.24	2.72	8.06	3.68	7.96	3.00
d(OG-SC)	10.39	6.03	10.33	3.98	10.19	6.41
Direct typicality						
Ingroup	1.92	.91	1.44	.92	1.72	1.02
Outgroup	.68	1.55	1.16	.90	1.04	1.17
Intergroup evaluation						
Ingroup evaluation	1.02	1.08	1.18	1.11	1.37	.97
Outgroup evaluation	1.33	.86	1.38	.84	.88	.87

Note. d(IG,SC): Euclidean Distance between the ingroup and the superordinate category; d(OG,SC): Euclidean Distance between the outgroup and the superordinate category.

Intergroup evaluation. Ingroup and outgroup evaluation was assessed by seven items each that exhibited sufficient reliability (Cronbach's $\alpha = .88$ and Cronbach's $\alpha = .83$). Table 2 shows mean evaluation scores and standard deviations. Evaluation of ingroup and outgroup was subjected to a 2 × 3 ANOVA with ingroup and outgroup evaluation as within-participants factor and experimental condition as between-participants factor. No main effect was significant, Fs < 1, but a significant interaction effect was found, $F(2,72) = 3.70$, $p < .05$, $\eta^2 = .093$. To explore the interaction effect, ingroup bias (i.e., the difference between ingroup and outgroup evaluation) was used as dependent variable and an orthogonal contrast analysis was conducted. Testing my hypothesis concerning the subtyping condition, the first contrast (0 -1 1) compared the subtyping condition against the control condition. The second contrast (-2 1 1) juxtaposed the subtyping and control condition against the subgrouping condition. The first contrast was significant, $t(72) = 2.16$, $p < .05$, whereas the second contrast was not, $t(72) = 1.66$, $p > .1$. Although the manipulation of the ingroup representation did not change perceived group prototypicality, the results concerning intergroup evaluation were thus significant: Establishing a clearly defined representation of the ingroup by excluding inconsistent members led to more ingroup bias compared to a control group.

Relation between relative ingroup prototypicality and intergroup evaluation. To test the hypothesis concerning the interaction between experimental condition and perceived prototypicality on ingroup bias, a multiple regression analysis according to Aiken and West (1991) was conducted. As the Experiment had three experimental conditions, two effect-coded variables ([1 -1 0] and [0 -1 1]) were formed and perceived relative prototypicality (i.e., the difference between perceived ingroup and outgroup prototypicality) was subjected to a *z*-standardization. Ingroup bias was the dependent variable. The model with both effect-coded variables and the *indirect* measure of prototypicality as predictors explained a significant portion of variance, $R^2 = .214$, $F(3,67) = 6.06$[6], $p < .01$. Adding the interaction terms to the model equation did not lead to a significant change in R^2, R^2-change = .004 and change in $F < 1$. Note, however, that indirect prototypicality was a significant predictor of ingroup bias in the multiple regression when the experimental contrasts were partialled out, $\beta = .347$, $p < .01$.

However, using the *direct* measure of prototypicality, the effect-coded variables and their interaction terms as predictors, a significant moderation of the effect of prototypicality on

[6] Due to missing values this test was based on a sample of $N = 71$ so that the error term has only 67 degrees of freedom.

ingroup bias was obtained. The base model including only the effect-coded variables and prototypicality explained 10.1% of the variance, $F(3,71) = 2.66$, $p = .06$. The interaction terms led to a significant R^2-change = .091, $F(2,69) = 3.91$, $p < .05$. The beta coefficient for the interaction term of the first effect-coded variable and *direct prototypicality* was not significant, $\beta = .091$, $p > .05$, but the beta coefficient for the interaction term of the second effect-coded variable and *direct prototypicality* was significant, $\beta = .255$, $p < .05$. These results indicate that the correlations between *direct prototypicality* and ingroup bias did not differ between control and subgrouping condition, whereas they did differ between subtyping and control condition.

To explore the moderation further, the simple slopes in the regression of ingroup bias on the direct prototypicality measure were analyzed within each experimental condition. Non-significant slopes were found in the subgrouping and control condition, $\beta = .194$ and $\beta = -.356$, both *p*s > .05, whereas the slope was significant in the subtyping condition, $\beta = .405$, $p < .05$, indicating that perceived prototypicality formed a significant predictor of ingroup bias only in the subtyping condition. In order to illustrate the moderation effect, the simple slopes are depicted in Figure 2. Given a clear prototype of the ingroup, a significant relation between relative ingroup prototypicality and ingroup bias was obtained as predicted by the Ingroup Projection Model, whereas there was no such relation in the subgrouping and the control condition.

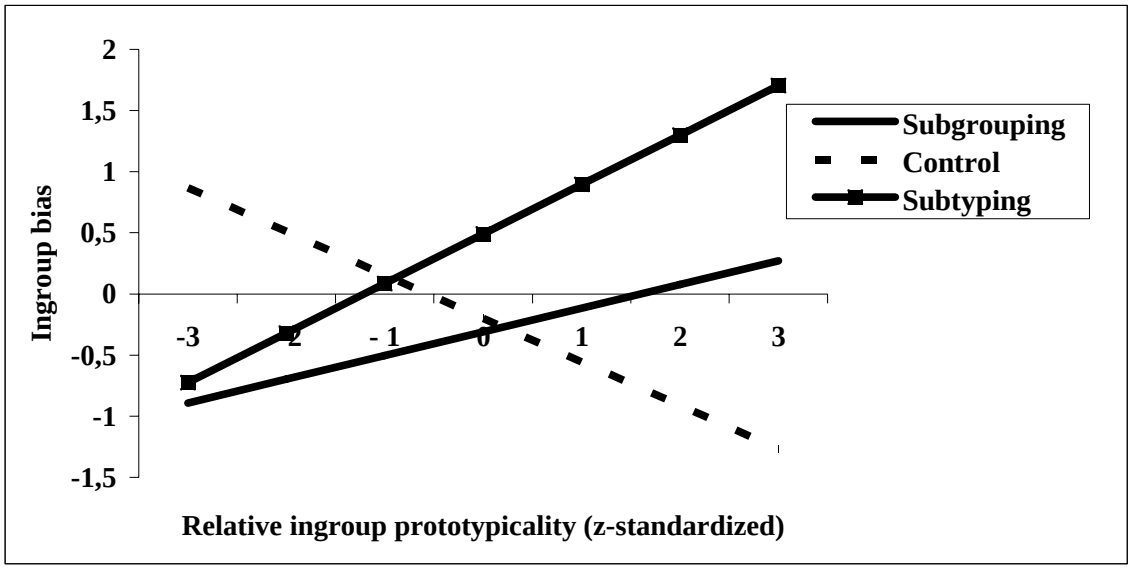

Figure 2. The relation between ingroup bias and relative ingroup prototypicality in the three experimental conditions (Experiment 1).

5.1.4 Summary

It was hypothesized that complexity of mental ingroup representations changes the projection and evaluation process such that less complex ingroup representations either increase relative ingroup prototypicality or strengthen the ingroup prototypicality-ingroup bias link. Experiment 1 provided evidence that subtyping manipulations did not change the average perception of relative ingroup prototypicality but strengthened the relation between perceived prototypicality and ingroup bias. This finding confirmed the hypothesis that only a prototype characterized by little complexity can serve as a prescriptive comparison standard. A plausible explanation is that only in the subtyping condition the projected ingroup prototype served as a judgmental standard at the level of the superordinate category because it provided clear criteria for judgment.

Concerning the subgrouping condition, less relative ingroup prototypicality and less ingroup bias as a consequence of complexity was expected but not found. One post-hoc explanation why the subgrouping condition did not differ from the control condition neither with regard to ingroup bias nor with regard to the strength of the relation between relative ingroup prototypicality and ingroup bias derives from research by Park et al. (1992). Park and colleagues showed that people generate subgroups for their ingroups more easily than for outgroups. This result suggests that subgrouping is the default for ingroups so that instructions concerning the ingroup can hardly show substantial effects.

A second experiment aimed at a replication of the effect that perceived ingroup prototypicality only predicts ingroup bias if the ingroup prototype is of little complexity. Because I wanted to show that the effect was neither limited to the particular intergroup situation of Experiment 1 nor to the particular manipulation of complexity, a second experiment was conducted which relied on a different intergroup setting and a different manipulation.

5.2 Experiment 2

5.2.1 Introduction

The second experiment was particularly aiming at a replication of the subtyping effect of Experiment 1. Furthermore, I hypothesized that subtyping of the ingroup creates an instance of what Snyder and Ickes (1985) called psychologically strong situations which "tend to be those that provide salient cues to guide behavior and have a fairly high degree of structure and definition" (p. 904). Snyder and Ickes (1985) pointed out that most experimental treatments are intended to be strong situations in which the effects of personality variables are overpowered. Thus, in "psychologically weak" situations like the control condition, interindividual differences might have predictive power. In a subtyping condition, which should be a "psychologically strong" situation, in contrast, prototypicality should become the main predicting variable of ingroup favoritism and interindividual variables should lose influence. To investigate this issue, the interindividual difference measure Personal Need for Structure (PNS) was introduced. As a second interindividual difference measure, diversity beliefs were introduced. However, the employment of diversity beliefs has a clearly explorative character.

Next to the replication of the subtyping effect, subgrouping is manipulated again to examine whether a different manipulation has the potential to increases the complexity of the ingroup representation. As a second factor, the order of ingroup and outgroup judgments were manipulated because of evidence that the order of evaluation may play a role for the level of ingroup bias (Meiser et al., 2004; Otten, 2002). Thus, Experiment 2 has a 2 (order: ingroup first versus outgroup first) × 3 (mental representation: Subgrouping versus control versus subtyping) between-participants design. Furthermore, a different intergroup setting was chosen in Experiment 2. Students of natural sciences constituted the ingroup, students of humanities constituted the outgroup, and scientists in general constituted the superordinate category.

5.2.2 Interindividual differences

Diversity beliefs. Van Knippenberg and Haslam (2003) suggested that diversity of a group may be an aspect of the social identity. Van Knippenberg, Haslam and Platow (2000) and Haslam and van Knippenberg (2000, both cited after van Knippenberg & Haslam, 2003) tested this idea experimentally as well as correlationally. Experimentally, they manipulated

the composition of the group by giving participants bogus feedback about the ingroup composition. In one condition the group was said to be homogeneous whereas it was said to be heterogeneous in the other condition. As a second between-participants factor group tasks were manipulated. In one condition participants had to generate as many unique ideas as possible (unique ideas condition); in the other condition the solutions to the problem had to be shared by the majority (shared ideas condition). Thus, as a second factor the authors manipulated believes in diversity itself such that in the unique ideas condition participants learned to favor diversity whereas they learned to favor unity in the shared ideas condition. As a result, participants in the unique ideas condition believed in the superiority of heterogeneous groups whereas participants in the shared ideas condition believed in the superiority of homogeneous groups. In a correlational study by Haslam and van Knippenberg (2000, cited after van Knippenberg & Haslam, 2003) some of the results converged with the experimental findings such that identification with heterogeneous groups is high when composition beliefs favor diversity.

Although diversity beliefs were so far only considered to be an aspect of identity in intragroup processes, I wanted to explore the influence of diversity beliefs with regard to intergroup processes. Furthermore, in the cited literature diversity beliefs varied with the context. However, it is also conceivable to consider diversity beliefs as a personal value. For Experiment 2, a scale was constructed that measured the extent to which people appreciate heterogeneity of the superordinate category. On a societal level, the concept of diversity beliefs should be identical with the ideological approach of multiculturalism. Multiculturalism advocates or even emphasizes category membership and acknowledges and appreciates differences between groups (Richeson & Nussbaum, 2004). It has been shown that the belief in multiculturalism leads to a better explicit and implicit evaluation of outgroups (Richeson & Nussbaum, 2004; Wolsko, Park, Judd, & Wittenbrink, 2000; see also Park & Judd, in press). In assuming that in an intergroup context the concepts of diversity beliefs and multiculturalism are almost identical, I argue that diversity beliefs are negatively related to ingroup bias. But diversity beliefs should be a strong predictor of ingroup bias only in the control condition because in the subtyping condition there should be strong cues, namely ingroup prototypicality, that guide intergroup judgment. However, this variable has a clearly explorative function.

Personal Need for Structure. Aside from diversity beliefs, I wanted to investigate whether individual differences in the mental structuring of social information may play a role in the projection process. It has been demonstrated that the Personal Need for Structure (PNS)

scale by Thompson et al. (1993, cited after Neuberg & Newsom, 1993) is related to social perception, stereotype formation, and social judgment (Moskowitz, 1993; Neuberg & Newsom, 1993; Schaller, Boyd, Yohannes, & O'Brian, 1995). Furthermore, PNS is related to identification with the ingroup in a minimal group paradigm (Perreault & Bourhis, 1999). Similar results were obtained for the Need for Cognitive Closure (NFC) scale by Webster and Kruglanski (1994), which measures largely the same construct as PNS (Leone, Wallace, & Modglin, 1999; Neuberg, Judice, & West, 1997). NFC is related to the application of stereotypes, to the perception of homogeneity of groups, and to the memory for stereotype-inconsistent behavior (Dijksterhuis, van Knippenberg, Kruglanski, & Schaper, 1996). In the field of intergroup studies, research has shown that NFC is significantly related to ingroup favoritism and outgroup derogation (Kruglanski, Shah, Pierro, & Mannetti, 2002; Shah, Kruglanski, & Thompson, 1998). On the basis of these previous findings, I expected correlations between PNS and ingroup bias in the control condition. For the subtyping condition, however, relative ingroup prototypicality was expected to be the strongest predictor because a clear standard for judgment is available which should overpower the role of interindividual differences (Snyder & Ickes, 1985).

Construction of a German Personal Need for Structure Scale. Because a complete, reliable and valid PNS scale was not available in German language, the original PNS Scale as cited in Neuberg and Newsom (1993) was translated into German, subjected to a scale analysis, and validated with personality and social psychological variables (Machunsky & Meiser, in press). The psychometric analysis which was based on a sample of 710 participants revealed that the internal consistency of the German scale was with Cronbach's $\alpha = .80$ comparable to the English version. Similarly, according to a factor analysis the factorial structure was equivalent to the results of Neuberg and Newsom (1993). In particular, the two factorial structure of the original version was replicated with factor loadings of the individual items being widely equivalent. Furthermore, a confirmatory factor analysis with two correlated latent variables yielded a better model fit than a one-factor model. Again, this parallels the results of the scale analysis of the English version.

In a second study, the convergent and divergent validity of the PNS scale was tested with classical personality variables. Next to Need for Cognition (Keller, Bohner, & Erb, 2000) and Conservatism (Riemann, Grubich, Hempel, & Mergl, 1993), the Big Five personality factors (Borkenau & Ostendorf, 1993) were employed. As expected, PNS was positively correlated with Neuroticism, Conscientiousness, and Conservatism, and negatively correlated with Openness. The divergent validity was provided by non-significant relations between PNS and

Need for Cognition as well as between PNS and Agreeableness. The aim of the third study was to integrate PNS into a nomothetical network of variables from the field of intergroup research. In accordance with the hypothesis, PNS was related to diversity beliefs, perceptions of group homogeneity, and ingroup bias (i.e., the evaluation of the ingroup relative to the outgroup). From the successful psychometric analysis and validation it can be concluded that the German version of the PNS scale is a reliable and valid scale. Therefore, the German version of the PNS scale by Machunsky and Meiser (in press) was employed in order to test the hypothesis that PNS predicts ingroup bias in psychologically weak situations but loses predictive power in psychologically strong situations.

5.2.3 Method

Pretest. Similar to Experiment 1, in order to assess indirect prototypicality, traits needed to be identified which are associated with either the ingroup or the outgroup to an equally strong extent and which are moderately positive in valence. Thus, 33 traits were collected which I perceived as either associated with the ingroup or the outgroup. Twenty students of natural sciences indicated for 33 traits on bipolar scales how much they applied to the group of students of natural sciences or to the group of students of humanities. Trait ratings were made on 7-point scales ranging from 3 (*applies to the group of students of humanities*) via 0 (*applies to both*) to 3 (*applies to the group of students of natural sciences*). Another 20 students of natural sciences rated the same 33 traits for valence on rating scales ranging from -3 (*very negative*) to +3 (*very positive*). For Experiment 2, six traits were chosen of which half were associated with the ingroup ($M = 1.58$, $SD = 1.25$) and half were associated with the outgroup ($M = 1.58$, $SD = 1.23$). Thus, the association of ingroup and ingroup specific traits (e.g., “goal-oriented”) and outgroup and outgroup specific traits (e.g., “liking discussions”) was about equally strong. Furthermore, the three ingroup traits and the three outgroup traits were about equally positive in valence ($M = 1.91$, $SD = 1.12$, and $M = 1.85$, $SD = 1.03$).

Participants. Participants were 88 students of the natural sciences from the University of Jena. They were recruited in lectures of natural sciences and were told the study investigates group perception. Participants were randomly assigned to a 3 (mental representation: subgrouping, subtyping, control) × 2 (order: ingroup evaluation first, outgroup evaluation first) factorial design. Three students were excluded because they did not aspire a degree in natural sciences. Thus, the final sample consisted of 85 students of natural sciences.

Procedure. As in Experiment 1, mental representation of the ingroup which was manipulated by means of subgrouping, subtyping, and control instructions served as a first between-participants factor. To control for the influence of order, half of the participants rated the prototypicality of the ingroup and evaluated the ingroup first and the outgroup second, whereas the other half responded to outgroup items first.

As in the first experiment, participants read a general introduction about the purpose of the experiment which was again announced as investigating group perception. It was stated that wide parts of the experiment are concerned with the group of natural scientists to whom the participants themselves belonged. Furthermore, the experiment dealt with scientists of humanities as outgroup and with scientists in general as superordinate category.

In order to manipulate the complexity of mental group representations, a procedure from Halberstadt et al. (1996) was adopted in which participants had to sort cards containing personality attributes into either three piles or into seven piles which represented "future selves" (see also Linville & Jones, 1980, for a similar procedure). This procedure was employed to induce different levels of self-complexity. For the purpose of the present dissertation, the procedure was transferred from the level of the self to the level of the ingroup. In a pilot study, students of the natural sciences were interviewed to name commonly perceived subgroups and subtypes within the group of natural scientists. From subgroups those were chosen that cut across various subjects within the natural sciences and that are characterized, for instance, by different scientific methods and objects of research. Namely, the subgroups of predominantly theoretical, applied, technical, analytical, and experimental natural sciences were chosen. Similarly, 22 attributes were chosen which were considered as useful for differentiating between the different approaches within natural sciences. In the *subgrouping* condition participants had to sort these 22 attributes into the five predetermined subgroups of natural scientists. According to the pilot study "technical natural scientists" were considered as being different from the group of natural scientists in general. Hence, in the *subtyping* condition participants were asked to sort the same 22 attributes into either "the proper group of natural scientists" or into a subtype of "technical natural scientists". That is, the group of technical natural scientists was framed as one of several subgroups in the subgrouping condition, whereas it was framed as a subtype that differed from the rest of the group of natural scientists in the subtyping condition. Again, subgrouping should lead to the ingroup being perceived as complex, whereas subtyping should lead to a simple representation that includes only members who closely fit the prototype of the group of natural scientists in general. To equate conditions, participants in the *control* condition were

told that the same list of 22 attributes can be used to describe the group of natural scientists and were asked to rate the list for valence on a 7-point scale ranging from -3 (*negative*) to +3 (*positive*) to activate the representation of the ingroup.

Dependent Variables. Firstly, the *identification* with the ingroup and the superordinate category was assessed again as a control variable. As in the first experiment each scale contained four items with scale endpoints of 0 (*does not apply at all*) and 5 (*applies completely*). *Diversity beliefs* were assessed by eight items which can be found in the Appendix. Participants rated their agreement with the statements on 6-point scales ranging from 1 (*does not apply at all*) to 6 (*applies completely*). To assess *PNS*, the German version of the original PNS scale was used, the psychometric qualities and content validity of which were shown in previous research (Machunsky & Meiser, in press). Participants rated the applicability of twelve statements on a 6-point scale ranging from 1 (*does not apply at all*) to 6 (*applies completely*).

Next, participants completed trait ratings for the ingroup, the outgroup and the superordinate category. The 7-point scales for the six pre-selected attributes (see pretest) ranged from -3 (*not at all*) to +3 (*completely*). As in Experiment 1, Euclidean Distances were computed between ingroup and superordinate category and between outgroup and superordinate category. The difference between the outgroup-superordinate category distance and the ingroup-superordinate category distance is referred to as *indirect* measure of prototypicality. Again, similar to Experiment 1, perceived prototypicality of the ingroup and the outgroup was also assessed *directly* on 7-point scales ranging from -3 (*not at all*) to +3 (*completely*). Ingroup and outgroup evaluation was assessed with eight items each (e.g., "I like to talk to students [of natural sciences, of humanities]") on 7-point scales ranging from -3 (*applies not at all*) to +3 (*applies completely*). The difference between ingroup evaluation and outgroup evaluation is referred to as *ingroup bias*.

5.2.4 Results and discussion

Identification. The items of identification with the ingroup as well as identification with the superordinate category provided an internal consistency of Cronbach's $\alpha = .71$ and $\alpha = .68$, respectively. Mean identification scores as a function of mental representation and order can be found in Table 3. According to a 3 (mental representation) × 2 (order) ANOVA, identification with the superordinate category did not vary as a function of mental representation, $F(2,79) = 1.58$, $p > .1$, or order, $F < 1$. The interaction was not significant

either, $F(2,79) = 1.52$, $p > .1$. Likewise, identification with the ingroup did not vary as a function of mental representation, $F(2,79) = 1.91$, $p > .1$, or order, $F(1,79) = 1.02$, $p > .1$. For identification with the ingroup there was, however, a marginally significant interaction between mental representation and order, $F(2,79) = 3.16$, $p = .05$, $\eta^2 = .074$. Whereas there was no main effect of mental representation within the "ingroup first" condition, $F(2,39) = 1.20$, $p > .05$, there was a significant effect of mental representation in the "outgroup first" condition, $F(2,40) = 6.01$, $p < .01$, $\eta^2 = .231$. A Tukey-HSD post hoc test revealed that the control condition differed significantly from the subgrouping condition, $p < .01$. Table 3 shows that participants were more identified with their ingroup in the subgrouping condition than in the control condition. However, testing within the subgrouping condition whether the "ingroup first condition" differ from the "outgroup first condition" revealed no significant result, $t(26) = -1.56$, $p > .1$. Similarly, within the control condition and the subtyping condition the order conditions did not differ significantly, $t(27) = 1.47$, $p > .1$, and $t(26) = 1.61$, $p > .1$. Identification scores with the ingroup and the superordinate category averaged across conditions were significantly above the scale midpoint of 2.5, $t(84) = 19.00$, $p < .001$, and $t(84) = 16.13$, $p < .001$. Participants were more identified with the ingroup ($M = 4.04$, $SD = 0.75$) than with the superordinate category ($M = 3.84$, $SD = 0.77$), $t(84) = 2.84$ and $p < .01$.

The interaction between mental representation and order for ingroup identification can hardly be interpreted as an effect of experimental manipulation because at this point of the questionnaire the order factor was not yet introduced. Therefore, the significant result could be regarded as an α-error in the randomized assignment of participants to the cells of the experimental design. However, identification with the ingroup and the superordinate category were generally rather high.

Table 3. Means and standard deviations of identification with the ingroup and the superordinate category, diversity beliefs, and Personal Need for Structure as a function of experimental condition (Experiment 2).

		Ingroup first		Outgroup first	
Dependent variable		*M*	*SD*	*M*	*SD*
Identification					
Ingroup	Subgrouping	4.08	.69	4.42	.46
	Control	4.12	.77	3.73	.63
	Subtyping	3.66	1.09	4.18	.51
Superordinate category	Subgrouping	4.15	.57	3.95	.73
	Control	3.77	.89	3.75	.67
	Subtyping	3.48	.91	3.96	.71
Diversity beliefs	Subgrouping	4.45	.63	4.18	.63
	Control	4.48	.68	4.70	.61
	Subtyping	4.68	.59	4.78	.44
Personal Need for Structure	Subgrouping	3.19	.64	3.47	.56
	Control	3.34	.85	3.36	.73
	Subtyping	3.17	.89	3.39	.51

Diversity beliefs and Personal Need for Structure. The eight items of the *diversity beliefs* scale showed less than an optimal level of reliability of Cronbach's $\alpha = .67$. A 3 × 2 ANOVA with mental representation and order as factors and diversity beliefs as dependent variable revealed a significant effect of mental representation, $F(2,79) = 3.41$, $p < .05$, $\eta^2 = .080$, but no main effect of order and no interaction, Fs < 1.3, ps > .1. The means and standard deviations are displayed in Table 3. Contrasting the experimental conditions of mental representation, the linear trend (-1 0 1) was significant, $t(82) = 2.64$ and $p < .05$, whereas the quadratic contrast (-1 2 -1) was not, $t < 1$. Interestingly, the linear trend shows a significant difference between the subgrouping and subtyping condition with regard to diversity beliefs

such that subgrouping led to less diversity beliefs. This effect will be discussed in terms of distinctiveness threat in the discussion of Part I.

The PNS items provided sufficient reliability, Cronbach's $\alpha = .78$. Neither mental representation, nor order or their interaction did influence PNS, Fs < 1.3, ps > .1. Means and standard deviations are displayed in Table 3. As expected, the PNS scores did not change as a function of experimental condition.

Indirect and direct measures of prototypicality. Table 4 displays the means and standard deviations of the Euclidean Distance measures between ingroup and superordinate category and between outgroup and superordinate category, respectively, as a function of mental representation and order *(indirect prototypicality)*. Note that these measures reflect profile dissimilarities and, therefore, reach high values when group prototypicality is low. A 2 × 2 × 3 ANOVA with target group (i.e., indirect prototypicality of ingroup versus outgroup) as within-participants factor and order and mental representation as between-participants factors revealed a main effect of target group, $F(1,79) = 67.22$, $p < .001$, $\eta^2 = .460$. The significant within-participants factor revealed that ingroup and superordinate category were perceived less dissimilar with respect to the selected attributes (mean distance of $M = 2.35$, $SD = 1.10$) than outgroup and superordinate category (mean distance of $M = 3.90$, $SD = 1.72$). All other effects were not significant, Fs < 1.

The *direct prototypicality* measures were subjected to a 2 × 2 × 3 ANOVA, too. As for indirect prototypicality, a significant effect of target group for direct prototypicality was found, $F(1,79) = 127.40$, $p < .001$, $\eta^2 = .617$. The effect indicates that the ingroup was perceived as more prototypical of the superordinate category than the outgroup (see Table 4). There was no further significant main or two-way interaction effect, Fs < 1.7, ps > .1. However, the effect of target group was qualified by a significant three-way interaction, $F(2,79) = 3.35$, $p < .05$, $\eta^2 = .078$. A closer inspection of Table 4 shows that the difference between ingroup and outgroup prototypicality is especially pronounced in the subgrouping condition if the outgroup is rated first. On the other hand, the difference between ingroup and outgroup prototypicality is especially low in the control condition if the outgroup is rated first. Pairwise post hoc tests (Tukey-HSD) among the six means of relative prototypicality (i.e., direct ingroup prototypicality minus direct outgroup prototypicality) revealed one significant comparison: The subgrouping/outgroup first condition differed significantly from the control/outgroup first condition with regard to direct prototypicality, $p < .05$.

Table 4. Means and standard deviations of direct and indirect ingroup prototypicality and intergroup evaluations as a function of experimental condition (Experiment 2).

		Ingroup first		Outgroup first	
Dependent variable		*M*	*SD*	*M*	*SD*
Euclidean Distance					
d(IG-SC)	Subgrouping	2.45	1.01	2.01	.82
	Control	2.48	1.42	2.33	1.30
	Subtyping	2.34	.81	2.51	1.23
d(OG-SC)	Subgrouping	3.85	1.67	4.09	1.89
	Control	3.81	1.89	3.40	1.55
	Subtyping	3.74	1.74	4.47	1.66
Direct prototypicality					
Ingroup	Subgrouping	1.54	1.05	1.93	.80
	Control	1.33	1.11	1.43	1.28
	Subtyping	1.50	.94	1.43	1.02
Outgroup	Subgrouping	-.08	1.04	-.87	1.41
	Control	-.60	.91	.29	1.20
	Subtyping	-.29	.83	-.14	1.46
Intergroup evaluation					
Ingroup evaluation	Subgrouping	1.98	.49	1.98	.46
	Control	1.87	.46	1.77	.75
	Subtyping	1.83	.81	2.24	.32
Outgroup evaluation	Subgrouping	.53	1.18	.40	.70
	Control	1.08	.70	1.21	.76
	Subtyping	.62	.87	.60	.97

Note. d(IG,SC): Euclidean Distance between the ingroup and the superordinate category; d(OG,SC): Euclidean Distance between the outgroup and the superordinate category.

Both measures of prototypicality revealed that the ingroup is perceived as significantly more prototypical than the outgroup. Again, the mental representation did not influence any of the prototypicality measures. However, a significant interaction between mental representation and order was obtained for direct prototypicality for which a theoretical explanation cannot be provided. Interestingly, the subgrouping/outgroup first condition and the control/outgroup first condition were exactly the two conditions which already differed significantly with regard to ingroup identification. So there might be a causal relation between these two effects. Note however that the significant interaction did not involve the subtyping condition which was the main focus here.[7]

Intergroup evaluation. The eight items for ingroup and outgroup evaluation provided reliable measures, Cronbach's $\alpha = .79$ and $\alpha = .85$, respectively. Table 4 displays mean scores and standard deviations of ingroup and outgroup evaluation with high scores indicating the possession of desirable traits. A 2 × 2 × 3 ANOVA with target group as within-participants factor and order and mental representation as between-participants factor revealed a significant effect of target group, $F(1,78) = 126.47$,[8] $p < .001$, $\eta^2 = .619$. The ingroup was evaluated significantly better than the outgroup. However, this main effect was qualified by a reliable target group by mental representation interaction, $F(2,78) = 6.33$, $p < .01$, $\eta^2 = .140$, indicating that the difference between ingroup and outgroup evaluation is varying with the mental representation. There were no further main or interaction effects, Fs < .1. The analyses of the simple effects within the conditions of mental representation indicated that ingroup bias was reliable in all three conditions and that the effect sizes were of comparable magnitude in the subgrouping and subtyping condition, $F(1,26) = 59.70$ $p < .001$, $\eta^2 = .697$, and $F(1,26) = 49.45$, $p < .001$, $\eta^2 = .647$, respectively, whereas it was smaller in the control condition, $F(1, 28) = 19.95$, $p < .001$, $\eta^2 = .416$. Tukey-HSD post hoc tests of the difference measure of *ingroup bias* between the three conditions of mental representation showed that the subgrouping and subtyping conditions differed significantly from the control condition, both ps < .01, but not from each other, $p > .1$.

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[7] A 2 (mental representation) × 2 (order) between-participants ANOVA that only included the control and the subtyping condition revealed that there was no significant interaction for the direct prototypicality measure, $F < 1$.

[8] Due to missing values this test was based on a sample of $N = 84$ so that the error term has only 78 degrees of freedom.

The means in Table 4 suggest that variations in ingroup bias are mainly driven by evaluation of the outgroup. Therefore two two-factorial ANOVAs with group representation and order as factors and evaluation of the ingroup and the outgroup, respectively, as dependent variables were conducted. Evaluation of the ingroup did not vary as a function of group representation, order or the interaction of both, Fs < 1.6, ps > .05. In contrast, group representation had a significant effect on outgroup evaluation, $F(2,78) = 4.75$, $p < .05$, $\eta^2 = .109$. The main effect of order and the interaction were not significant, Fs < 1. A contrast that compared outgroup evaluation between the subgrouping and subtyping conditions with the control condition (-1 2 -1) revealed a significant result, $t(81) = 3.08$, $p < .01$.

Although the experimental manipulation did not influence perceived prototypicality in the subtyping condition as compared to the control condition, participants in the subtyping condition showed more ingroup bias than participants in the control condition. Unexpectedly, participants in the subgrouping condition showed more ingroup bias compared to the control condition, too.

Relation between relative ingroup prototypicality, PNS, diversity beliefs, and intergroup evaluation. In a multiple regression approach following Aiken and West (1991) it was tested whether the relation between relative prototypicality and ingroup bias was moderated by mental ingroup representation. For this purpose, the experimental conditions were effect-coded ([1 -1 0] contrasting subgrouping and control condition and [0 -1 1] contrasting subtyping and control condition). Both effect codes and the z-standardized prototypicality measure were entered into the regression model first. Then, the interaction terms were entered as predictors, too.

The model with both effect-coded variables and the *indirect* measure of prototypicality reached significance, $R^2 = .153$, $F(3,80)$, $p < .05$. Adding the interaction terms did not lead to a significant change in R^2, R^2-change = .002, $F < 1$. Indirect prototypicality was not a significant predictor of ingroup bias when controlling for mental representation, $\beta = .129$, $p > .1$.

Using the *direct* measure of prototypicality and both effect-coded variables as predictors led to a significant regression model, $R^2 = .220$, $F(3,80) = 7.54$, $p < .001$. Again, including the interaction terms did not lead to a significant increase in the portion of explained variance, R^2-change = .031, $F(2,78) = 1.61$, $p > .1$. The analysis of simple slopes, however, showed the expected pattern. The simple slope for the control condition was not significant, $\beta = .009$, $p > .1$, whereas the simple slopes for the subgrouping and subtyping conditions were both

(marginally) significant, β = .341, p = .05, and β = .447, p < .01. The relation between relative direct prototypicality and ingroup bias for the three conditions of mental representation can be seen in Figure 3. On account of the results of the simple slopes analysis, the regression analysis was computed anew, contrasting the subgrouping and subtyping conditions together against the control condition [-1 2 -1] and testing subgrouping and subtyping against each other in a second contrast-coded variable [1 0 -1]. The marginally significant interaction term between the [-1 2 -1] coded variable and direct prototypicality, β = -.171, p = .09, indicated that the ingroup prototypicality-ingroup bias link in the subgrouping and subtyping conditions were stronger than that in the control condition. The second interaction term was not significant, t < 1, indicating that the slopes in the subgrouping condition and the subtyping condition did not differ.

With respect to the role of diversity beliefs, there was neither an interaction between diversity beliefs and experimental condition for ingroup evaluation nor for outgroup evaluation or ingroup bias, R^2-changes < .002, Fs < 1. There was a tendency for a relation between ingroup bias and diversity beliefs in the expected direction, β = -.174, p = .11. Diversity beliefs did not predict evaluation of the ingroup, β = .128, p > .1, but evaluation of the outgroup was related to diversity beliefs in the expected direction, β = .283, p < .01.

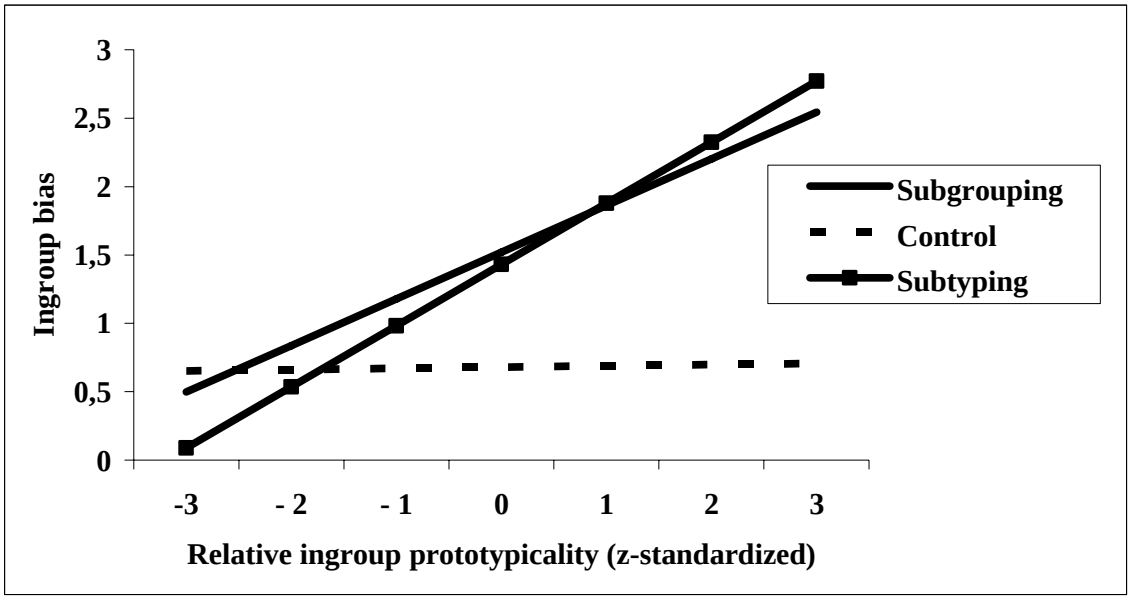

Figure 3. The relation between relative ingroup prototypicality and ingroup bias in the three experimental conditions (Experiment 2).

The relation between PNS and ingroup bias was not moderated by experimental condition either, R^2-change = .014, $F < 1$, but as PNS is a construct which consists of two factors (Neuberg & Newsom, 1993), a moderation was tested for both factors of PNS separately. The moderation of ingroup bias and the factor "desire for simple structure" by mental representation approached significance, R^2-change = .048, $F(2,78) = 2.30$, $p < .11$, the moderation of ingroup bias and the factor "response to lack of structure" by mental representation did not, R^2-change = .003, $F < 1$. Furthermore, for the factor "desire for simple structure" was tested whether the subgrouping and subtyping conditions converged in respect to the relation between PNS and ingroup bias, whereas the control condition was tested for divergence. A moderation analysis with the contrast codes of [-1 2 -1] and [1 0 -1] was calculated, which yielded a significant interaction term for the former contrast code, $\beta = .219$, $p < .05$, but no significant result for the latter, $\beta = .013$, $p > .1$. Simple slopes were calculated within each experimental condition for the relation between ingroup bias and the subfactor "desire for simple structure". The simple slopes in the subgrouping and subtyping conditions were not significant, $\beta = -.076$, $p > .1$, and $\beta = -.119$, $p > .1$, whereas "desire for simple structure" and ingroup bias were significantly related in the control condition, $\beta = .365$, $p < .05$ (see Figure 4).

It was also tested how PNS relates to relative prototypicality. Interestingly, PNS was neither related to indirect nor to direct prototypicality, $\beta = -.077$, $p > .1$, and $\beta = -.079$, $p > .1$. Neither relation was moderated by experimental condition, R^2-change = .013, $F < 1$, and R^2-change = .027, $F(2,79) = 1.15$, $p > .1$.

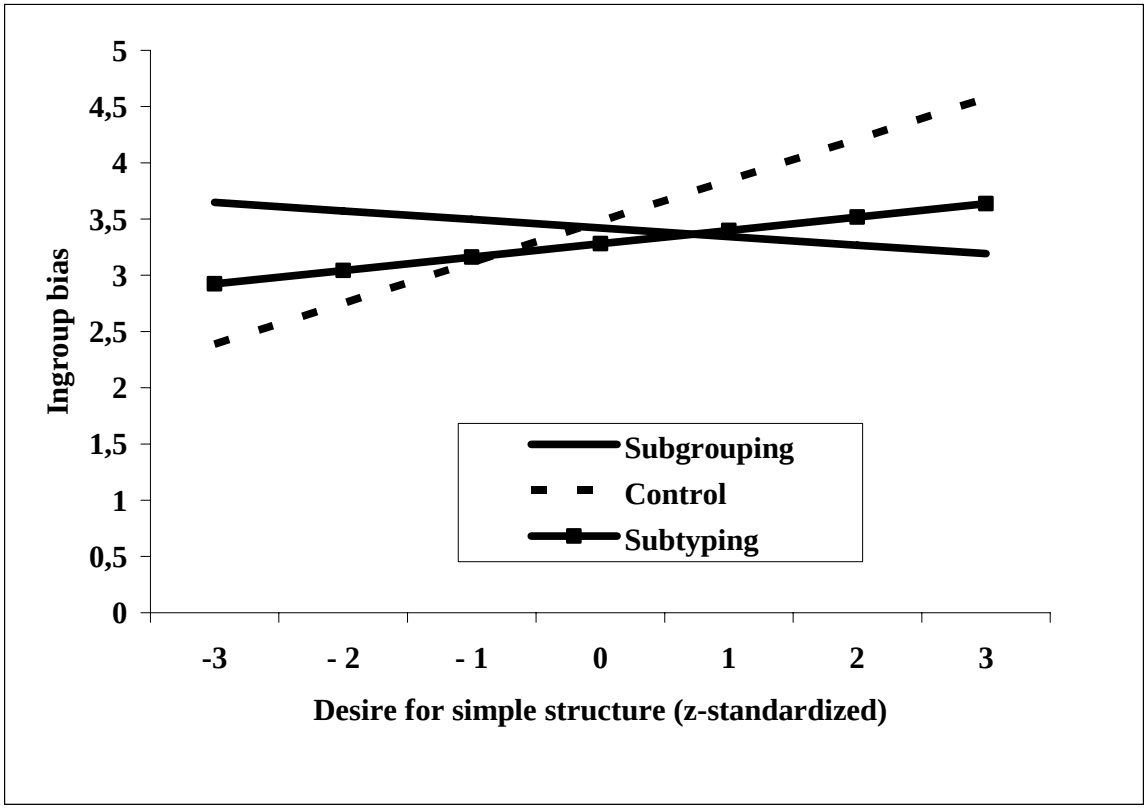

Figure 4. The relation between "desire for simple structure" and ingroup bias in the three experimental conditions (Experiment 2).

5.2.5 Summary

The aim of Experiment 2 was to replicate the subtyping effect of Experiment 1. Furthermore, the role of interindividual differences was investigated. It was hypothesized that interindividual differences are predictors of ingroup bias in "psychologically weak situations" but that they loose predictive power in "psychologically strong situations". Concerning subgrouping, it was investigated whether stronger manipulations of subgrouping than in Experiment 1 would have effects on projection and evaluation such that more complex ingroup representations either decrease the magnitude of relative ingroup prototypicality or weaken the relation between relative ingroup prototypicality and ingroup bias.

To summarize the results, a significant interaction between experimental condition and order was obtained for identification with the ingroup. This effect was also found for direct prototypicality. However, none of the other dependent variables varied with the order of ingroup and outgroup judgments. As the effect for ingroup identification occurred before the order factor was introduced it was attributed to an α-error in the randomized assignment of participants to the cells of the experimental design. It is possible that the effect of ingroup

identification was transferred to the direct prototypicality measure. However, the interaction between order and mental representation did not include the subtyping and control condition.

Similar to Experiment 1, prototypicality measures were not affected by experimental manipulations. However, the control condition showed significantly less ingroup bias compared to the subgrouping and the subtyping condition. In the two latter conditions, relative ingroup prototypicality was the basis for ingroup bias as indicated by significant relations between relative ingroup prototypicality measures and intergroup evaluation, whereas it was the desire to gain simple structure which predicted intergroup evaluation in the control condition. Thus, in those conditions in which high ingroup bias was obtained, ingroup bias was based on the perception of relative ingroup prototypicality. As expected, diversity beliefs were significantly correlated with more positive outgroup evaluations and marginally with reduced ingroup bias. Interestingly, diversity beliefs decreased significantly in the subgrouping condition.

Hence, it was possible to provide evidence for the subtyping effect in two experiments. Open to question remains the effect of subgrouping. Processes that might be triggered by subgrouping and that have caused the results in Experiment 1 and 2 are discussed in the next chapter.

5.3 Discussion of Part I

The two experiments reported in Part I investigated the influence of mental ingroup representations on projection and intergroup evaluation. In Experiment 1 experimental manipulations did not change the magnitude of relative ingroup prototypicality as measured by direct and indirect indices of prototypicality for the superordinate category. Nonetheless, more ingroup bias was found following a subtyping manipulation compared to a control and a subgrouping condition. Furthermore and in line with the hypothesis on the relation between ingroup prototypicality and ingroup bias, the subtyping condition showed a stronger link between relative ingroup prototypicality and ingroup bias. In Experiment 2, relative ingroup prototypicality was not affected by experimental manipulations either. Again, the subtyping manipulation led to more ingroup bias compared to the control condition. Unexpectedly, the subgrouping condition also led to more ingroup bias than the control condition. Interestingly, in the two conditions in which most ingroup bias was expressed, intergroup evaluation was based on relative ingroup prototypicality whereas intergroup evaluation in the control condition was strongly based on the individual desire for simple structure.

To conclude, ingroup features seem to be projected onto the superordinate category irrespective of the complexity of the mental representation of the ingroup as indicated by the constant amount of relative ingroup prototypicality across experimental conditions in both experiments. However, relative ingroup prototypicality was not the basis for intergroup evaluation per se. It is rather the clarity of the prototype which determines if the prototype becomes prescriptive. I want to focus on the subtyping conditions in both studies first. Apparently, a projected ingroup prototype is a reliable ground for evaluation if the prototype possesses little complexity. This expected pattern was indicated by the simple slopes for relative ingroup prototypicality and ingroup bias in the subtyping conditions of both experiments. This finding parallels the results of Hogg et al. (1993) who showed that the prototypicality of an ingroup member only predicted liking if the group possessed a clear and simple prototype. In the control group, the central tendency of the ingroup was projected, too, as suggested by the constant amount of relative ingroup prototypicality across conditions. However, perceived prototypicality did not predict ingroup bias in the control condition, so that some characteristic of the prototype of the ingroup and superordinate category may have prevented that prototypicality was taken as a prescriptive standard for intergroup evaluations.

The personality variable PNS led to a further completion of the interpretation. A subscale of PNS was a predictor of ingroup bias in the control condition, but its predictive power

diminished in the other experimental conditions. This result fits Snyder and Ickes' idea (1985) that strong social situations overpower the influence of personality variables. Subtyping, that is, the creation of a simple ingroup representation, seemed to be such a strong situation, in which intergroup evaluations are guided by the availability of a unique prototype.

I now turn to the results of the subgrouping manipulations. In Experiment 1 the subgrouping condition did not differ from the control condition. The instruction to form subgroups within the ingroup might not differ from the default mental representation of the ingroup. As already discussed, research by Park et al. (1992) suggested that participants more easily produced subgroups of the ingroup compared to the outgroup. Thus, asking participants to form subgroups of the ingroup may have led to a reproduction of the default mental representation of the ingroup and, therefore, did not affect the mental representation of the ingroup as compared to the control condition.

In contrast, in Experiment 2, participants were forced to think about subgroups which they did not choose themselves. Thinking about subgroups predetermined by the experimenter might exceed the participant's idiosyncratic mental representation of the ingroup. The fact that endorsement of diversity beliefs dropped under subgrouping might be useful in order to understand the increased ingroup bias. I can only speculate about this effect, but it seems plausible that forcing participants to think about subgroups that do not characterize their everyday thinking about their ingroup poses a certain threat to the distinctiveness of the ingroup. The "forced" complexity (and, therefore, variability) of the ingroup might threaten group boundaries and differentiation needs (e.g., Brewer, 1991). Especially Social Identity Theory emphasized the importance for the ingroup to be distinct from other groups (Branscombe, Ellemers, Spears, & Doosje, 1999; Jetten & Spears, 2003; see also Brewer, 1991). Previous research has demonstrated that intergroup distance *and* within group variability trigger distinctiveness threat (Jetten, Spears, & Manstead, 1998). Thus, distinctiveness threat, resulting in an attempt to restore positive intergroup differentiation by ingroup bias, is also expected for high group variability. To the extent that subgrouping increases perceived ingroup variability, it may therefore lead to distinctiveness threat and, as a consequence, to a positive intergroup differentiation in terms of ingroup favoritism. In addition to social identity motives, it is also possible that positive ingroup differentiation is a means to re-establish a clear recategorization in order to conserve the resource-saving simplification of the social environment (Macrae et al., 1994). According to this notion, threat is a motivated cognition which is not aiming at positive ingroup distinctiveness but to a clearly categorized world in general. Irrespective of the underlying cause, it is conceivable

that participants rebuild the ingroup as a distinct unit through a devaluation of diversity in order to re-establish distinctiveness. This would suggest a paradoxical effect: Participants repair the threat posed by complexity through a denial of diversity within their ingroup. If it is correct that projection and evaluation only correlate if the prescriptive prototype is clearly defined and if subgrouping leads to a denial of ingroup diversity it is a logical outcome that a significant ingroup prototypicality-ingroup bias link under subgrouping was found. It goes without saying, however, that the assumed phenomenon of distinctiveness threat within the field of ingroup diversity needs further consideration and empirical evidence. The role of distinctiveness threat will be considered in further detail in the second part of the present thesis.

In essence, from the experiments in Part I it might be concluded that intergroup evaluation only depends on projection if the projected prototype is clearly defined so that it can serve as a prescriptive standard. This conclusion is particularly based on the comparison between subtyping and control condition that showed that prototypicality only predicts ingroup bias under subtyping. More generally it can be concluded that mental *ingroup* representations in terms of complexity play a crucial role in projection and intergroup evaluation.

6 Part II: The role of variability of mental ingroup representation in ingroup projection

Concerning the effects of complex and simple ingroup representations within the Model of Ingroup Projection, I assumed that two processes were possible. One possibility was a main effect of ingroup complexity on relative ingroup prototypicality such that higher levels of complexity reduce the perception of relative ingroup prototypicality. The second possibility was that ingroup complexity moderates the relation between relative ingroup prototypicality and ingroup bias such that complex ingroup representations weaken the ingroup prototypicality-ingroup bias link. Experiment 1 and 2 demonstrated that the prototypicality-ingroup bias relation was a function of ingroup complexity. Thus, evidence for the hypothesis concerning a moderation effect was provided.

In the second part of the present thesis the role of *variability* within the projection process is considered. Variability is of course closely related to complexity. But as already outlined in the theoretical part, complexity is a broader concept than variability. Complexity refers to the *differentiation* of stimuli in a first step and to the *integration* of stimuli according to their similarities on multiple dimensions in a second step (Scott, 1969). As already outlined before, I argue that variability refers to *differentiation but not to integration*. Thus, a category is variable to the extent that the corresponding stimuli are widely distributed on multiple dimensions but not clustered according to similarities. As variability comprises only one component, namely differentiation, it could be understood as the more parsimonious strategy because it might require less cognitive effort. It was the interest of the present thesis to investigate whether simple variability manipulations are already sufficient to establish effects on relative ingroup prototypicality and intergroup evaluation. In particular and in line with the hypotheses formulated in the theoretical part, it was tested whether variability of the ingroup representation affects the magnitude of relative ingroup prototypicality and whether variability of the ingroup representation affects the strength of the ingroup prototypicality-ingroup bias relation.

The second part of this dissertation encompasses Experiment 3 and Experiment 4. In both Experiment 3 and Experiment 4 diversity versus unity manipulations of Waldzus et al. (2003, 2005) were employed to induce high versus low levels of ingroup variability. Furthermore, different levels of variability were also induced for the mental representation of the

superordinate category in Experiment 3. Effects of superordinate category variability on relative ingroup prototypicality would replicate the results of Waldzus et al. (2003; 2005). Experiment 4 opens another perspective on variability of mental ingroup representations. In particular, the role of distinctiveness threat (Jetten & Spears, 2003) was investigated as a negative side effect of increased variability of mental ingroup representations.

6.1 Experiment 3

6.1.1 Introduction

In Experiment 3, I wanted to test whether perceived ingroup variability (as opposed to ingroup complexity) has the potential to reduce projection tendencies or to weaken the ingroup prototypicality-ingroup bias link. For this purpose, the manipulation of Waldzus et al. (2003; 2005) was used which induces unity or diversity of a social category. Although Waldzus and colleagues intended to manipulate complexity by asking participants to either think about the unity or the diversity of a social category, in this thesis it was proposed that unity and diversity mainly refer to variability rather than to complexity. To think about the diversity of a social category instigates differentiation between the stimuli within that category. Relying on the proposed difference between variability and complexity, I suggested that unity and diversity manipulations miss the integration component and, therefore, should be conceived as a manipulation of variability.

Waldzus et al.'s (2003, 2005) approach was to manipulate the mental representation of the *inclusive category*. They argued that people cannot project ingroup features onto diverse superordinate categories. With the same argument as in Experiments 1 and 2, I would argue that the manipulation of the variability of the *ingroup* representation is also an effective means to either prevent projection or to moderate the ingroup prototypicality-ingroup bias relation. Thus, both ingroup and superordinate category manipulations are hypothesized to change processes in ingroup projection.

Ingroup diversity was predicted to lead to less relative ingroup prototypicality and, therefore, to less ingroup bias. On the other hand, *superordinate category* diversity was predicted to lead to less relative ingroup prototypicality and, therefore, to less ingroup bias. The hypothesis concerning the superordinate category relates to the work of Waldzus et al. (2003, 2005) and a confirmation of this hypothesis would represent a replication of previous research. An effect of ingroup diversity and superordinate category diversity such that both lead to less relative ingroup prototypicality translates into a main effect of variability on relative ingroup prototypicality.

As we know from Experiment 1 and 2, projection can occur irrespective of the mental ingroup representation. At the same time, Experiment 1 and 2 provided some evidence for the reasoning that only a mental ingroup representation of little complexity can serve as a

prescriptive standard for evaluation. In line with Experiment 1 and 2, it is hypothesized that the relation between relative ingroup prototypicality and intergroup evaluation should only occur if variability is perceived to be low. This effect translates into a statistical interaction effect between relative ingroup prototypicality and variability of the mental representation on ingroup bias.

The intergroup situation in Experiment 3 consisted of Germans as the ingroup, Poles as the outgroup and Europeans as the superordinate category. This setting was adopted from Waldzus et al. (2003). The design was a 2 (mental representation: unity versus diversity) × 2 (level of manipulation: ingroup versus superordinate category) between-participants design with a non-orthogonal control group.

6.1.2 Method

Pretest. 20 participants were asked to rate how typical each of 51 attributes was of Germans and Poles on rating scales ranging from +3 (*applies to Poles*) via 0 (*applies to both*) to +3 (*applies to Germans*). 4 Persons were excluded from the analysis because they indicated that they did not have the German citizenship. Likewise, another 20 participants were asked to indicate the same attributes' valence on 7-point scales ranging from -3 (*very negative*) to +3 (*very positive*).

Eight attributes were chosen of which four were perceived as applying to Poles (e.g., "religious") and four were perceived as typical of Germans (e.g., "efficient"). After the rating scales were transformed into scales ranging from -3 (*applies to Poles*) to +3 (*applies to Germans*), the mean typicality of the Polish attributes was M = -1.24 (SD = 1.16) and the mean typicality of the German attributes was M = 1.17 (SD = 1.09). Importantly, the four typical Polish attributes were perceived as moderately positive on average (M = 1.13, SD = 1.12), as were the four typical German attributes (M = 1.22, SD = 1.02).

Participants. Participants were students from the University of Giessen. The Experiment was advertised on campus as a study on how Europeans perceive Europe. Participants were randomly assigned to one of four conditions of the 2 (variability: unity versus diversity) × 2 (level of manipulation: ingroup versus superordinate category) design or the control group. All participants were members of the ingroup "Germans" so that the final sample consisted of all 111 initial participants with 22 or 23 participants in each condition. Participants received 5 EUR for their participation.

Procedure. Participants completed the experiment individually but in sessions with up to 12 participants. The presented intergroup situation described Europe as the superordinate category which contained Germans and Poles as ingroup and outgroup. First, participants read that the purpose of the study was to assess the perception of Europe, Germany, and Poland from different perspectives. This introduction was intended to make the intergroup situation with ingroup, outgroup and superordinate category salient.

Thereafter, the manipulation of diversity versus unity, respectively, referred either to the ingroup or the superordinate group. In the diversity condition, participants were asked to think about the diversity of the respective group (i.e., ingroup or superordinate category) and to describe this diversity in a short paragraph. The wording of the unity condition was analogous except that the word "diversity" was exchanged with unity. These manipulations were adopted from Waldzus et al. (2003, 2005). The control condition only received the introduction.

On the pages following the manipulation, the dependent measures were assessed. After the entire questionnaire was completed, participants were thanked and received 5 EUR for participation. Participants were debriefed via electronic mail after the data collection was completed.

Dependent Variables. First, participants indicated their *identification* with the ingroup and with the superordinate category on four items each (e.g., "I identify with the [Germans, Europeans]"). These questions were answered on 6-point scales ranging from 0 (*does not apply at all*) to 5 (*applies completely*). Like in Experiment 1 and 2, identification was an important control variable. As a manipulation check, the *global within group similarities* of the ingroup, the outgroup and the superordinate category were assessed with one item each. Participants rated their agreement with the item "The [Germans, Poles, Europeans] are mostly very similar to each other" on 7-point scales ranging from -3 (*does not apply at all*) to +3 (*applies completely*) (Maurer et al., 1995).

Next, participants rated the ingroup, the outgroup and the superordinate category on eight attributes on rating scales ranging from -3 (not at all) to +3 (completely). According to the pretest, four of the eight attributes were stereotypical of Germans (e.g., „efficient") and four of Poles (e.g., „religious"). As in Part I, these ratings were used to calculate Euclidean Distances between the superordinate category and the ingroup and outgroup, respectively. The difference between outgroup-superordinate category distance and ingroup-superordinate category distance served as an indirect measure of perceived prototypicality of the ingroup

relative to that of the outgroup (*indirect prototypicality)*. Perceived prototypicality was also assessed directly (*direct prototypicality*). Participants rated the statements "[Germans, Poles] are typical of Europeans" on 7-point scales from -3 (*does not apply at all*) to +3 (*applies completely*).

To assess intergroup evaluation, the ingroup was rated on two items "I like Germans" and "I like the German mentality" on 7-point scales ranging from -3 (*does not apply at all*) to +3 (*applies completely*). For outgroup evaluation, eleven items were available. In particular, the two items paralleling ingroup evaluation (e.g., "I like Poles") plus nine more items (e.g., "I would like to have contact to Poles") were employed. As an index of *ingroup bias* the difference between ingroup evaluation and outgroup evaluation on the two common items was calculated.

6.1.3 Results and discussion

In order to analyze the 2 × 2 between-participants design, two-factorial between-participants ANOVAs were conducted. The manipulation of unity versus diversity is entered into the ANOVA as "mental representation"-factor. The mental representation was either manipulated at the level of the ingroup or at the level of the superordinate category. This second orthogonal factor is referred to as "level of manipulation"-factor. The non-orthogonal control condition was not included in these 2 × 2 ANOVAs. If the 2 × 2 ANOVAs revealed a significant effect of experimental manipulation, planned contrast analyses including the control group were employed in order to provide information about the relation between experimental conditions and the baseline.

Identification. After the exclusion of one item in both the ingroup identification scale and the superordinate category identification scale ("Sometimes I regret being [German, European]."), the scales were reliable (Cronbach's $\alpha = .88$ and .91, respectively). An ANOVA with target group (i.e., identification with the ingroup and the superordinate category) as within-participants factor and mental representation and level of manipulation as between-participants factor revealed a main effect of target group, $F(1,85) = 14.08$, $p < .001$, $\eta^2 = .142$. The mean score of identification with the ingroup was $M = 3.22$ ($SD = 1.10$). The significantly higher mean identification with the superordinate category was $M = 3.77$ ($SD = 1.06$). No further main effect or interaction occurred, Fs < 1. Both means differed significantly from the scale midpoint of 2.5, $t(110) = 6.88$ and $t(110) = 12.66$, ps < .001. The results indicated that participants were more identified with the superordinate category across

all conditions. Moreover, identification with both the ingroup and the superordinate category was considerably high. But importantly, neither identification with the ingroup nor with the superordinate category varied as a function of experimental manipulation.

Manipulation check. To check the efficiency of the manipulation at the ingroup and the superordinate category level, 2 (mental representation) × 2 (level of manipulation) ANOVAs were calculated with either the similarity measure of the ingroup or the superordinate category as dependent variables. None of the effects was significant, *F*s < 1. It was also tested whether the manipulation of ingroup or superordinate category variability affected the mental representation of the outgroup. Using the similarity measure of the outgroup as dependent variable, the 2 × 2 ANOVA did not reveal a significant effect either, *F*s < 1.

Indirect and direct measures of prototypicality. Table 5 displays means and standard deviations of the *indirect prototypicality* measures for ingroup and outgroup. A 2 × 2 × 2 ANOVA with target group as within-participants factor and mental representation and level of manipulation as between-participants factors yielded a significant effect of mental representation, $F(1,84) = 4.28$,[9] $p < .05$, $\eta^2 = .049$. The means in Table 5 suggest that in the unity conditions both the ingroup and the outgroup were perceived as less prototypical (i.e., more distant) of the superordinate category ($M_{d(IG\text{-}SC)} = 3.66$, $SD = 1.36$, and $M_{d(OG\text{-}SC)} = 4.03$, $SD = 1.76$) than in the diversity conditions ($M_{d(IG\text{-}SC)} = 3.26$, $SD = 1.62$, and $M_{d(OG\text{-}SC)} = 3.27$, $SD = 1.57$). All other effects were not significant, *F*s < 1.10. Specifically, ingroup and outgroup were perceived as equally prototypical of the superordinate category as indicated by their profile similarity ($M = 3.46$, $SD = 1.50$, and $M = 3.66$, $SD = 1.70$).

Also for *direct prototypicality* a 2 × 2 × 2 ANOVA was conducted with target group as within-participants factor and mental representation and level of manipulation as between-participants factors. The analysis revealed a main effect of target group, $F(1,85) = 54.77$, $p < .001$, $\eta^2 = .392$. The ingroup was perceived as more prototypical of the superordinate category than the outgroup ($M = .38$, $SD = 1.32$ versus $M = -.49$, $SD = 1.15$). In line with predictions, the target group × mental representation interaction was also significant, $F(1,85) = 4.06$, $p < .05$, $\eta^2 = .046$. The means in Table 5 show that in both diversity conditions the differences between ingroup and outgroup prototypicality were smaller than in the unity conditions ($M = .64$, $SD = 1.25$ versus $M = 1.11$, $SD = .94$). An unexpected marginal interaction effect

[9] Due to one missing value in the diversity/ingroup condition, this test was based on a sample of $N = 88$ so that the error term has only 84 degrees of freedom.

between mental representation × level of manipulation emerged, $F(1,85) = 3.11$, $p = .08$. Table 5 suggests that participants in the superordinate category/unity condition perceived both ingroup and outgroup as more prototypical of the superordinate category. However, this effect was only marginal. There was no further main, second or third order interaction effect ($F(1,85) = 1.70$, $p > .1$, for the main effect of mental representation, other Fs < 1). Using relative direct prototypicality (i.e., the difference measure) as a dependent measure and contrasting the unity conditions against the control condition in a first contrast and the diversity conditions against the control condition in a second contrast, revealed no significant effect, $t(104) = 1.45$, $p > .1$, and $t < 1$.

As indicated by the significant two-way interaction (mental representation × target group), diversity manipulations led to less relative ingroup prototypicality. This replicates the results of Waldzus et al. (2003; 2005) where a diversity manipulation at the superordinate category level was related to less relative ingroup prototypicality than a unity manipulation. Furthermore, the results presented here showed that also a diversity manipulation at the *ingroup* level was related to less relative ingroup prototypicality compared to a unity manipulation. Since no three-way interaction occurred, both the manipulation of mental representation at the ingroup level as well as at the superordinate category level can be assumed to be equally effective in reducing relative ingroup prototypicality.

Intergroup evaluation. Ingroup and outgroup evaluation were assessed with two items each ($r(109) = .635$, $p < .001$; $r(108) = .588$, $p < .001$[10]). Table 5 displays mean evaluation scores and standard deviations as a function of experimental manipulation. A 2 (mental representation) × 2 (level of manipulation) × 2 (target group) ANOVA was conducted. The ingroup was evaluated better than the outgroup ($M = .68$, $SD = 1.11$, and $M = .35$, $SD = .97$) reflecting the classical ingroup bias, $F(1,84) = 5.49$, $p < .05$, $\eta^2 = .061$. No further main effects, two- or three-way interactions were obtained, $F(1,84) = 2.28$, $p > .1$, for the mental representation × target group interaction, all other Fs < 1. Although the mental representation × target group interaction was not significant, note that the means in Table 5 indicate on a descriptive level that contrary to predictions the difference between ingroup and outgroup evaluation was especially pronounced in the diversity conditions ($M = .70$ and $M = .41$) whereas the difference was smaller in the unity conditions ($M = .22$ and $M = .02$).

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[10] Due to one missing value in the unity/superordinate category condition, this test was based on a sample of $N = 110$ so that the error term has only 108 degrees of freedom.

Table 5. Means and standard deviations of indirect prototypicality, direct prototypicality and evaluation of the ingroup and outgroup as a function of mental representation and level of manipulation (Experiment 3).

	Ingroup				Superordinate category				Control	
	Unity		Diversity		Unity		Diversity			
Dependent variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Euclidean Distance										
d(IG-SC)	3.73	1.40	3.31	1.71	3.59	1.35	3.21	1.56	4.23	1.57
d(OG-SC)	4.16	1.86	3.31	1.39	3.90	1.67	3.23	1.75	3.88	1.51
Direct typicality										
Ingroup	.35	1.53	.32	1.17	.95	1.21	-.09	1.19	.05	1.65
Outgroup	-.70	1.29	-.45	1.01	-.23	1.38	-.59	.80	-.55	1.44
Evaluation										
Ingroup	.59	1.16	.98	1.05	.43	1.22	.73	1.01	.36	1.28
Outgroup (2 items)	.37	.98	.27	1.13	.43	1.06	.32	.75	.32	1.35
Outgroup (11 items)	.22	1.14	.40	.98	.31	1.04	.54	1.21	.48	1.3

Note. d(IG,SC): Euclidean Distance between the ingroup and superordinate category trait ratings; d(OG,SC): Euclidean Distance between the outgroup and superordinate category trait ratings.

For the *evaluation of the outgroup*, altogether 11 items were employed. The scale was reliable with an internal consistency of Cronbach's alpha = .91. The means and standard deviations of the 11-item scale are also presented in Table 5. A 2 (mental representation) × 2 (level of manipulation) ANOVA was conducted. None of the effects was significant, Fs < 1.

To summarize, the analysis of intergroup evaluation showed the well-known phenomenon of ingroup favoritism. But the manipulation of diversity and unity did not influence ingroup bias in the expected direction. In contrast, at a merely descriptive level,

intergroup evaluation was affected opposite to expectations (i.e., better evaluation of the ingroup in relation to the outgroup in the diversity conditions). Parallel to the analyses of Waldzus et al. (2003), I also tested if outgroup evaluation alone changed as a function of experimental condition. Similar to Waldzus et al. (2003) it was not possible to demonstrate a total effect of mental representation on outgroup evaluation.

Relation between mental representation, relative ingroup prototypicality and intergroup evaluation. By a mediation analysis according to Baron and Kenny (1986) I tested the hypothesis that diversity leads to less relative ingroup prototypicality and that relative ingroup prototypicality is positively related to ingroup bias. As already demonstrated by the analysis of variance and in line with predictions, mental representation (coded as a contrast variable, -1 for unity conditions, +1 for diversity conditions) was significantly related to *direct prototypicality*, $\beta = -.212$, $p < .05$, $R^2 = .045$. The analysis of variance also already revealed that mental representation is not related to ingroup favoritism. The regression analysis confirmed this result, $\beta = .160$, $p > .1$, $R^2 = .026$. When mental representation and direct prototypicality were simultaneously entered into the regression model, direct prototypicality was related to ingroup favoritism as expected and predicted by the Ingroup Projection Model, $\beta = .250$, $p < .05$. Furthermore, within the same regression model the direct β-weight of mental representation as a predictor of ingroup favoritism reached significance, $\beta = .216$, $p < .05$. Surprisingly, diversity led to more ingroup favoritism if direct prototypicality was controlled for. For an illustration of the mediation analysis see Figure 5.

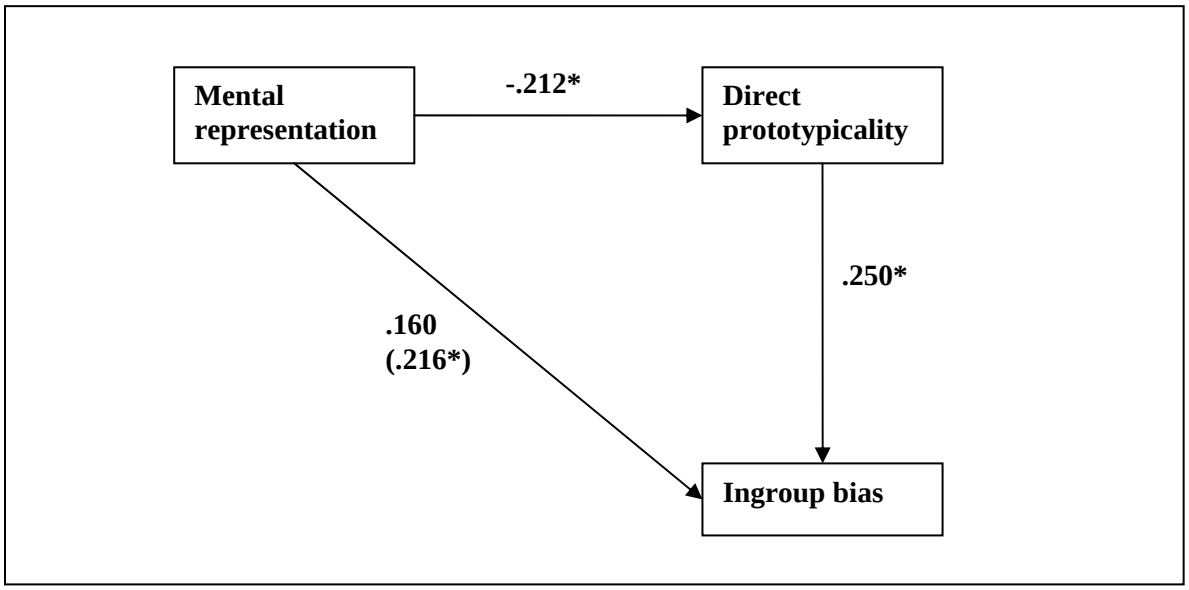

*Figure 5. The relations between mental representation, direct prototypicality, and ingroup bias. * p < .05. Mental representation: (-1) unity manipulation; (+1) diversity manipulation.*

In order to test if the relation between ingroup favoritism and direct prototypicality was moderated by experimental conditions, I conducted a moderation analysis following the suggestions of Aiken and West (1991). Three contrast-coded variables (i.e., the main effect of mental representation [-1 1 -1 1], the main effect of level of manipulation [-1 -1 1 1] and their interaction [1 -1 -1 1]) and the *z*-standardized direct prototypicality variable were entered into a regression model with ingroup favoritism as a dependent variable. The model as a whole reached marginal significance, $R^2 = .093$, $F(4,83) = 2.12$, $p = .09$. As already indicated by the mediation analysis, the contrast-coded variable which represented mental representation as well as the direct prototypicality variable were significant predictors of ingroup favoritism, $\beta = .218$, $p < .05$, and $\beta = .249$, $p < .05$. Adding the product terms of the contrast-coded variables and direct prototypicality did not lead to a significant change in R^2, R^2-change = .010, $F < 1$. Thus, the relation between ingroup bias and direct prototypicality was not moderated by the experimental conditions.

The second measure of perceived prototypicality, *indirect prototypicality*, was not related to ingroup favoritism, $\beta = .056$, $p > .05$, and, as already indicated by the analysis of variance, indirect prototypicality was not affected by the experimental conditions. Similarly, there was no significant moderation for the relation between indirect prototypicality and ingroup bias, R^2-change = .020, $F < 1$.

Because originally the Ingroup Projection Model formulated that relative ingroup prototypicality predicts outgroup derogation, I also tested for the relation between relative ingroup prototypicality and outgroup evaluation. Evaluation of the outgroup was assessed with eleven items of which only two entered the difference score of ingroup bias. As for ingroup bias, the relation between outgroup evaluation and relative prototypicality (measured directly or indirectly) was not moderated by experimental condition, all $|t\text{s}| < 1.5$, $p\text{s} > .1$. Thus, indirect and direct prototypicality are equally good predictors of outgroup evaluation across all experimental conditions, $\beta = -.312$, $p < .01$, and $\beta = -.309$, $p < .01$. Like for ingroup bias, experimental conditions and direct prototypicality were entered simultaneously into the regression model with outgroup evaluation as the dependent variable. Direct prototypicality remained a significant predictor, $\beta = -.362$, $p < .01$. But contrary to ingroup bias, mental representation did not predict outgroup evaluations after direct prototypicality was controlled for, $\beta < 1$, $p > .1$. The same results were obtained if indirect prototypicality and experimental conditions were entered simultaneously into the regression model, $\beta = -.294$, $p < .01$, for indirect prototypicality and $\beta < 1$, $p > .1$, for mental representation. Hence, the results for

outgroup evaluations did not parallel the results of ingroup bias concerning variability manipulations as a predictor when prototypicality was controlled for.

6.1.4 Summary

It was hypothesized that diversity manipulations at the ingroup as well as at the superordinate category level lead to a decrease in perceived ingroup prototypicality. Furthermore and in correspondence to Experiment 1 and 2, it was expected that ingroup prototypicality and ingroup bias are positively related only if the mental representation of the ingroup and the superordinate category, respectively, are of little variability like in the unity conditions.

To control for the effect of identification on ingroup bias, identification with the ingroup and the superordinate category were assessed. Neither identification with the ingroup nor with the superordinate category was influenced by experimental conditions. Although the manipulation check with perceived ingroup similarity did not prove the effectiveness of the manipulation, evidence was provided that diversity manipulations prevented participants from projecting ingroup attributes onto the superordinate category as indicated by a significant main effect of mental representation on direct prototypicality (see Figure 5). In line with the hypothesis, this effect was found irrespective of the level of manipulation (see the non-significant three-way interaction). Hence, diversity manipulations at the ingroup level as well as at the superordinate category level may be effective means to decrease projection tendencies. As predicted by the Ingroup Projection Model, prototypicality perceptions (if measured directly) were significantly related to ingroup favoritism. But although diversity manipulations decreased direct prototypicality perceptions and direct prototypicality predicted ingroup bias, there was no *total effect* of mental representation on ingroup bias. However, the *direct effect* of mental representation on ingroup favoritism became significant after perceived prototypicality was controlled for. Interestingly, the positive regression coefficient indicated that diversity led to significantly more ingroup favoritism after controlling for direct prototypicality.

The fact that the mediation analysis revealed significant paths from mental representation to direct ingroup prototypicality and from direct ingroup prototypicality to ingroup bias but no significant total effect from mental representation to ingroup bias ($\beta = .160$) suggests other processes at work. Diversity manipulations may trigger a second process that is antagonistic to the effect of variability on prototypicality perceptions and neutralizes the positive effects of

variability on prototypicality. A hint might lie in the results regarding ingroup and outgroup evaluation. Although neither ingroup nor outgroup evaluation varied as a function of experimental manipulations ($F(4,106) = 1.00$, $p > .1$, and $F < 1$), a consideration of the means at a purely descriptive level reveals that in both diversity conditions it was the evaluation of the *ingroup* that increased (see Figure 6). This points toward the assumed second, antagonistic process.

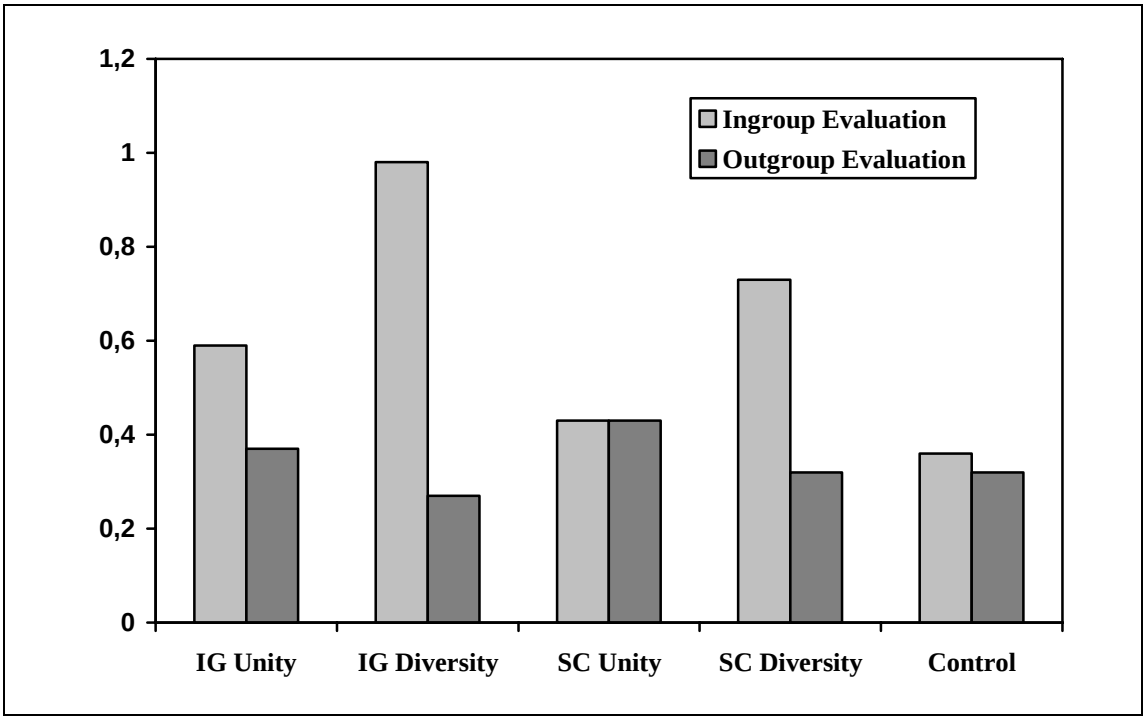

Figure 6. Mean ingroup and outgroup evaluation scores (Experiment 3). IG: Ingroup; SC: Superordinate category.

In the discussion of Experiment 2, I already argued that threat might be triggered by diverse or complex group representations. In particular, the finding that subgrouping led to more ingroup bias was discussed with regard to distinctiveness threat. Although the focus of the distinctiveness threat literature was mainly on intergroup distance, which was supposed to threaten distinctiveness needs and to provoke ingroup bias (e.g., Brown & Abrams, 1986; Hornsey & Hogg, 2000; Jetten, Spears, & Manstead, 1996; Roccas & Schwartz, 1993), Jetten, Spears and Manstead (1997, 1998) manipulated ingroup variability and intergroup distance orthogonally. Jetten et al.'s (1998) data showed an interaction between intergroup distance and within-group variability. If the mean distance between two groups is rather high, an increase in ingroup and outgroup variability triggered ingroup bias which was interpreted as a consequence of threat. The fact that intergroup distance needs to be high for an effect of increased group variability to occur was interpreted such that only two groups that are

perceived as two different entities can feel threat to their distinctiveness. As the intergroup situation of Experiment 3 (and Experiment 4), Germans and Poles within Europe, consisted of two clearly distinguishable groups, it is conceivable that an increase in ingroup variability exerted threat to the groups' distinctiveness.

As already pointed out, it is the ingroup which is upgraded in the diversity conditions compared to the unity and control conditions, a result which parallels the findings of Jetten et al. (1997) who found a better evaluation of the ingroup and no devaluation of the outgroup in the distinctiveness threat condition. In Experiment 4, I want to investigate the influence of variability manipulations on distinctiveness threat.

So far the main focus of the present thesis was on cognitive, "cold" processes. Hypothesizing distinctiveness threat as an antagonistic process, however, reintroduces a rather "hot" component to the model. According to social identity approaches, people feel threatened when their positive social identity is challenged (Jetten & Spears, 2003). In order to maintain positive distinctiveness, people increase ingroup evaluations relative to outgroup evaluations. Hence, a necessary reaction to threat is ingroup bias. On the other hand, distinctiveness threat can also be conceived as a motivated social cognition process where clear group boundaries are desirable because they facilitate an understanding of social reality without much cognitive effort. In this case, increasing the difference between ingroup and outgroup evaluation is only a means to retain clear group boundaries and is not an instrument to enhance ones own positive social identity. Concerning the present thesis, both motivations can cause the effect. However, I do not aim at disentangling these two motivations but suggest that the effect of diversity manipulations on ingroup prototypicality is compensated by a motivational process.

6.2 Experiment 4

6.2.1 Introduction

Distinctiveness threat research so far rests on the assumption that similarity between two groups leads to threat (for a review see Jetten & Spears, 2003). In several studies it has been demonstrated that a decrease of group distinctiveness led to ingroup bias. However, this proposition has never been measured up to date. In particular, from the manipulations of intergroup distance or within group variability and the resulting ingroup bias it has been *inferred* that people feel threatened. But participants have never been actually asked if they felt threat in response to low intergroup similarity or high within group variability.

Similarly problematic is that the predictions of Social Identity Theory and Self Categorization Theory are clearly contradicting with regard to the effect of intergroup distance: Social Identity Theory predicts that higher intergroup similarity undermines group distinctiveness which provokes positive differentiation (i.e., ingroup bias) to reestablish clear group boundaries (Brown, 1984). In contrast, the more cognitive and perceptual perspective of Self Categorization Theory predicts that higher intergroup similarity deemphasizes differences and relates to less ingroup bias (Jetten & Spears, 2003). Thus, whereas intergroup similarity leads to ingroup bias according to Social Identity Theory, it leads to intergroup harmony according to Self Categorization Theory. Spears, Jetten and Scheepers (2002) conclude that "(…) both, the presence of group distinctiveness, and its absence, have been used to account for differentiation and discrimination between groups" (p. 148, see also Mummendey & Wenzel, 1999). Also empirical results concerning the relation between distinctiveness and differentiation are rather mixed (Brown, 1984; Henderson-King, Henderson-King, Zhermer, Posokhova, & Chiker, 1997; Mummendey & Schreiber, 1984).

Theoretical arguments to dissolve the theoretical contradictions come from Spears et al. (2002). The authors distinguish *two* processes that are either related to Social Identity Theory or to Self Categorization Theory. A *reactive distinctiveness process* is at work in accordance with Social Identity Theory and leads to ingroup bias as a consequence of high intergroup similarity. A *reflective distinctiveness process* is at work in accordance with Self Categorization Theory and leads to ingroup bias as a consequence of low intergroup similarity. Self Categorization Theory defined intergroup similarity by the meta-contrast which is the ratio of intergroup differences to intragroup differences (Oakes, Haslam, & Turner, 1994). The meta-contrast increases with an increase in intergroup differences and a

decrease in intragroup differences. Reflective distinctiveness is based on the meta-contrast principle and is, therefore, a more cognitive and perceptual process and is related to Self Categorization Theory. According to the reflective distinctiveness process more ingroup bias is expected for dissimilar groups.

Spears et al. (2002) suggested identification with the ingroup as a moderator which determines whether reactive or reflective distinctiveness processes will occur. The reflective distinctiveness process is predominant for low identifiers whereas high identifiers will be more susceptible to the reactive distinctiveness process. Experimental support for this hypothesis comes from data collected by Jetten, Spears and Manstead (2001; see also Roccas & Schwartz, 1993; Spears, Doosje, & Ellemers, 1997). Further support for the assumption that identification will determine whether reactive or reflective distinctiveness processes are predominant derives from a meta-analytic integration by Jetten, Spears and Postmes (2004). The authors found a positive relation between intergroup similarity and ingroup bias for high identifiers (reactive distinctiveness) and a negative relation for low identifiers (reflective distinctiveness).

The reflective distinctiveness process which is based on the meta-contrast is similar to the perception of prototypicality in that both are rather cognitive processes. Relying on the Cognitive Model of Ingroup Projection and, thus, understanding projection as a heuristic process, I assumed that projection occurs irrespective of the level of identification. Likewise, threat reactions, expressed by ingroup bias, after the induction of intergroup similarity do not necessarily depend on the level of identification (Pickett, Bonner, & Coleman, 2002). Reaction to threatened group distinctiveness could also be conceptualized in terms of more general social motives. For example, Optimal Distinctiveness Theory (Brewer, 1991) proposed opposing needs for assimilation versus differentiation as two powerful social motives. The assimilation need is satisfied by inclusion of the self into large social entities whereas the differentiation need is satisfied by contrasting others (e.g., outgroups) from the self. It has been shown that the differentiation need leads to more ingroup bias and increased levels of ingroup and outgroup homogeneity (Brewer, Manzi, & Shaw, 1993; Pickett & Brewer, 2001). Similar to distinctiveness threat, differentiation needs have been experimentally induced by increasing the overlap between ingroup and outgroup distribution on some attributes (Pickett et al., 2001; Pickett & Brewer, 2002). Although it has never been investigated, it seems very plausible that increasing the variability of the ingroup and, thereby, suggesting that nearly everybody belongs to the ingroup, also increases differentiation needs. Because the need for differentiation is understood as a very general social motive, it does not

necessarily depend on identification. In sum, it has been shown that both relative prototypicality and threat (differentiation needs) affected ingroup bias irrespective of the level of identification.[11]

Integrating the cited research, I suggest that variability triggers two antagonistic processes in parallel that both affect ingroup bias. On the one hand, diverse ingroup representations lead to a decrease in ingroup bias via the more cognitive pathway of perceived prototypicality. On the other hand, diverse ingroup representations lead to an increase in ingroup bias via the motivational pathway of distinctiveness threat (or differentiation need). For the reasons discussed, the two antagonistic pathways do not necessarily depend on identification.

The hypothesis that motivational and cognitive processes are antagonistic with regard to ingroup bias is a post-hoc explanation for the results of Experiment 3 (see Figure 5): Although high ingroup variability led via ingroup prototypicality to less ingroup bias, it simultaneously caused more distinctiveness threat which led to more ingroup bias. Thus, the outcome of these two processes was a non-significant relation between variability manipulations and ingroup bias. The aim of Experiment 4 is to investigate the role of distinctiveness threat explicitly. Addressing the problem that distinctiveness threat has never been measured, a scale was developed to measure threat and to analyze the underlying processes.

In line with Jetten et al. (1998), it is assumed that both intergroup distance and ingroup variability are important components of group distinctiveness. In particular, distinctiveness between two groups increases with increasing intergroup distance and decreasing within group variability. In Experiment 4, the design of Jetten et al. (1998) was adapted and ingroup variability and intergroup distance were manipulated orthogonally. The idea that intergroup distance and ingroup similarity are two components of the distinctiveness construct can be understood by the metaphor of a t-test (Jetten et al., 1998): Two groups differ if their means are distinct and the standard deviation around them is rather small. The smaller the difference between the two means *and* the higher the standard deviations, the smaller becomes the

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[11] Though Optimal Distinctiveness Theory and the approach of Jetten and colleagues focus on different perspectives (i.e., the former has an interpersonal perspective whereas the latter has a group perspective), both theories make many similar predictions concerning intergroup distinctiveness (Spears et al., 2002). Therefore, the terms “differentiation needs” and “distinctiveness threat” are used synonymously in the following chapters.

likelihood that the test indicates a significant difference between two groups. So, both factors work in concert. Distinctiveness threat decreases if two groups become more different in statistical terms. Thus, I assume that the two factors combine additively with regard to threat.[12] In particular, an increase in variability and a decrease in intergroup distance should lead to more distinctiveness threat. At first glance, this hypothesis contradicts the observed interaction effect of intergroup distance and within group variability found by Jetten et al. (1998). The authors demonstrated that threat only occurred as a consequence of high within group variability given that the intergroup distance was rather high. Jetten et al. (1998) reasoned that groups need to feel as two distinct entities to feel threatened by an increase in variability. However, in the intergroup setting of Experiment 3 and 4 (Poles and Germans) groups are clearly distinguishable and, thus, the extreme that ingroup and outgroup nearly do not differ was not investigated here. Therefore, a linear relation between distinctiveness and threat is hypothesized in Experiment 4.

The prototypicality pathway relates to Self Categorization Theory and the Ingroup Projection Model which emphasize the cognitive and perceptual side of intergroup evaluations. Both intergroup distance and ingroup variability seem to be important in this context, too. Concerning intergroup distance, Mummendey and Wenzel (1999) stated that given an inclusive background, dissimilarity between groups is related to more relative ingroup prototypicality and leads to more negative intergroup evaluations. Indeed, Waldzus et al. (2003) showed a significant positive relation between dissimilarity of ingroup and outgroup and relative ingroup prototypicality. The role of variability for prototypicality perceptions has been outlined already: More variability should reduce prototypicality perceptions. Hence, concerning the two factors intergroup distance and ingroup variability, I expected two main effects with regard to ingroup prototypicality. In particular, an increase in variability should lead to less ingroup prototypicality; an increase in intergroup distance should lead to more ingroup prototypicality. These two main effects represent the cognitive processes derived from the perceptual principles of Self Categorization Theory and the

[12] Note, that I only manipulated the variability of the ingroup. Using once again the t-test metaphor, I argue that the variability of one group is sufficient in order to produce different levels of distinctiveness. But I acknowledge that different levels of variability in both ingroup and outgroup could produce stronger effects.

Ingroup Projection Model. The hypotheses concerning the prototypicality and the threat pathway are summarized in Figure 7.

To summarize, in the 2 (ingroup variability: unity versus diversity) × 2 (intergroup distance: high versus low) design I expected no effect on ingroup bias because two processes, namely threat and prototypicality, compensate for each other: The two independent factors influence the two mediating variables such that they have opposite effects on the dependent variable ingroup bias. Concerning threat, two main effects were expected. Firstly, low intergroup distance leads to more threat. Secondly, high ingroup variability leads to more threat. In accordance with the literature I expected that threat predicts ingroup bias. Similarly, for ingroup prototypicality two main effects were hypothesized. As a replication of Experiment 3, I expected that ingroup variability leads to less relative ingroup prototypicality. In addition, low intergroup distance should also lead to less relative ingroup prototypicality.

Next to the main effects it was also tested whether the relation between ingroup prototypicality and ingroup bias is moderated by experimental condition as in Experiment 1 and 2. In particular, it was expected that ingroup prototypicality and ingroup bias are significantly related under low ingroup variability but that this relation diminished under high ingroup variability. There was no directed hypothesis for intergroup distance with regard to the moderation hypothesis.

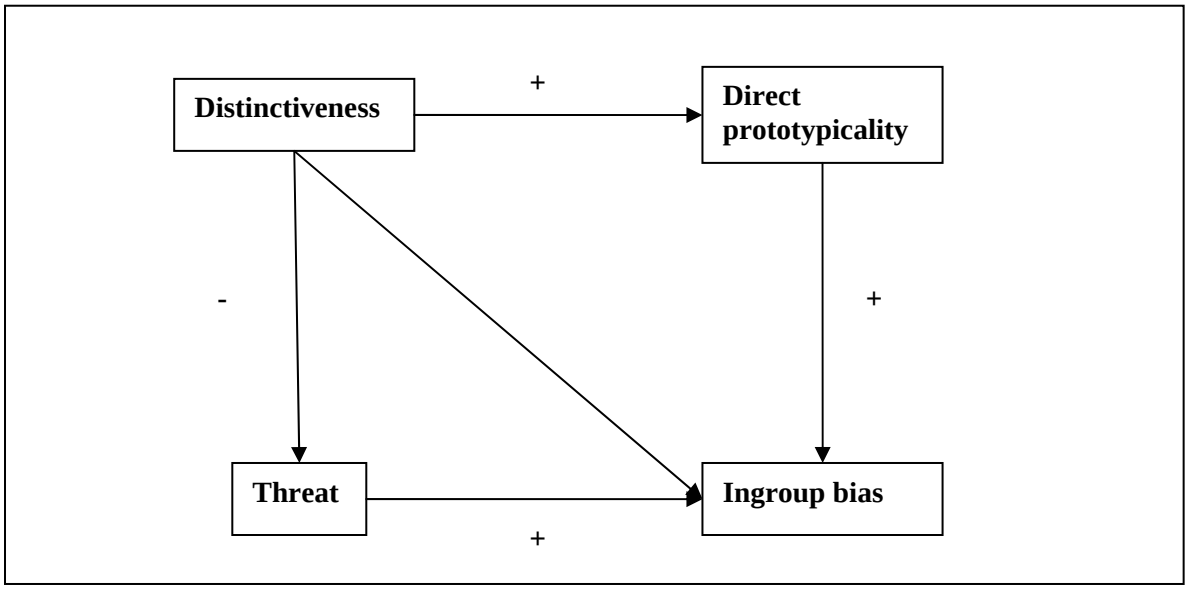

Figure 7. The relations between distinctiveness, relative ingroup prototypicality, threat and ingroup bias. "Distinctiveness" refers to a composite of ingroup variability and intergroup distance.

6.2.2 Method

Participants. Participants were 149 students from the University of Jena. They were recruited on campus and were asked to take part in a study on Europe. Participants were randomly assigned to the cells of a 2 (ingroup variability: unity versus diversity) × 2 (intergroup distance: high versus low) factorial design and a non-orthogonal control group. As in the previous study, Germans were the ingroup, Poles the outgroup and Europeans the superordinate category. Eight students were excluded because they were not born in Germany or because German was not their first language. The final sample consisted of 141 German students. They were paid 2 EUR for their participation.

Procedure. The distance between ingroup and outgroup was manipulated between participants. Then, variability of mental ingroup representation (unity versus diversity) was manipulated orthogonally between participants. Note that in this study only the mental representation of the ingroup was manipulated; the superordinate category representation was not subjected to any manipulation.

As in all studies, the material comprised a general introduction about the purpose of the study which was announced as a study on the perception of Europe. It was mentioned that the study was concerned with participants' perception of Germany, and one of its neighboring countries, in this case Poland, and Europe in general. This part introduced the intergroup situation from the start.

In order to manipulate intergroup distance, participants were asked to think about the similarities (low intergroup distance) or differences (high intergroup distance) of Germany and its European neighbors and to write down their ideas about similarities or differences in a few words. The manipulation did not target intergroup distance between Germans and Poles directly such that it paralleled the manipulation of ingroup similarity as closely as possible. Thus, the manipulation focused on the mental representation of the ingroup and not the outgroup.

After the intergroup distance manipulation, ingroup variability was manipulated orthogonally between participants. The manipulation of ingroup variability was adapted from Waldzus et al. (2003, 2005) and parallels Experiment 3. Participants were asked to think either about the unity or the diversity of their ingroup and to write down some thoughts. Finally, the manipulations were summarized in one sentence saying that the study was concerned with differences (or similarities) *between* Germany and their European neighbors

and the unity (or diversity) *within* Germany. The control condition did not receive any instructions to think about intergroup differences or ingroup variability. Then, the dependent measures were assessed in the same way for all five conditions.

Dependent Variables. Identification with the ingroup and the superordinate category were important control variables (see Experiment 1, 2, and 3) and were assessed with four items each on 6-point scales ranging from 0 (*does not apply at all*) to 5 (*applies completely*). Next, *distinctiveness threat* was measured with six items (e.g., "I worry that Germany will lose its characteristics because of the European Unification") (see Appendix). Participants indicated their agreement with six statements on 7-point rating scales ranging from -3 (*does not apply at all*) to +3 (*applies completely*).

In order to obtain a measure of *indirect prototypicality*, participants rated the ingroup, the outgroup and the superordinate category on various traits. Because the intergroup situation was the same as in Experiment 3, the same pretested attributes as in Experiment 3 were used. Participants were asked for mean ratings on 7-point rating scales ranging from -3 (*not at all*) to +3 (*completely*). As in Experiment 3, Euclidean Distances between ingroup and superordinate category and between outgroup and superordinate category were calculated. The difference between the outgroup-superordinate category distance and the ingroup-superordinate category distance were computed to which I refer as *indirect* measure of prototypicality. In addition, participants indicated how prototypical ingroup and outgroup are of the superordinate category directly on a 7-point scale ranging from -3 (*not at all*) to +3 (*completely*). The difference between these direct ingroup and outgroup prototypicality ratings is taken as a *direct* measure of prototypicality.

Ingroup and outgroup evaluation were assessed with four items each (e.g., "I like Germans/Poles.") on 7-point rating scales ranging from -3 (*applies not at all*) to +3 (*applies completely*). *Ingroup bias* was calculated as the difference between ingroup and outgroup evaluation. Furthermore, the willingness to have contact to Poles was measured with four items (e.g., "I am interested to get to know Poles."). The same 7-point rating scales as for ingroup bias were used. To obtain a more affective measure of intergroup attitude a "feeling thermometer" (Campbell, 1971) was employed. Participants were asked how positive they feel towards the ingroup, the outgroup and the superordinate category and to place themselves on the 10-point thermometer with the endpoints 0 (*negative*) and 10 (*positive*).

As a *manipulation check* of ingroup variability, *global similarity* was assessed as in the previous experiment with one item per group. High values indicate that the members of the

group are perceived to be similar. In addition, I asked how diverse the ingroup, the outgroup and the superordinate category were perceived. Concerning the diversity scale, high values indicate that the group is perceived as diverse. For both variables, 7-point rating scales ranging from -3 (*does not apply at all*) to +3 (*applies completely*) were used.

In order to check the effectiveness of the intergroup distance manipulation, I employed one verbal item and one pictorial item that was adapted from Schubert and Otten (2002). The verbal measure asked for similarity between the groups of Poles and Germans on a 7-point scale ranging from -3 (*very different*) to +3 (*very similar*). The pictorial measure shows seven pictures on which two circles, representing the groups of Germans and Poles, overlap to an increasing extend from not at all to near completely. Participants were asked which of the seven pictures best represented the similarity between Germans and Poles. Possible values range between 1 and 7 with higher values indicating a higher overlap between Poles and Germans.

6.2.3 Results and discussion

First, 2 × 2 ANOVAs were conducted to analyze the influence of intergroup distance and ingroup variability. I refer to the manipulation of high versus low intergroup distance as "intergroup distance"-factor. The factor "ingroup variability" refers to the manipulation of diversity versus unity. Secondly, planned contrasts including the control condition were conducted when an effect of experimental condition was obtained to test the experimental conditions against the baseline.

Identification. The four items for ingroup and superordinate category identification provided reliable scales, Cronbach's $\alpha = .77$ and Cronbach's $\alpha = .80$, respectively. An ANOVA with ingroup identification versus superordinate category identification as a within-participants factor and ingroup variability and intergroup distance as between-participants factors revealed a significant effect of target group, $F(1,110) = 53.49$, $p < .001$, $\eta^2 = .327$. Participants were more identified with the superordinate category ($M = 3.93$, $SD = .91$) than with the ingroup ($M = 3.12$, $SD = 1.10$). All other main effects, two-way or three-way interactions were not significant, Fs < 1.9, ps > .1. Mean identification scores with the ingroup and the superordinate category were significantly above the scale midpoint of 2.5, $t(140) = 7.45$, $p < .001$, and $t(140) = 19.18$, $p < .001$. In sum, identification with both the ingroup and the superordinate category were rather high and neither ingroup nor superordinate category identification varied as a function of experimental condition.

Manipulation check. As manipulation check, *global similarity* as well as *global diversity* were assessed. Means and standard deviation are presented in Table 6. A two-factorial ANOVA with ingroup variability and intergroup distance as between-participants factors and similarity of the ingroup as dependent variable revealed a significant effect of ingroup variability, $F(1,110) = 8.35$, $p < .01$, $\eta^2 = .071$. This indicates that participants in the diversity conditions perceived the members of the ingroup as less similar compared to the participants in the unity conditions ($M = -.84$, $SD = 1.35$, versus $M = -.04$, $SD = 1.59$). The other effects of the two-factorial ANOVA were not significant, Fs < 1. It was tested whether both high and low ingroup variability manipulations differ from the control group. Two planned contrasts were calculated. In assigning contrast weights of [-1 0 -1 0 2] the unity conditions were tested against the control condition; in assigning contrast weights of [0 -1 0 -1 2] the diversity conditions were tested against the control condition. Both contrasts were not significant, $t(144) = -1.30$, $p > .1$, for the fist contrast, $t(144) = 1.21$, $p > .1$, for the second contrast. Thus, unity and diversity conditions differed significantly from each other but both did not differ from the control condition.

The manipulation of ingroup variability did not affect the perception of outgroup similarity, $F(1,110) = 1.82$, $p > .1$, for ingroup variability, other Fs < 1. Likewise, the perception of superordinate category variability did not vary with experimental conditions, $F(1,110) = 1.42$, $p > .1$, for ingroup variability, other Fs < 1.

The analysis of *global diversity* yielded a similar picture. A 2 × 2 ANOVA with diversity of the ingroup as dependent variable revealed a significant effect of ingroup variability, $F(1,110) = 6.01$, $p < .05$, $\eta^2 = .052$. Table 6 indicates that participants in the diversity conditions perceive the ingroup as more diverse than participants in the unity conditions ($M = 1.77$, $SD = .82$, versus $M = 1.32$, $SD = 1.12$). The other effects were not significant, Fs < 1. Planned contrast analyses were conducted to test whether both unity and diversity conditions differed from the control group. Contrasting the unity conditions against the control condition did not reveal a significant effect, $t < 1$, whereas contrasting the diversity conditions against the control condition revealed a marginally significant effect, $t(144) = -1.89$, $p = .06$.

The 2 × 2 ANOVA was not significant for the diversity of the outgroup, Fs < 1. However, conducting a 2 × 2 ANOVA with diversity of the superordinate category as dependent variable revealed a marginally significant effect of ingroup variability, $F(1,109) =$

3.83, $p = .05$, $\eta^2 = .034$,[13] indicating a tendency towards more perceived diversity of the superordinate category in the diversity conditions compared to the unity conditions ($M = 2.71$, $SD = .68$, versus $M = 2.49$, $SD = .53$). The other effects were not significant, Fs < 1. Also here it was tested whether the unity and the diversity conditions differed from the control condition. Both contrasts were not significant, ts < 1.2.

Intergroup distance was assessed with one verbal and one pictorial item. Means as a function of experimental condition can be found in Table 6. A 2 × 2 ANOVA with the verbal item as dependent variable revealed no significant effects, $F(1,110) = 1.62$, $p > .1$, for intergroup distance, other Fs < 1. However, the pictorial measure of intergroup distance showed the expected effect for intergroup distance, $F(1,110) = 11.04$, $p < .01$, $\eta^2 = .091$. In the low intergroup distance condition the ingroup and the outgroup were perceived as overlapping to a higher extent than in the high intergroup distance condition ($M = 3.98$, $SD = 1.14$, versus $M = 3.28$, $SD = 1.10$). All other effects of the ANOVA were not significant, Fs < 1. Contrasting the low intergroup distance conditions against the control condition revealed no significant effect, $t < 1$, whereas the high intergroup distance conditions differed significantly from the control condition, $t(136) = 2.28$, $p < .05$.

In sum, the results on similarity and diversity demonstrate that the manipulation of *in*group variability was successful. The results demonstrated at the same time that variability manipulations of the ingroup did not affect the mental representation of the outgroup so that effects of variability can not be attributed to the outgroup representation. Concerning the superordinate category, variability manipulations did (marginally) affect the perceived diversity. The pictorial manipulation check on intergroup distance showed the success of the manipulation. The verbal intergroup distance item, however, did not confirm this result.

[13] Due to one missing value in the unity/superordinate category condition, this test was based on a sample of $N = 113$ so that the error term has only 109 degrees of freedom.

Table 6. Means and standard deviations of the manipulation checks (Experiment 4).

	High intergroup distance				Low intergroup distance				Control	
	Unity		Diversity		Unity		Diversity			
Dependent variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Within group variability										
Ingroup similarity	-.14	1.63	-.97	1.40	.07	1.58	-.71	1.30	-.52	1.74
Outgroup similarity	.21	1.20	-.21	1.45	.24	1.27	.00	1.31	-.19	1.62
Superordinate category similarity	-1.18	1.42	-1.55	1.30	-1.24	1.48	-1.50	1.45	-1.78	1.15
Ingroup diversity	1.36	1.13	1.76	.74	1.28	1.13	1.79	.92	1.33	1.44
Outgroup diversity	.89	1.13	.83	1.28	.90	1.18	1.18	1.09	1.15	1.32
Superordinate category diversity	2.50	.64	2.62	.56	2.48	.74	2.81	.48	2.59	.80
Intergroup distance										
Verbal distance	-.64	1.13	-.55	1.18	-.31	1.26	-.29	1.44	-.11	1.01
Pictorial distance	3.21	1.17	3.34	1.04	4.10	1.21	4.10	1.21	3.85	.82

Distinctiveness threat. Two main effects were expected for threat. Firstly, I expected that high ingroup variability instigates threat. Secondly, in line with research on distinctiveness threat, I hypothesized that low intergroup distance leads to more threat compared to high intergroup distance. The six items to measure distinctiveness threat showed less than an optimal level of internal consistency, Cronbach's $\alpha = .60$.

The threat scale was subjected to a two-factorial ANOVA with ingroup variability and intergroup distance as between-participants factors. A main effect of ingroup variability occurred, $F(1,110) = 5.87$, $p < .05$, $\eta^2 = .051$. In line with the hypothesis, in the diversity conditions significantly more threat was experienced than in the unity conditions ($M = .69$, $SD = .70$, versus $M = .29$, $SD = 1.02$). The effect of intergroup distance as well as the interaction were not significant, $F(1,110) = 1.41$, $p > .1$, and $F < 1$. Planned contrasts contrasting either the unity conditions against the control condition or the diversity conditions against the control condition did not yield significant results, ts < 1. In sum, concerning the main effect of variability on threat, the hypothesis was confirmed that an increase in ingroup variability leads to more threat. However, intergroup distance did not have the expected effect on threat.

Indirect and direct measures of prototypicality. Table 7 displays the means and standard deviations of the Euclidean distance measures (*indirect prototypicality*) between ingroup and superordinate category and outgroup and superordinate category, respectively, as a function of intergroup distance and ingroup variability. The distance measures were subjected to a 2 × 2 × 2 ANOVA with intergroup distance and ingroup variability as between-participants factors and target group as within-participants factor. The target group factor revealed a significant effect, $F(1,107) = 4.74$, $p < .05$, $\eta^2 = .042$, indicating that the ingroup is perceived as more distant from the superordinate category than the outgroup ($M = 3.93$, $SD = 1.50$, versus $M = 3.56$, $SD = 1.54$). All other effects were not significant, Fs < 1.

The same analysis was conducted for *direct prototypicality.* Means and standard deviations as a function of intergroup distance and ingroup variability are presented in Table 7. A 2 × 2 × 2 ANOVA with intergroup distance and ingroup variability as between-participants factors and target group as within-participants factor was conducted. The target group factor was significant, $F(1,110) = 36.70$, $p < .001$, $\eta^2 = .250$, indicating that the ingroup is perceived as more prototypical ($M = .68$, $SD = 1.37$) than the outgroup ($M = .10$, $SD = 1.21$). The only other significant effect was a main effect of intergroup distance, $F(1,110) = 4.04$, $p < .05$, $\eta^2 = .035$. An inspection of Table 7 shows that both ingroup and outgroup are rated as being more prototypical of the superordinate category in the low intergroup distance condition. Planned contrast analyses revealed that neither the low nor the high intergroup distance conditions differed from the control condition with regard to direct ingroup or outgroup prototypicality ratings, ts < 1.

Table 7. Means and standard deviations of distinctiveness threat, indirect and direct prototypicality, ingroup and outgroup evaluation, contact intentions and thermometer scales as a function of ingroup variability and intergroup distance (Experiment 4).

	High intergroup distance				Low intergroup distance				Control	
	Unity		Diversity		Unity		Diversity			
Dependent variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Threat	.46	.87	.72	.66	.13	1.14	.66	.75	.48	.99
Euclidean Distance										
d(IG-SC)	3.79	1.54	4.14	1.57	4.03	1.69	3.75	1.21	3.61	1.52
d(OG-SC)	3.59	1.73	3.74	1.75	3.54	1.31	3.38	1.41	3.43	1.60
Direct typicality										
Ingroup	.29	1.70	.59	1.05	.66	1.29	1.18	1.31	.70	1.38
Outgroup	-.18	1.36	-.03	.98	.24	1.24	.36	1.22	.33	1.21
Evaluation										
Ingroup	.39	1.38	.49	1.08	.78	1.12	.81	1.29	.91	1.09
Outgroup	.13	.92	.51	.94	.57	.87	.88	.84	.84	.90
Contact intention	.89	1.00	.88	1.43	.87	1.17	1.46	1.02	1.37	.95
Thermometer scales										
Ingroup	5.35	3.24	4.01	2.99	4.90	3.83	5.64	3.18	6.02	3.07
Outgroup	4.26	2.79	2.90	3.01	3.50	3.49	4.64	3.12	4.44	3.32
Superordinate category	6.58	3.30	6.20	2.89	5.97	3.41	6.73	2.62	6.83	2.86

Note. d(IG,SC): Euclidean Distance between the ingroup and superordinate category trait ratings; d(OG,SC): Euclidean Distance between the outgroup and superordinate category trait ratings.

To summarize, the measure of indirect prototypicality showed a significant difference between target groups. Surprisingly, the ingroup was perceived as more distant from the superordinate category than the outgroup. In contrast, the measure of direct prototypicality showed the expected significant differences regarding the higher prototypicality of the ingroup. The expected interactions between target group and within group variability (i.e., less perceived relative ingroup prototypicality in the diversity conditions) and between target group and intergroup distance (i.e., less perceived relative ingroup prototypicality in the low intergroup distance conditions) failed to reach significance. Instead a significant main effect of intergroup distance was obtained such that ingroup and outgroup are both perceived as more prototypical in the low intergroup distance condition.

Intergroup evaluation. The items of ingroup and outgroup evaluation provided scales with internal consistencies of Cronbach's $\alpha = .87$ and .77. Table 7 displays means and standard deviations of both scores. A 2 × 2 × 2 ANOVA with target group as within-participants factor and intergroup distance and ingroup variability as between-participants factors revealed only a significant main effect of intergroup distance, $F(1,110) = 6.99$, $p < .01$, $\eta^2 = .060$. Table 7 suggests that low intergroup distance led to a better evaluation of both ingroup and outgroup ($M_{ingroup} = .79$, $SD = 1.20$, and $M_{outgroup} = .72$, $SD = .86$) compared to high intergroup distance ($M_{ingroup} = .44$, $SD = 1.22$, and $M_{outgroup} = .32$, $SD = .94$). All other effects were not significant, $F(1,110) = 2.07$, $p > .05$, for the main effect of ingroup variability, all other Fs < 1. Planned contrast analyses revealed that the high intergroup distance conditions (marginally) differed from the control group concerning both ingroup and outgroup evaluation, $t(136) = 1.66$, $p = .1$, and $t(136) = 2.49$, $p < .05$. Contrasting the low intergroup distance conditions against the control condition with ingroup and outgroup evaluation as dependent variables did not yield a significant effect, both ts<1.

We also measured *intentions* to have *contact* with the outgroup. The five items of the scale proved to be reliable, Cronbach's $\alpha = .85$. Mean scores and standard deviations are shown in Table 7. A 2 (intergroup distance) × 2 (ingroup variability) ANOVA was conducted on these data. Neither the two main effects nor the interaction were significant, $F(1,110) = 1.70$, $p > .1$, for intergroup distance, $F(1,110) = 1.78$, $p > .1$, for ingroup variability, $F(1,110) = 1.90$, $p > .1$, for the interaction.

Finally, *thermometer scales* were used in order to assess the attitude towards the ingroup, the outgroup and the superordinate category. As before, ingroup and outgroup thermometer evaluation were entered as within-participants factor into a 2 (target group) × 2 (intergroup

distance) × 2 (ingroup variability) ANOVA. The target group factor was significant, $F(1,110) = 12.44$, $p < .01$, $\eta^2 = .102$, indicating that the ingroup was evaluated better than the outgroup ($M = 4.96$, $SD = 3.34$, versus $M = 3.82$, $SD = 3.15$). The only other significant effect was the two-way interaction between intergroup distance and ingroup variability, $F(1,110) = 5.07$, $p < .05$, $\eta^2 = .044$. A closer inspection of Table 7 revealed that in the high intergroup distance/high ingroup variability condition and in the low intergroup distance/low ingroup variability condition both target groups were evaluated worse compared to the other two conditions. Superordinate category evaluation was also assessed with the thermometer scales. The evaluation of the superordinate category did not vary across experimental condition, Fs < 1.

In sum, the analysis of the intergroup evaluation scales did not yield significant ingroup bias. In contrast, the analysis of the thermometer scales revealed the classical ingroup bias. Because of the presumed antagonistic cognitive and motivational processes, ingroup bias, contact intentions and the thermometer measures did not vary across experimental condition. Similarly, the evaluation of the superordinate category did not vary with experimental conditions.

Relation between experimental manipulation, threat, relative ingroup prototypicality, and intergroup evaluation. I wanted to test if perceived distinctiveness threat and ingroup prototypicality are both influenced by the experimental manipulations (i.e., ingroup variability and intergroup distance) and if they, in turn, influence intergroup evaluation in opposite ways. For threat, two main effects were expected indicating that more ingroup variability and less intergroup distance increase the feeling of threat. In turn, threat will lead to intergroup bias. For perceived ingroup prototypicality, I hypothesized that high levels of variability decrease the perception of ingroup prototypicality, as in Experiment 3. On the other hand, high intergroup distance was expected to enhance relative ingroup prototypicality. As predicted by the Ingroup Projection Model and as already shown in the present series of Experiments, perceived ingroup prototypicality is related to ingroup favoritism. Thus, the hypothesis was about two opposing mediations, or two antagonistic processes, which cancel each other out explaining that in total there was no effect of the experimental manipulations on ingroup bias.

Reflecting the analysis of variance, the three contrast-coded variables (intergroup distance [1 1 -1 -1], ingroup variability [-1 1 -1 1], and the interaction [1 -1 -1 1]) did not predict *ingroup bias*, $R^2 = .009$, $F < 1$. Considering the mediation via relative ingroup prototypicality, the paths between experimental condition and *indirect prototypicality* were

calculated first. None of the betas representing the predictive weight of the experimental conditions or the interaction were significant (βs < .1, *ps* > .1). Using *direct prototypicality* as dependent variable, again all three contrast-coded variables failed to reach significant levels (βs < .15, *ps* > .1). As expected, *direct prototypicality* was related to ingroup bias also if experimental conditions were controlled for, β = .229, $p < .05$. Likewise, *indirect prototypicality* was significantly related to ingroup bias when the experimental conditions were controlled for, β = .313, $p < .01$. Considering the mediation via *threat,* the result of the 2 × 2 ANOVA was replicated in that only ingroup variability predicted threat, β = .223, $p < .05$. Entering the mediating variable threat as well as experimental condition together in a regression analysis, threat remained a significant predictor of ingroup bias, β = .230, $p < .05$. Concerning the experimental conditions, none of the contrast-coded variables were significant, βs < .150, *p*s > .1. The relations between ingroup variability, (in-)direct prototypicality, threat and ingroup bias are depicted in Figure 8.[14]

It was also tested how relative ingroup prototypicality and threat were related to the *intention to have contact* with the outgroup. Entering indirect prototypicality and the experimental conditions simultaneously into a regression analysis, indirect prototypicality was a significant predictor of contact intentions, β = -.207, $p < .05$. Similarly, direct prototypicality predicted contact intentions, β = -.185, $p = .05$. Concerning the threat pathway, a regression analysis also yielded a significant result such that threat was negatively related to contact intentions, β = -.282, $p < .01$. In none of the regression analysis experimental conditions predicted contact intentions, *p*s ≥ .1.

Regressing the *thermometer difference measure* (i.e., the ingroup thermometer scale relative to the outgroup thermometer scale) on indirect prototypicality and experimental conditions, indirect prototypicality was a significant predictor, β = .215, $p < .05$. Using direct prototypicality as a predictor, the regression analysis also revealed a significant effect, β = .404, $p < .001$. Threat was also (marginally) related to the thermometer difference measure, β = .188, $p = .06$. Again, in none of the regression analysis experimental conditions were significantly related to the thermometer difference measure, $p > .1$.

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[14] Threat was neither predicted by indirect prototypicality, β = .002, $p > .1$, nor by direct prototypicality, β = .029, $p > .1$. Furthermore, neither relation was moderated by experimental condition, R^2-change = .035, $F(3,106) = 1.33$, $p > .1$, for indirect prototypicality and R^2-change = .016, $F < 1$, for direct prototypicality.

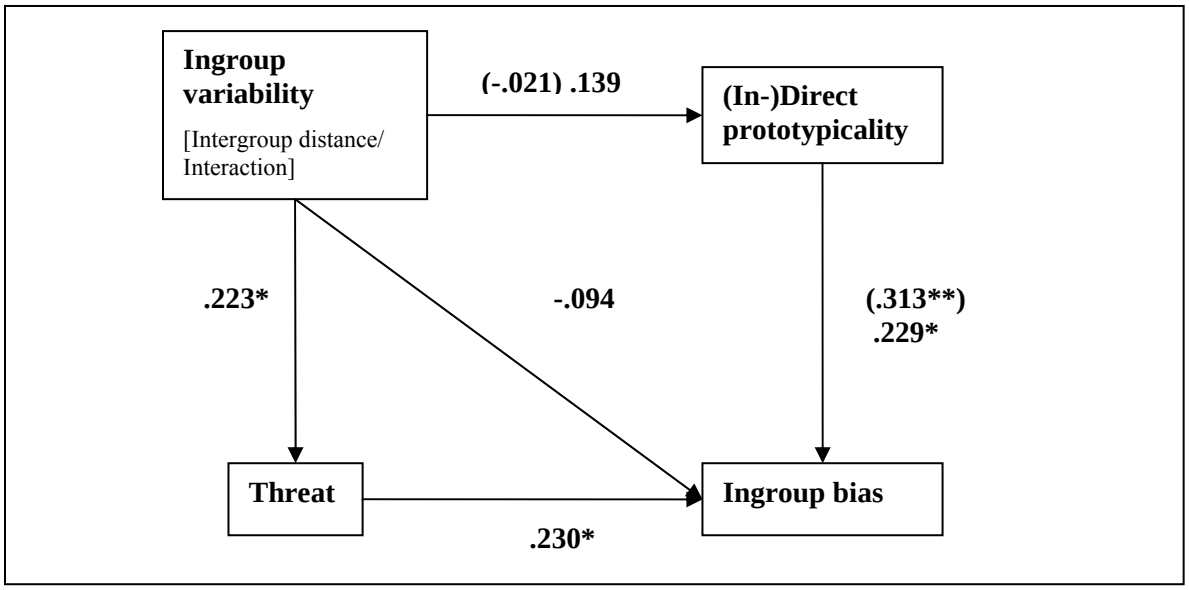

*Figure 8. The relations (in βs) between ingroup variability, relative ingroup prototypicality, threat and ingroup bias (Experiment 4). β-weights refer to the variable "ingroup variability" with assigned contrast weights of -1 for unity and +1 for diversity. However, the regression analysis included "intergroup distance" and the interaction. In brackets: The relations with indirect prototypicality; Without brackets: The relations with direct prototypicality. * p < .05, ** p < .01.*

Overall, the regression analyses using different dependent variables revealed very consistent results. The relations between relative ingroup prototypicality (measured as direct and indirect prototypicality) and ingroup bias, contact intentions and the thermometer difference measure were in line with the ingroup projection model. Similarly, threat predicted ingroup bias, contact intentions and the thermometer differences measure in the expected directions. In line with the predictions, ingroup variability triggered threat. However, the relation between ingroup variability and relative ingroup prototypicality was not replicated.

Moderation of the ingroup prototypicality - ingroup bias relation and the threat - ingroup bias relation by experimental condition. A directed hypothesis has been formulated for the moderation of relative prototypicality and ingroup bias by ingroup variability. In particular, I hypothesized that the relation between relative ingroup prototypicality and ingroup bias only sustains if the ingroup representation is of little variability. On the contrary, if the ingroup representation reaches high levels of variability the relation between relative ingroup prototypicality and ingroup bias is hypothesized to diminish. Concerning threat, a moderation analysis testing whether the threat-ingroup bias relation was moderated by experimental conditions was calculated to assure that the significant relation is stable across conditions.

Moderations were tested in a multiple regression approach. Predictors were three contrast-coded variables (intergroup distance [1 1 -1 -1], ingroup variability [-1 1 -1 1], and the interaction [1 -1 -1 1]), either perceived prototypicality or threat as continuous variables (z-standardized) and the product terms of the contrast-coded variables and the continuous variables. Ingroup bias was the dependent variable.

For *indirect prototypicality*, no moderation emerged, R^2-change = .018, F < 1. *For direct prototypicality*, however, the interaction terms led to a significant R^2-change, R^2-change = .112, $F(3,106) = 4.76$, $p < .01$. Considering the βs of the interaction terms, the three-way interaction and the two-way interaction between intergroup distance and direct prototypicality were significant, β = -.227, $p < .05$, and β = .187, $p < .05$. In order to clarify the meaning of the significant betas of the product terms, simple slopes were calculated. In the unity/high intergroup distance condition there was a significant positive relation between direct prototypicality and ingroup bias, β = .377, $p < .05$. Similarly, in the unity/low intergroup distance and the diversity/high intergroup distance conditions significant positive relations between direct prototypicality and ingroup bias were obtained, β = .458, $p < .05$, and β = .626, $p < .05$. Only in the diversity/low intergroup distance conditions, the simple slope analysis revealed a non-significant relation, β = -.202, $p > .1$. In addition, ingroup bias was regressed on direct prototypicality in the control condition. The regression analysis yielded a non-significant β, β = .132, $p > .1$ (see Figure 9). Regarding the low intergroup distance conditions, the relation between direct prototypicality and ingroup bias nearly replicated Experiment 1 and 2. This result can be conceived as support for the theoretical argument that only in the unity condition the projected ingroup prototype served as a comparison standard whereas a loosely defined ingroup prototype (diversity condition) cannot serve as such a standard. However, this interaction effect was only obtained in the low intergroup distance condition. The role of intergroup distance for the relation between relative ingroup prototypicality and ingroup bias will be addressed in the general discussion.

It was also tested whether the relations between indirect and direct prototypicality and contact intentions were moderated by experimental conditions. The moderation analysis revealed that the relation between indirect prototypicality and contact intentions did not vary with experimental conditions, R^2-change = .014, $F < 1$. However and similar to the moderation analysis with ingroup bias as dependent variable, the relation between direct prototypicality and contact intentions was moderated by experimental condition, R^2-change = .086, $F(3,106) = 3.63$, $p < .05$. Considering the βs, the three-way interaction between intergroup distance, ingroup variability and direct prototypicality was significant, β = .250, *p*

< .01. Therefore, simple slopes were calculated. The simple slope analysis was consistent with previous results concerning ingroup bias: Direct prototypicality was negatively (though not always significantly) related to contact intentions in the high distance/unity condition, β = -.200, $p > .1$, in the high distance/diversity condition, β = -.520, $p < .05$, and in the low distance/unity condition, β = -.510, p < .05. In the low distance/diversity condition, however, there was no negative relation between direct prototypicality and contact intentions, β = .170, $p > .1$. In the control condition there was no significant relation between direct prototypicality and contact intentions either, β = -.092, $p > .1$.

The relation between indirect prototypicality and the thermometer difference measure was not moderated by experimental condition, R^2-change = .023, $F < 1$. Similarly, the moderation analysis using the direct prototypicality measure revealed no significant R^2-change, R^2-change = .032, $F(3,106) = 1.39$, $p > .1$. However, the β for the three-way interaction reached marginal significance, β = -1.76, $p = .06$. To illustrate this result, simple slopes were calculated. Again, the simple slopes were (marginally) significant in both high distance conditions, $\beta_{unity} = .315$, $p = .08$, and $\beta_{diversity} = .668$, $p < .01$, and in the low distance/unity condition, β = .582, $p < .01$. Again, in the low distance/diversity condition direct prototypicality was no predictor of the dependent variable, β = .232, $p > .1$. In line with previous results, direct prototypicality was not significantly related to the thermometer difference measure in the control condition, β = .200, $p > .1$.

The moderation analysis for *threat* yielded no significant moderation when ingroup bias was the dependent variable: Entering the interaction terms into the model yielded no significant change in the predictive power of the model, R^2-change = .020, $F < 1$. Thus, the relation between threat and ingroup bias is not a function of intergroup distance and ingroup variability or their interaction. Likewise, neither the relation between threat and contact intentions nor between threat and the thermometer difference measure was moderated by experimental condition, R^2-change = .008, $F < 1$, and R^2-change = .005, $F < 1$.

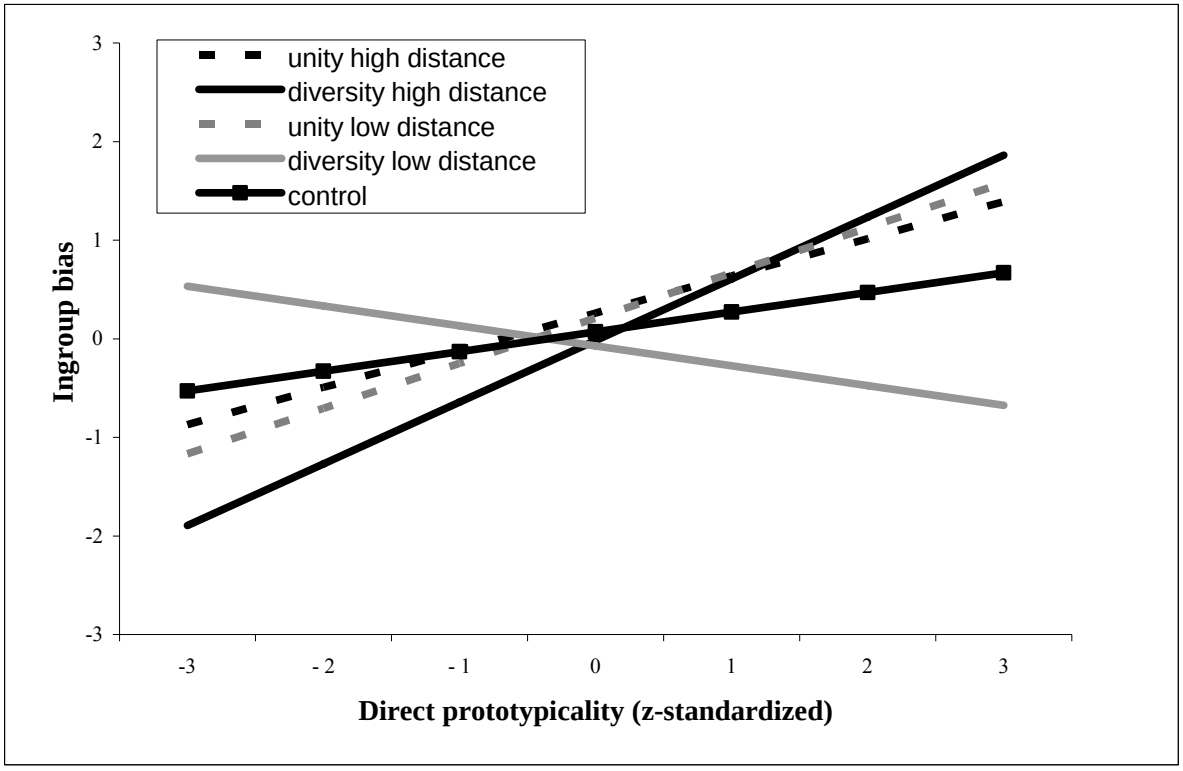

Figure 9. The relation between direct prototypicality and ingroup bias as a function of experimental condition (Experiment 4).

In sum, the moderation analyses revealed consistent effects using different dependent measures (i.e., ingroup bias, contact intentions and the thermometer difference measure). In particular, the results converged such that direct prototypicality was related to ingroup bias, contact intentions and the thermometer difference measure in both high intergroup distance conditions and in the low intergroup distance/unity condition whereas there was no such relation in the low intergroup distance/diversity condition and in the control condition. The moderation analyses concerning threat indicated that threat is an equally good predictor of ingroup bias, contact intentions and the thermometer difference measure in all experimental conditions.

6.2.4 Summary

The aim of Experiment 4 was to investigate the role of distinctiveness threat when variability of the ingroup was manipulated. Therefore, a distinctiveness threat scale was developed to measure the influence of variability manipulations on threat. Because intergroup distance was the focus variable in distinctiveness threat research, intergroup distance was manipulated orthogonally to ingroup variability. It was hypothesized that high levels of ingroup variability and low levels of intergroup distance increase distinctiveness threat. For

relative ingroup prototypicality it was expected that high levels of ingroup variability and low levels of intergroup distance decrease relative ingroup prototypicality. In addition, the hypothesis was tested that ingroup variability affects the ingroup prototypicality-ingroup bias link such that a significant relation between these two variables is only expected for low levels of ingroup variability.

To summarize, in Experiment 4 intergroup distance and ingroup variability were successfully manipulated as indicated by the manipulation checks. As in previous Experiments, identification neither with the ingroup nor with the superordinate category varied as a function of the experimental manipulation. Although the threat scale showed less than an optimal level of internal consistency, the manipulation of ingroup variability significantly affected the degree of experienced threat. Contrary to expectations, intergroup distance did not affect threat. In line with predictions, threat was a significant predictor of ingroup bias. The effect shown in Experiment 3 that an increase in ingroup variability decreased direct prototypicality was not replicated. Similarly, direct prototypicality was not affected by the manipulation of intergroup distance. But interestingly, low intergroup distance heightened the perception of *both* the ingroups' and the outgroups' direct prototypicality. Consequently, both ingroup and outgroup were evaluated better in the low intergroup distance conditions. But as expected, the relative evaluation of ingroup and outgroup did not vary across experimental conditions.

The moderation analysis concerning the relation between direct prototypicality and ingroup bias revealed a significant effect. Interestingly, there was no significant relation between direct prototypicality and ingroup bias in the diversity/low intergroup distance condition whereas there was such a relation in the other three experimental conditions. Similar results were obtained when either contact intentions or the thermometer difference measure were used as dependent variables. If only the low intergroup distance condition is considered, the result can be understood as a replication of Experiment 1 and 2. In both experiments a significant relation between relative ingroup prototypicality and ingroup bias was obtained in conditions with low ingroup complexity. The interpretation of Experiment 4 as a replication of Experiment 1 and 2 was substantiated when the manipulation check of the intergroup distance manipulation is considered. The mean perceived intergroup distance differed not from the control condition in the low intergroup distance conditions whereas the expected difference was observed for the high intergroup distance conditions. That the high intergroup distance manipulations increased the distance between ingroup and outgroup but that the low intergroup distance manipulations did not significantly decrease the distance

between ingroup and outgroup compared to the control condition seems to suggest that low intergroup distance is the default in this particular intergroup situation. If low intergroup distance is the default representation in the context of Germans and Poles within Europe, the significantly different relation between direct prototypicality and ingroup bias in the low intergroup distance/unity condition compared to the low intergroup distance/diversity condition might be interpreted as a replication of the experiments in Part I.

Throughout this thesis, it has been argued that variability of the ingroup representation is projected onto the superordinate category. Support for this reasoning derives from the diversity measures in Experiment 4. Interestingly, diversity manipulations of the ingroup led to more perception of diversity at the superordinate category level. This finding might be interpreted as a support for the notion that variability of the ingroup representation is projected onto the superordinate category where it influences the usability of the superordinate category prototype as a comparison standard.

6.3 Discussion of Part II

The two Experiments reported in Part II showed rather mixed results. In contrast to Part 1, Part 2 focused on the role of variability instead of complexity. The difference between complexity and variability has been defined with reference to the concepts of differentiation and integration. Variability only refers to the differentiation of elements whereas complexity refers to both differentiation and integration. Both Experiments in Part II used the manipulations of Waldzus et al (2003, 2005) to manipulate variability.

In Experiment 3, unity and diversity manipulations were employed to manipulate the variability of the mental ingroup or superordinate category representation. Confirming the notion of prototypicality as a function of ingroup variability, results showed that on both levels of categorization the manipulation of diversity led to a decrease in ingroup prototypicality perceptions. Prototypicality perceptions were, as expected, related to ingroup bias. However, diversity manipulations did not lead to less ingroup bias. To the contrary, if ingroup bias was regressed onto experimental condition while prototypicality perceptions were controlled for, the analysis even revealed the opposite effect such that diversity led to more ingroup bias.

Already in Part I, I discussed the possibility that distinctiveness threat might have influenced the effects of complexity. The puzzling results of Experiment 3 suggested investigating the likely influence of distinctiveness threat. Because distinctiveness threat has never been measured, a distinctiveness threat scale was constructed for Experiment 4. Intergroup distance as a focus variable of the distinctiveness threat research was introduced as a second factor and was manipulated by asking participants to think about the similarities or differences between the ingroup category and other categories belonging to the superordinate category. Ingroup variability was manipulated as in Experiment 3. Both manipulations were successful as indicated by significant manipulation checks.

Although the threat scale did not meet conventional levels of internal consistency, a significant effect of ingroup variability was obtained. As predicted, high levels of ingroup variability led to an increase in distinctiveness threat. However, the notion that intergroup distance affects threat was not confirmed. In line with the hypothesis, threat was significantly related to ingroup bias. On the whole, the attempt to measure threat to make conclusions about the different effects of variability manipulations was rather successful. However, neither variability of the mental ingroup representation nor intergroup distance did affect the

magnitude of relative ingroup prototypicality. Thus, the effect of variability manipulations on relative ingroup prototypicality in Experiment 3 was not replicated in Experiment 4.

This thesis formulated a second hypothesis that specifies the conditions in which a relation between relative ingroup prototypicality and ingroup bias is to be expected. In particular, I argued that relative ingroup prototypicality predicts ingroup bias only if the mental ingroup representation is of little variability. Evidence for this reasoning derived from Experiment 1 and 2. In accordance with Experiment 1 and 2, a moderation of direct prototypicality and ingroup bias by experimental condition was also obtained in Experiment 4. In particular, simple slopes analysis revealed that in the low distance/diversity condition a non-significant β-weight was obtained whereas the other three conditions showed significant positive β-weights. Similar results were obtained using contact intentions or the thermometer difference measure as dependent variables. It should be noted that the perceived intergroup distance did not differ significantly between the low intergroup distance conditions and the control condition whereas the perceived intergroup distance differed significantly between the high intergroup distance conditions and the control condition. If low intergroup distance represents the default intergroup distance in this particular setting, the results can be conceived as a replication of Experiment 1 and 2 where intergroup distance was not manipulated. In sum, Experiments 1, 2, and 4 supported the theoretical argument that only given that the ingroup mental representation is clearly defined (as opposed to variable and complex) it serves as a prescriptive standard at the level of the superordinate category.

In general, the results concerning distinctiveness threat can be conceived as an enlightening contribution to the overall understanding of the effects of variability and complexity of mental ingroup representations. However, the distinctiveness threat scale used in Experiment 4 clearly needs some revision. It is still an unresolved issue under which conditions ingroup variability or complexity influence the magnitude of relative ingroup prototypicality and under which conditions they influence the relation between ingroup prototypicality and ingroup bias. Apparently, it is not the difference between variability and complexity that caused the different effects as Experiment 3 and 4 used the same manipulations.

7 General discussion

7.1 Overview

The starting point of this doctoral thesis was to investigate the role of mental ingroup representations for ingroup projection and intergroup evaluation. The idea that mental ingroup representations are crucial for projection and evaluation processes in intergroup settings derived from the Cognitive Model of Ingroup Projection. Because superordinate categories are less available and less defined than basic categories (Rosch et al., 1976), the Cognitive Model of Ingroup Projection has argued that features of subordinate groups are projected to superordinate categories in order to generate mental representations of superordinate categories. In contrast to exemplar-based mental group representations, prototype-based mental group representations can be used in a more resource-saving manner (e.g., Sherman et al., 2000). Hence, the generalization of prototype-based subordinate features to superordinate categories enables people to generate a superordinate category representation without too much cognitive effort. In bringing together research on the linguistic intergroup bias (e.g., Maass et al., 1989), the ultimate attribution error (e.g., Islam & Hewstone, 1993), spontaneous trait inferences (Otten & Moskowitz, 2000) and Sherman et al.'s (1998) work on prototype- versus exemplar-based representations in intergroup settings, it has been reasoned that positive ingroup and negative outgroup features are represented prototype-based whereas negative ingroup and positive outgroup features are represented on the basis of exemplars. Linking the cited research, the Cognitive Model of Ingroup projection has argued that concerning positive contents people use the prototype-based, abstract mental ingroup representation to generate a superordinate category representation.

Relying on the Cognitive Model of Ingroup Projection, the basic concern of my dissertation was to find mechanisms to change the ingroup projection process. For this purpose, properties of prototype-based, abstract representations were identified. In reviewing the relevant literature and in considering theoretical arguments, variability and complexity were identified as two concepts related to prototype-based, abstract representations. It was argued that prototypes are summary representations of categories which are used as heuristic tools to navigate through social reality (Fiske & Neuberg, 1990). Heuristics as rules of thumb are clearly related to simplicity and low levels of variability otherwise they loose their characteristic as a tool that allows people to organize their every-day life without much cognitive effort. Following the Cognitive Model of Ingroup Projection, projection is a

function of the abstractness of the mental ingroup representation. Linking these assumptions, I hypothesized that projection is a function of complexity and variability such that ingroup representations should be projected to the extent that the ingroup representation is of little complexity and variability. In more technical terms, variability and complexity of the ingroup representation should affect the magnitude of ingroup projection.

In addition, a second hypothesis was proposed. The Cognitive Model of Ingroup Projection has argued that ingroup features are projected onto the superordinate category to generate a mental image of the superordinate category. Extending this argument, I proposed that complexity and variability of the ingroup are projected onto the superordinate category in a similar manner. Following the findings of Hogg et al. (1993) who have shown that evaluation of ingroup members is predicted by members' prototypicality only if the ingroup prototype is clearly defined, I argued that evaluation of subordinate groups is predicted by their prototypicality only if the superordinate category prototype is clearly defined and can, thus, serve as an evaluative standard for ingroup and outgroup judgments. Hence, because the mental representation of the ingroup is used to characterize the superordinate category representation I hypothesized that ingroup prototypicality is a predictor of ingroup bias only if the mental representation of the ingroup is clearly defined, and thus, of little complexity and variability. In contrast, if the superordinate category is through projection characterized by high levels of ingroup variability and complexity, it cannot be used as a standard and, thus, ingroup prototypicality is not related to ingroup bias. In more technical terms, the extent of variability and complexity of the ingroup representation should affect the extent to which prototypicality perceptions are related to intergroup evaluations.

Subgrouping and subtyping were identified as two processes that are related to the complexity of mental ingroup representations. Subgrouping is to sort group members into clusters according to multi-dimensional similarities. Thus, subgrouping should generate a complex mental ingroup representation. In contrast, subtyping is the mental isolation of stereotype-inconsistent group members: Along the line of the stereotype consistency-inconsistency dimension, stereotype-inconsistent members are mentally excluded from the group representation. After exclusion of the stereotype-inconsistent group members, the mental group representation is of little complexity. I argued that in contrast to complexity which refers to the differentiation and integration of a given set of stimuli, variability only refers to the differentiation of stimuli. To induce low versus high levels of variability of mental ingroup representations, the unity and diversity manipulations of Waldzus et al. (2003; 2005) were employed as they trigger differentiation but do not enforce integration. The

empirical part was divided into two chapters. In the first chapter, complexity manipulations were employed whereas variability manipulations were employed in the second chapter. I will now briefly summarize the results of the four experiments presented in this thesis.

The aim of Experiment 1 was to demonstrate that varying levels of complexity of the mental ingroup representation change the ingroup projection and intergroup evaluation process such that increasing complexity decreases the magnitude of relative ingroup prototypicality and the link between relative ingroup prototypicality and ingroup bias. In Experiment 1, subgrouping and subtyping manipulations for natural groups (Park et al., 1992) were employed in order to manipulate complexity. Next to the experimental conditions, Experiment 1 included a control condition. The prototypicality measures did not vary with the experimental manipulation. However, ingroup bias was a function of the experimental conditions such that the subtyping condition differed significantly from the control condition. Furthermore, a regression analysis testing for a moderation of the relation between relative ingroup prototypicality and ingroup bias by experimental condition yielded a significant result. Simple slopes indicated that only in the subtyping condition relative ingroup prototypicality was a significant predictor of ingroup bias whereas the subgrouping and control condition did not show a significant relation between relative ingroup prototypicality and ingroup bias. In accordance with the theoretical argument that only a clear prototype serves as a prescriptive standard, a significant difference was found between the control condition and the subtyping condition in the strength of the relation between relative prototypicality and ingroup bias. The results concerning the subgrouping condition were interpreted such that the request to subgroup one's own ingroup leads to a reproduction of the default mental ingroup representation (see Park et al., 1992) so that no difference between the subgrouping and the control condition can occur.

The main aim of Experiment 2 was to replicate the subtyping effect on ingroup bias and on the relation between relative ingroup prototypicality and ingroup bias. In order to manipulate subgrouping and subtyping, subgroups and subtypes were predefined and participants were asked to sort attributes to either the different subgroups or to the subtype and the remaining ingroup. The results largely replicated Experiment 1. Firstly, experimental conditions did not affect prototypicality perceptions. Secondly, in the subtyping condition participants showed significantly more ingroup bias than in the control condition. Thirdly, the relation between ingroup bias and relative ingroup prototypicality was significantly stronger in the subtyping condition than in the control condition. A second aim of Experiment 2 was to investigate the role of interindividual differences within the projection process. Based on the

reasoning of Snyder and Ickes (1985) it was hypothesized that interindividual differences determine judgmental decisions and behavior as long as no other cues guide decisions and behaviors (i.e., "psychologically weak situations"). PNS and diversity beliefs were introduced as interindividual difference measures. PNS detects the individual preference for simple structure and is related to ingroup bias (Shah et al., 1998). Besides PNS, a diversity beliefs scale was employed. A diversity beliefs scale is supposed to measure the preference for diverse (as opposed to homogeneous) categories (van Knippenberg & Haslam, 2003). I suggested that on a societal level, diversity beliefs are identical to the preference for multiculturalism which is related to lower levels of ingroup favoritism (Richeson & Nussbaum, 2004; Wolsko et al., 2000). However, as diversity beliefs are not an established interindividual difference measure, this scale was employed to serve explorative functions. In line with Snyder and Ickes (1985), I hypothesized that PNS and diversity beliefs are related to ingroup bias in the control condition whereas neither PNS nor diversity beliefs are significant predictors in the subtyping condition. Such a moderation would shed further light on the moderation of ingroup prototypicality and ingroup bias by complexity of mental representations in that it would prove that simple representations are strong cues for evaluation and, thus, overpower interindividual differences.

Indeed, evidence was provided that the desire for simple structure, a subscale of PNS, was related to ingroup bias only in the control condition. For diversity beliefs, the expected moderation did not appear. Interestingly, diversity beliefs decreased under subgrouping. This gave interesting insights into processes that might have been triggered by subgrouping manipulations. In Experiment 2, participants in the subgrouping condition showed significantly more ingroup bias and a significantly stronger ingroup prototypicality-ingroup bias link than participants in the control condition. Post-hoc I argued that forcing people to structure their ingroup beyond their default mental representation might lead to reluctance and to a denial of ingroup complexity. This might have caused a contraction of the ingroup representation and might be expressed in the decrease of diversity beliefs. In the context of Experiment 2, the possibility that manipulations of ingroup complexity and variability cause distinctiveness threat were discussed (Jetten and Spears, 2003).

In Experiment 3, diversity and unity manipulations of Waldzus et al. (2003, 2005) were employed in order to induce low versus high variability levels of mental category representations. The aim of Experiment 3 was to investigate whether the more parsimonious concept of variability is already sufficient to trigger changes in the projection and evaluation process. Furthermore, unity and diversity were either manipulated at the level of the ingroup

or at the level of the superordinate category so that the tolerance model of Waldzus and colleagues (2003, 2005) and the hypothesis of the present thesis were tested within one experiment. Manipulations of the mental ingroup representation refer to the hypothesis of the present line of research whereas manipulations of the mental superordinate category representation refer to the approach of Waldzus and collaborators (2003, 2005). The results confirmed the hypothesis that diverse *ingroup* representations decrease the perception of relative ingroup prototypicality. In addition, the Waldzus et al. (2003, 2005) results were replicated in showing that participants in the diverse *superordinate category* condition claimed less prototypicality for the ingroup. Furthermore, more perceived ingroup prototypicality was related to more ingroup bias. The relation between ingroup prototypicality and ingroup bias was not moderated by experimental condition. However, there was no total effect of diversity manipulations on ingroup bias. That is, variability of mental representations led to less ingroup prototypicality and ingroup prototypicality was significantly related to ingroup bias but there was no significant effect of variability of mental representations on ingroup bias. This suggested that a second process that is antagonistic to the prototypicality process shapes the mediation. In Experiment 2 it was already discussed that variability or complexity manipulations might trigger distinctiveness threat or differentiation needs. Likewise, the puzzling results of Experiment 3 were discussed against the background of distinctiveness threat.

The role of distinctiveness threat was investigated more explicitly in Experiment 4. Most of the distinctiveness threat research manipulated intergroup distance and measured ingroup bias as a dependent variable. But recently also ingroup variability was manipulated in order to trigger threat (Jetten et al., 1998). The results confirmed that ingroup variability manipulations were related to ingroup bias. Thus, I reasoned that ingroup variability or complexity manipulations in the present line of research might have triggered threat or a need for differentiation. I suggested a dual pathway model that specifies the two effects of variability. Firstly, variability leads to less prototypicality perceptions which are related to less ingroup bias. Secondly, variability leads to more distinctiveness threat which is related to more bias. As a result, these two pathways cancel each other out such that ingroup bias is not affected by variability manipulations.

Intergroup distance was manipulated orthogonally to ingroup variability to allow for a broader scope of distinctiveness. For ingroup variability manipulations, the instructions of Experiment 3 were adopted. Low versus high intergroup distance was induced by asking participants to think about similarities versus differences between their ingroup and other

groups within the superordinate category. It was expected that high levels of ingroup variability and low intergroup distance lead to the least ingroup prototypicality perceptions whereas low levels of ingroup variability and high intergroup distance lead to the most ingroup prototypicality perceptions. In accordance with the distinctiveness threat research, most threat was expected for high levels of ingroup variability and low intergroup distance whereas least threat was expected for low levels of ingroup variability and high intergroup distance. A measurement instrument for distinctiveness threat was developed to investigate the hypothesized, underlying processes. Although the distinctiveness threat scale did not meet conventional levels of reliability, variability manipulations affected distinctiveness threat such that diversity triggers distinctiveness threat. In line with the hypothesis, high levels of distinctiveness threat were related to more ingroup bias. Concerning relative ingroup prototypicality, the results of Experiment 3 were not replicated and neither ingroup variability nor intergroup distance manipulations were related to perceived ingroup prototypicality. To summarize, it was possible to provide evidence for the distinctiveness threat pathway but no evidence was provided for the prototypicality pathway within the same experiment. However, an interesting moderation was found in Experiment 4. In the low intergroup distance condition the relation between relative ingroup prototypicality and ingroup bias was moderated by ingroup variability such that only in the unity condition relative ingroup prototypicality was a significant predictor of ingroup bias. The manipulation check provided evidence that the low intergroup distance condition is the default representation in this intergroup setting in that it did not differ from the non-orthogonal control condition with regard to the perception of intergroup distance. Thus, Experiment 4 might be interpreted as a replication of Experiment 1 and 2 and as support for the argument that only ingroup representations of little complexity or variability serve as a prescriptive standard at the level of the superordinate category. This interpretation was corroborated by the finding that variability manipulations of the ingroup affect the perceived variability of the superordinate category.

To broadly summarize the empirical part of this thesis, mental ingroup representations of little *complexity* lead to a strengthened ingroup prototypicality-ingroup bias link as compared to a control condition (Experiment 1 and 2). The induction of low levels of *variability* of mental ingroup representations showed mixed results. In Experiment 3 the level of relative ingroup prototypicality increased with decreased levels of variability of the mental ingroup representation whereas Experiment 4 provided evidence for a strengthened ingroup prototypicality-ingroup bias link in the unity condition as compared to the diversity condition

which might be considered as a replication of Experiment 1 and 2 (disregarding the high intergroup distance condition). Experiment 2 and 3 raised the question if the manipulation of variable and complex ingroup representations triggers distinctiveness threat. Experiment 4 provided evidence that indeed variability manipulations increased threat.

7.2 Strengths and limitations of the presented experiments

In this line of research, it was assumed that variability and complexity of mental ingroup representations shape the ingroup prototypicality-ingroup bias link such that prototypicality is strongly related to ingroup bias only when the mental ingroup representation is of low variability and complexity. In contrast, mental ingroup representations of high complexity or variability were hypothesized to weaken the ingroup prototypicality-ingroup bias link. This hypothesis was supported in that relative ingroup prototypicality was a stronger predictor of ingroup bias in conditions with low complexity and variability compared to control conditions (Experiment 1 and 2) or high variability conditions (Experiment 4). This evidence is not limited to a specific intergroup setting. In different intergroup settings – business students versus students of economics (Experiment 1), natural science students versus students of humanities (Experiment 2) and Germans versus Poles (Experiment 4) – the same pattern of moderation emerged and therefore seems not to be restricted to characteristics of any of these settings.

The present thesis relies on the Cognitive Model of Ingroup Projection. Ingroup identification in terms of social identity needs is not considered as a crucial variable within this model. However, identification should not vary across experimental condition so that the effects of experimental manipulations on ingroup bias cannot be attributed to varying levels of ingroup identification and, thus, to different levels of social identity needs. Hence, identification measures were important control variables. In the presented experiments, identification was rather high but did not vary with experimental condition.[15] Therefore,

[15] One exception was Experiment 2. Experiment 2 yielded a significant interaction between the order factor (i.e., ingroup variables or outgroup variables were presented first) and mental representation (i.e., subgrouping, subtyping and control) for identification with the ingroup. However, at the time participants were asked to indicate their identification with the ingroup, the order factor was not yet introduced. Thus, the effect can only be due to an α-error in randomized assignment of participants to the experimental conditions.

social identity needs can neither explain the effects on ingroup bias nor the effects on the ingroup prototypicality-ingroup bias link.

Prototypicality is a key variable when ingroup projection processes are investigated. However, here and elsewhere (e.g., Waldzus et al., 2003) the reliable and valid assessment of prototypicality was rather difficult. In the experiments presented here, the direct and indirect measures of prototypicality did not always converge in their statistical association with the dependent measures. The effects were rather consistent across studies for the direct prototypicality measure in that direct prototypicality was a reliable predictor of ingroup bias in conditions with low levels of variability and complexity. In contrast, results concerning indirect prototypicality measures were rather mixed. Indirect prototypicality predicted ingroup bias in Experiment 1 and 4 whereas it was not significantly related to ingroup bias in Experiment 2 and 3. Hence, the main findings of the presented research rely on one item for direct ingroup prototypicality and on one item for direct outgroup prototypicality. This is clearly a limitation of the presented experiments. Future research should develop better measures of prototypicality. Implicit measures might be a promising approach in assessing prototypicality unobtrusively and validly (Bianchi & Mummendey, 2005).

A strength of the presented research is that both ingroup and outgroup evaluations were assessed simultaneously. Declaring an increase in outgroup evaluations as a positive effect with regard to intergroup relations ignores the possibility that ingroup evaluations might have increased at the same time which maintains the difference between ingroup and outgroup evaluations. Similarly, manipulations might increase ingroup evaluations while outgroup evaluations remain at the same level. Not assessing ingroup evaluations would mask the actual effect of an increase in ingroup bias (for a similar reasoning see also Gaertner, Mann, Murrell, & Dovidio, 1989). In Experiment 3, for example, variability manipulations increased (at a descriptive level) ingroup evaluations whereas outgroup evaluations remained at the same level. The regression analyses of Experiment 3 yielded even more obvious differences in effects depending on the evaluation measure: The regression of ingroup bias on variability manipulations and relative ingroup prototypicality revealed that variability manipulations are positively related to ingroup bias whereas there was no such effect if outgroup evaluation was the dependent variable. By assessing outgroup evaluation in relation to ingroup evaluation, the presented research revealed a more complete picture of intergroup evaluations and can, thus, draw more solid conclusions about positive and negative effects of variability and complexity.

The results of the subgrouping conditions remain an unanswered question. The subgrouping condition did not differ from the control condition in Experiment 1. However, the problem with the subgrouping manipulation can be reformulated as a problem with the control condition: If relative ingroup prototypicality and ingroup bias are not related in the control condition it is not possible to demonstrate a decrease in this relation in the subgrouping condition. The statistically non-significant and very weak relations between relative ingroup prototypicality and ingroup bias in the control conditions of Experiments 1, 2, and 4 contradict earlier research (e.g., Wenzel et al., 2003) and illustrates that relative ingroup prototypicality as a predictor of ingroup bias is not a general rule. To the contrary, further research is needed that clarifies the conditions under which relative ingroup prototypicality predicts ingroup bias. This doctoral dissertation might be conceived as a beginning in showing that the availability of a simple prototype plays a pivotal role.

Turning back to the subgrouping condition, Experiment 2 showed an equally strong ingroup prototypicality-ingroup bias link as the subtyping condition. Because of these puzzling results in Experiment 2, the question of a second antagonistic process emerged. Distinctiveness threat was suggested as such a process that operates in parallel to the projection process. Experiment 3 emphasized the necessity to investigate this process. The hypothesis that distinctiveness threat or optimal distinctiveness may play a major role if variability and complexity of mental ingroup representations are manipulated was developed in the progress of the presented research. And in fact, Experiment 4 was successful in providing evidence that participants felt threatened after a diversity manipulation. This supports the interpretation in Experiment 2 and 3 although this reasoning is post-hoc and it is, thus, not possible to draw safe conclusions. Even though no support was found for the notion that a decrease in intergroup distance leads to distinctiveness threat, the creation of a threat scale in Experiment 4 can be conceived as a starting point for the analysis of threat processes. In conclusion, the inconsistency of the results concerning the high complexity and variability manipulations should be taken as a strength of this research in that it led to a successful integration of the research on variability and complexity of mental representations within the process of ingroup projection and the distinctiveness threat and optimal distinctiveness research.

Despite the limitations discussed, the present line of research provided convincing evidence that variability and complexity of mental ingroup representations play a crucial role in ingroup projection and evaluation processes. In particular, Experiment 1, 2 and 4 provided convergent evidence that the extent to which the ingroup is perceived as complex versus

simple and variable versus homogeneous has an important impact on the usability of ingroup prototypicality as a criterion for group evaluations.

7.3 Theoretical links to intergroup research

As outlined in the theoretical part of this doctoral dissertation, variability and complexity of mental group representation have been a main topic in social psychology for more than two decades. Social cognition research considered variability of mental group representations mostly in the context of stereotyping. For example, taking estimates of stereotype-consistent and stereotype-inconsistent information as a measure of dispersion (Park & Judd, 1990), it has been demonstrated that providing stereotype-incongruent information changes the perceived variability of a category (Johnston & Hewstone, 1992; Weber & Crocker, 1983). Changing variability perceptions were considered as a vehicle of stereotype change as it impedes the overgeneralization of group attributes (i.e., "*All* Germans are efficient", e.g., Richards & Hewstone, 2001). Recently, Ryan, Judd and Park (1996) demonstrated that the confidence in a judgment of an individual group member according to the stereotype decreases with increasing group variability. But changes in variability were not necessarily related to a change in the central tendency of a group and, thus, not to the valence of the stereotype (Garcia-Marques & Mackie, 1999; Paolini, Hewstone, Rubin, & Pay, 2004).

In contrast, research on intergroup relations investigated the difference between perceived ingroup and outgroup variability and its relation to ingroup bias. Although the phenomenon of outgroup homogeneity has been understood as a "general rule" (e.g., Simon & Pettigrew, 1990), the research of the last 25 years provided rather mixed results with some results even pointing to an ingroup homogeneity effect. Concerning the relation between perceived variability and ingroup bias, some research emphasized that the perception of ingroup and outgroup variability is not connected to the phenomenon of ingroup favoritism (Judd & Park, 1988; Park & Rothbart, 1982). Other research suggested that "variability judgments can be used strategically as a way to make social identity more positive" (p. 1206, Rothgerber, 1997; see also Castano, Yzerbyt, Paladino, & Sacchi, 2002). Brewer (1993) concluded that the empirical evidence concerning the relation between variability and intergroup evaluations is rather ambiguous.

This thesis brings together stereotype and intergroup research in proposing a model that specifies the theoretical relation between variability and intergroup evaluations. Relying on the notion that prototypes are only usable as a tool to judge members of a group to the extent that within group variance is rather low (e.g., Ryan et al., 1996), I argued that a prototype is

only usable as a judgmental standard in an intergroup context to the extent that variability and complexity of the mental representation is rather low. It was suggested that only ingroup representations of little variability and complexity serve as a prescriptive standard at the level of the superordinate category. A prescriptive standard allows for clear judgments and, therefore, ingroup prototypicality predicts ingroup bias. Support for this reasoning was provided in Experiment 1, 2 and 4. Thus, this thesis bridges the gap between social cognition research and intergroup research in providing a model that specifies how ingroup variability and complexity shape the intergroup evaluation process.

The present work is clearly linked to the Cognitive Model of Ingroup Projection. The Cognitive Model of Ingroup Projection provided a reasonable framework to derive predictions about projection and evaluation processes but as the presented research was not aiming at explicitly testing the model, conclusions about the accuracy of the model can be made only to a very limited degree. However, the argument that prototype-based representations go hand in hand with limited variability and complexity of mental representations suggests that Experiment 3 in which relative ingroup prototypicality was a function of variability can be interpreted as support for the Cognitive Model of Ingroup Projection. In contrast, Experiment 1, 2, and 4 did not yield such a main effect on relative ingroup prototypicality. Although Experiment 1, 2, and 4 cannot be interpreted as clearly supportive for the Cognitive Model of Ingroup Projection, they are not contradictive either. To the contrary, a moderation of ingroup prototypicality and ingroup bias by variability or complexity of mental ingroup representation might be an interesting theoretical complement to the Cognitive Model of Ingroup Projection. Future research should investigate how and to which extent prototype-based representations influence the ingroup prototypicality-ingroup bias link. Convergent evidence with the presently reported results would support the cognitive perspective on projection and intergroup evaluation.

Obviously, the presented research is theoretically linked to the distinctiveness threat research. Distinctiveness threat was a post-hoc explanation for the puzzling results in Experiment 2 and 3 and Experiment 4 provided convincing evidence that diversity manipulations triggered threat. This is in line with research by Jetten et al. (1998) who suggested that intragroup variability was an unattended variable in the distinctiveness threat research and demonstrated that an increase in variability leads to more ingroup bias. Because I wanted to make conclusions about the process and to ensure that in fact threat triggers ingroup bias, a measurement instrument was developed in Experiment 4. This scale is certainly only a beginning and needs some refinement to increase internal consistency and external validity.

However, contrary to predictions of the distinctiveness threat research, intergroup distance was not related to threat. As the findings of the distinctiveness threat research are rather mixed concerning the effect of intergroup distance (Jetten et al., 2004) this result does not necessarily speak against the scale developed here. To the contrary, a distinctiveness threat scale might be helpful to investigate effects of intergroup distance and to clarify the interplay between within group variability and intergroup distance.

The hypothesis that variability manipulations at the *ingroup* level trigger distinctiveness threat is clear cut and corresponds to the distinctiveness threat literature. Maybe not so self-evident, but the notion of distinctiveness threat or the need for differentiation might also explain why diversity manipulations at the *superordinate category* level did not lead to a better intergroup evaluation either (see also Waldzus et al., 2003). Brewer (1993) argued that overly inclusive categories trigger the need for differentiation and, as a consequence, identification with lower order categories increases. In fact, Hornsey and Hogg (1999) demonstrated that the perception of inclusiveness of the superordinate category was related to more ingroup bias at the subgroup level. It is very likely that the manipulation of diversity at the superordinate category level implies a high level of inclusiveness and, thus, triggers differentiation needs which are related to ingroup bias (Brewer et al., 1993). In a nutshell, I argued that an increase in variability of mental representations of both ingroups and superordinate categories triggers threat. This suggests that whenever variability of mental representations is increased one should be aware of the possibility to cause negative side-effects for the relation between ingroup and outgroup evaluation.

Also closely related to this thesis is the tolerance model of Waldzus et al. (2003, 2005). The tolerance model suggests that variability of *superordinate category* representations influences the level of ingroup projection. In particular, it has been argued that for highly diverse superordinate categories the ingroup cannot claim prototypicality as strongly as for less diverse superordinate categories. In line with predictions, Waldzus et al. (2003, 2005) found evidence that the level of projection decreases with increased levels of superordinate category variability. In contrast, the present thesis focused on the *ingroup* representation. Two hypotheses were formulated. The hypothesis suggesting relative ingroup prototypicality to be a function of ingroup variability and complexity was supported in Experiment 3 whereas support for the second hypothesis that ingroup variability and complexity shape the ingroup prototypicality-ingroup bias link was found in Experiments 1, 2, and 4. However, according to the reasoning of the present thesis manipulating the superordinate category directly should also moderate this link. As already outlined, Waldzus et al. (2003, 2005) also argued that the

superordinate category prototype can only serve as a standard for subgroup judgment if it is characterized by low levels of variability. Nevertheless, Waldzus et al. (2003, 2005) did not report a moderation analysis. Although several questions concerning the effects of variability and complexity within the Ingroup Projection Model remain open, the results of the tolerance model and this thesis together illustrate that mental representations at each level of categorization can play a crucial role in the projection process.

Another model related to variability and complexity of mental representations is the multiculturalism approach. Multiculturalism emphasizes the diversity of an inclusive category and stresses that each subgroup within the inclusive category is an asset to the whole. Evidence has been provided that priming of the multicultural ideology decreased ingroup favoritism (Richeson & Nussbaum, 2004; Wolsko et al., 2000). Although the similarities between the approach of this thesis, the tolerance model and the multiculturalism approach are obvious in that they all focus on diversity, there exist some clear differences. While Waldzus' tolerance model and the approach of this thesis induced different levels of variability and complexity of mental representations without valuing the one or the other, the multiculturalism approach does not intervene in the idiosyncratic representation but tries to enhance the appreciation of existing diversity. These two outcome variables might be even negatively related as suggested by Experiment 2. That is, increasing the complexity of the ingroup led to a decrease in the appreciation of diversity at the superordinate category level. Thus, the representation of diversity and the appreciation of diversity seem to be two distinct concepts which are related in a more complex manner than it appears at first glance.

The social identity complexity approach by Roccas and Brewer (2002) needs to be mentioned when thinking about the relation between complexity and variability of mental representations and ingroup favoritism. However, this approach takes a clearly different perspective than the model of this doctoral thesis. It does not focus on the mental representation of groups but on the mental representation of the self. In particular, the focus is on the number of clearly distinguishable group memberships of an individual. A complex social identity refers to the perception that each ingroup an individual is a member of integrates different people and the self representation is the combined representation of all group identities. In contrast, a simple social identity is rather exclusive and integrates only people who share exactly the same category memberships. In terms of cross-cutting categories, a complex social identity would recognize all Whites *and* all Christians as being the ingroup whereas a simple social identity would only recognize White Christians as an ingroup. For complex social identities, two conditions need to be met: Firstly, people need to

be aware of multiple ingroup categorizations and, secondly, people need to realize that these multiple categories do not overlap completely.

Though the concept of complexity is employed in different areas (i.e., the self versus the ingroup) there are some overlaps between the social identity complexity approach and the idea of this dissertation. Subgrouping of the ingroup implies the recognition of differences within the ingroup: Some ingroup members are similar to the self on multiple dimensions but most ingroup members are different from the self on multiple dimensions. Likewise, a complex social identity implies that most ingroup members are ingroup members with respect to one dimension of categorization but outgroup members with respect to other dimensions of categorization. However, it is a characteristic of a complex social identity to recognize all individuals who only share one dimension as belonging to the ingroup. Hence, complex social identities include the perception of ingroups as complex. Indeed, similar to the results of Experiment 1 and 2, simple social identities were related to less tolerance towards outgroups (Brewer & Pierce, 2005). Brewer (2005) also demonstrated that social identity complexity was related to less ingroup projection. In sum, social identity complexity is a promising approach with regard to intergroup relations. Nevertheless, many questions remain open. So far, social identity complexity has been *measured* but was never *manipulated*. It is not unlikely that manipulating social identity complexity beyond the idiosyncratic mental representation triggers threat or differentiation needs. The present thesis showed that threat should be kept in mind when forcing people to change mental representations in terms of variability and complexity.

This thesis demonstrated that the reduction of complexity of mental ingroup representations strengthens the ingroup prototypicality-ingroup bias link and increases ingroup bias. Although different in reasoning and in the direction of impact, the presented research is in line with the tolerance model (Waldzus 2003, 2005), the multiculturalism approach (Richeson & Nussbaum, 2004; Wolsko et al., 2000) and the social identity complexity approach (Brewer & Pierce, 2005; Roccas & Brewer, 2002) with regard to the notion that diversity and complexity are promising variables for the change of intergroup evaluations. However, from the empirical evidence presented here it must be concluded that the *impairing* impact of simple and homogeneous mental representations on intergroup evaluations is greater than the *ameliorating* effect of complex and variable mental representations on intergroup evaluations. The improvement of intergroup evaluations through variability and complexity seems to be a complicated task. I suggested that when

dealing with complex or variable mental representations the danger of counteracting effects of threat or differentiation needs should be kept in mind.

7.4 Future research

It was argued here that prototypicality perceptions, variability and complexity of group perceptions are strongly interwoven concepts. According to the Cognitive Model of Ingroup Projection, projection strongly depends on ingroup and outgroup representations in terms of prototypes and exemplars. The presented research relied on changes in complexity and variability to change the prototype-based representation of the ingroup and, therefore, the projection process. The complexity of mental ingroup representations was manipulated using subgrouping and subtyping procedures whereas variability of mental ingroup representations was manipulated using diversity and unity instructions of Waldzus et al. (2003, 2005). Apparently, these procedures were rather blatant. More subtle procedures might be promising. An understanding of a prototype-based representation of a social category as equivalent to the notion of stereotypes (Stangor, 2000) would open the door for methods which have been used successfully to change stereotypes. A convincing approach to manipulate variability perceptions is the presentation of stereotype-inconsistent information (Garcia-Marques & Mackie, 1999). Paolini et al. (2004) demonstrated that little pieces of stereotype-inconsistent information are already sufficient to change perceived variability. Although these procedures were employed to change the variability of outgroup stereotypes, they should be similarly efficient in changing the variability of ingroup stereotypes. Furthermore, this procedure also provides the opportunity to trigger less variability through subtyping. If inconsistent information is concentrated within a few individuals, subtyping is triggered which leads to the mental exclusion of these inconsistent instances and homogenizes the category representation (Johnston & Hewstone, 1992; Weber & Crocker, 1983). Thus, the distribution of inconsistent information across group members determines whether high or low variability is induced. These more subtle procedures might also circumvent the distinctiveness threat problem.

This thesis only focused on positively valued contents. Similarly interesting might be to test if predictions would also be confirmed with negatively valued contents. The Cognitive Model of Ingroup Projection proposes that concerning negative contents it is the outgroup that is represented prototype-based. In this case, people should rely one the negative abstract mental representation of the outgroup in order to generate a mental representation of the superordinate category. If the negative outgroup representation is used to generate the superordinate category representation, outgroup and superordinate category representation are

automatically more similar than ingroup and superordinate category representation. Concerning negative contents, the relation between prototypicality and evaluation turns around such that the relatively more prototypical group is evaluated less positively. It would be interesting to replicate the findings of the present thesis with negative contents. In such an experiment, the negative contents of the ingroup and the outgroup should be emphasized before high versus low levels of complexity or variability are induced for the outgroup representation. As a mirror image of the processes regarding positive contents, it is expected that concerning negative contents the relation between outgroup prototypicality and ingroup bias are moderated by mental outgroup representations such that outgroup prototypicality is only positively related to ingroup bias if the outgroup representation is of little complexity and variability because only then the outgroup representation can serve as a standard at the level of the superordinate category. In addition, triggering high levels of complexity or variability of the outgroup representation might have the advantage that distinctiveness threat is not triggered simultaneously as the ingroup is not affected so that no negative side-effects of variability and complexity are to be expected.

Considering the manipulation of positive ingroup representations and negative outgroup representations suggests considering also the other two cells of the valence by target group matrix, namely the negative ingroup representations and the positive outgroup representations. From the empirical evidence provided here, I suggest, however, that a change of negative ingroup representations and positive outgroup representations would be less effective in changing the prototypicality-ingroup bias link. According to the Cognitive Model of Ingroup Projection, projection tendencies for negative ingroup representations and positive outgroup representations are rather low. Furthermore, the results of this thesis converged in that three out of four times variability of ingroup representations did not affect the magnitude of relative ingroup prototypicality. According to the argument put forward in this thesis, ingroup variability is projected onto the superordinate category just like individual ingroup features and, thus, influences the usability of the superordinate category prototype as a prescriptive standard. As a certain amount of projection seems necessary to transfer variability information onto the superordinate category and the magnitude of projection is hardly increased by variability manipulations it seems not very promising to modify negative ingroup representations and positive outgroup representations to change projection and evaluation processes.

Of capital importance would be the investigation of the underlying processes of the moderation found in Experiments 1, 2, and 4. It has been argued that variability and

complexity of mental representation might be stored in an abstract manner (Judd & Park, 1988). I reasoned that variability or complexity information of the ingroup is projected onto the superordinate category as an abstract piece of information. Support for this notion comes from Experiment 4 where ingroup variability manipulations affected the perceived variability of the superordinate category. I argued that the abstract variability information determines the usability of the superordinate category prototype as a prescriptive standard. The moderation hypothesis put forward here was derived from this theoretical argument. However, other processes would produce similar results. People might rely on variability or complexity information in order to determine the reliability or the diagnosticity of the prototypicality judgment. As in statistics, information is reliable to the extent that deviation is rather low. Support for this reasoning derives again from the stereotype literature. People use category information (i.e., stereotypes) only if there is not too much dispersion (Ford & Stangor, 1992). Furthermore, although people indicate that a group possesses a certain trait, this trait information is used to a stronger extent for further judgments when group variability is rather low (Park & Hastie, 1987). Likewise, Park et al. (1991) argued that highly variable group representations do not provide diagnostic information. Thus, people indicate mean judgments for a group if asked for it but they refuse to use the mean information as a *reliable* information basis for any further judgment under the condition of high group variability. With regard to the question of the present thesis, this notion would suggest that participants do indicate that their ingroup is more prototypical of the superordinate category than the outgroup. However, ingroup prototypicality serves as reliable information only if the ingroup is perceived as simple and homogeneous. Thus, only in this case prototypicality is diagnostic and, therefore, a predictor of intergroup evaluations.

In sum, two processes (i.e., the usability of the superordinate category prototype as a standard and the reliability of the ingroup prototypicality information) would both explain the results of Experiment 1, 2 and 4. The hypothesis that the usability of the superordinate category prototype as a standard is affected by ingroup variability and complexity manipulations could be tested by investigating if variability or complexity manipulations at the superordinate category level also moderate the ingroup prototypicality-ingroup bias link in the same way as variability and complexity manipulations at the ingroup level. In Experiment 3 the mental representation of the superordinate category in terms of unity and diversity was manipulated and no moderation occurred. However, in this experiment a moderation by ingroup complexity did not occur either. A reanalysis of the data of Waldzus et al. (2003, 2005) might provide further insight.

A direct test of the hypothesis that variability or complexity manipulations of mental ingroup representations affect the reliability of the ingroup prototypicality information appears more difficult. Similarly to a procedure of Ryan et al. (1996) who directly asked participants to indicate how confident they were in their trait judgments, one might ask participants directly about how much they rely on the judgment that the ingroup is more prototypical of the superordinate category than the outgroup. If it is in fact the reliability of the prototypicality judgment that caused the effects, the confidence in prototypicality judgments should moderate the ingroup prototypicality-ingroup bias link. However, next to this rather blatant procedure, more subtle procedures should be developed to measure or even manipulate confidence or reliability of prototypicality judgments.

The role of intergroup distance for prototypicality perceptions also needs further consideration. It has been argued (Mummendey & Wenzel, 1999) and demonstrated (Waldzus et al., 2003) that intergroup distance is related to prototypicality perceptions. It was not possible to replicate this relation in Experiment 4 although the manipulation check showed that the manipulation had the intended effect. Although it has been argued here and elsewhere (Mummendey & Wenzel, 1999) that an increase of intergroup distance should go hand in hand with an increase of relative ingroup prototypicality, this is not an inevitable relation. Theoretically, the distance between ingroup and outgroup can increase while the relative distance from the superordinate category prototype is maintained. Even though the magnitude of ingroup prototypicality was not affected by intergroup distance manipulations, Experiment 4 has shown that intergroup distance was an important factor for the strength of the relation between ingroup prototypicality and ingroup bias. That is, the strength of the relation between ingroup prototypicality and ingroup bias only varied with the variability of the mental ingroup representation if the intergroup distance was low. This suggests that high intergroup distance repairs either the usability of the standard or the reliability of the information concerning ingroup prototypicality. One possible explanation might be derived from research by Crisp (2005). Crisp provided evidence that manipulations of intercategory distance also affect intracategory differentiation such that more intercategory distance led to more homogeneity within categories. Higher intercategory distance also facilitated stereotype-accessibility. Both of these processes might have influenced the effects in Experiment 4 such that an increase in intergroup distance homogenized the category representation and made ingroup prototypes more accessible. The intergroup distance manipulation might, thus, overpower diversity manipulations. Clearly, the result concerning intergroup distance needs some replication and further theoretical considerations.

7.5 Conclusion

The current research addressed the question how variability and complexity of mental ingroup representations shape the projection and evaluation process. Although only three experiments converged such that the relation of ingroup prototypicality and ingroup bias was moderated by the variability or complexity of mental ingroup representation whereas one experiment provided evidence for a main effect of ingroup variability on ingroup projection, all experiments demonstrated that mental ingroup representations should carefully be considered when investigating intergroup processes.

In the progress of this research, the hypothesis emerged that distinctiveness threat or differentiation needs are crucial variables when variability and complexity of mental representations are manipulated. Experiment 4 provided evidence for this notion. In several approaches, complexity or variability of mental representations were used as promising variables to change intergroup evaluation and to promote tolerance (Brewer & Pierce, 2005; Waldzus et al., 2003, 2005; Wolsko et al., 2000). However, when increasing variability or complexity one should be aware of the risk to trigger distinctiveness threat or differentiation needs which work against the enhancement of intergroup relations.

This project is a first successful step in demonstrating the relevance of mental ingroup representations for projection and evaluation processes. Apparently, next steps should be taken to come to more definite conclusions. I outlined that two processes could explain the results of three experiments. It could be assumed that superordinate category standards are not usable for judgmental decisions if they are complex or variable. But it is similarly conceivable that increasing variability and complexity diminish the reliability of ingroup information. Similarly important from my perspective is the search for manipulation procedures that prevent threat or differentiation needs from occurring when variability or complexity are increased. While answering some questions, new urgent questions emerge. Nevertheless, this doctoral dissertation contributed to the existing research in the field of intergroup relations in that it emphasized mental *ingroup* representations as an important factor in ingroup projection and, more generally, in intergroup evaluations.

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Summary

This doctoral thesis is concerned with changes in intergroup evaluation processes. In focusing on the ingroup instead of the outgroup it takes a new perspective. The theoretical basis is the Ingroup Projection Model (Mummendey & Wenzel, 2003) with its proposition that people project ingroup features onto a superordinate category (encompassing both ingroup and outgroup) in order to be more prototypical of the superordinate category which leads to a better evaluation of the ingroup relative to the outgroup. Recently it has been proposed that the mode of mental ingroup representations is crucial for projection to occur (Meiser et al., 2005). In particular, it has been suggested that ingroup features are projected to the extent that they are represented in a well defined prototype. Relying on the cognitive perspective, the present research focuses on changes of the ingroup prototype in order to change projection and evaluation processes. This is a rather new approach in efforts to change intergroup evaluations as most approaches focus on the representation of either outgroups or superordinate categories (Gaertner et al., 1989; Garcia-Marques & Mackie, 1999; Mummendey & Wenzel, 1999).

Prototypes serve as tools to simplify the complex environment (Sherman et al., 2000). Prototypes need to be simple and of little variability to fulfill this function. Changing complexity and variability of prototypes should interfere with their function to simplify the complex environment. Thus, changing prototypes should change processes which are based on the use of prototypes. Relying on the proposition that ingroup features are projected to the extent that they are represented prototype-based, complexity and variability manipulations should weaken projection tendencies. In contrast, homogenizing the prototype should strengthen projection tendencies.

A second hypothesis was suggested. It has been suggested that variability information can be represented as an abstract piece of information like any other category information (Judd & Park, 1988). Thus, it is conceivable that variability and complexity information of the ingroup is projected onto the superordinate category like any other ingroup feature. I assumed that the projected variability and complexity information influence the usability of the prototype of the superordinate category (see also Hogg et al., 1993). The extent to which the superordinate category prototype serves as an evaluative standard should specify in how far ingroup prototypicality is the basis of better evaluation of the ingroup relative to the outgroup. This means that variability and complexity of the ingroup determine the extent to which ingroup prototypicality predicts ingroup bias.

One experiment (Experiment 3) supported the first hypothesis in providing evidence that projection tendencies increased after inducing ingroup representations of low variability as opposed to high variability. Converging evidence for the second hypothesis was found in three experiments (Experiment 1, 2 and 4). More specifically, ingroup prototypicality was a strong predictor of ingroup bias when the ingroup was of little complexity and variability. However, the induction of highly complex and variable ingroup representation yielded unexpected results. In particular, more complex ingroup representations did either not differ from a control condition (Experiment 1) or were similar to the low complexity condition (Experiment 2). These interesting results made it necessary to investigate the underlying process that was triggered by complexity and variability manipulations. In line with distinctiveness threat research (Jetten & Spears, 2003), I hypothesized that complexity and variability of the ingroup trigger threat and thereby foster ingroup bias. This hypothesis was explicitly investigated in Experiment 4. In line with the hypothesis, manipulations of ingroup variability led to more perceived threat and threat predicted ingroup bias.

In sum, the results of four experiments clearly support the notion that mental ingroup representations are crucial in ingroup projection and evaluation processes. In line with several other approaches (Brewer & Pierce, 2005; Richeson & Nussbaum, 2004; Roccas & Brewer, 2002; Waldzus 2003, 2005; Wolsko et al., 2000) this thesis emphasizes the potential of diversity and complexity as promising variables for the change of intergroup evaluations. However, the present thesis suggests that one should carefully consider the possibility of threat being triggered when complexity and variability are induced.

Zusammenfassung

Die vorliegende Arbeit befasst sich mit der Veränderung von Bewertungsprozessen im Intergruppenkontext. Dabei stellt die Eigengruppe im Gegensatz zur Fremdgruppe den Schwerpunkt dieser Dissertation dar. Somit wird hier eine neuartige Perspektive der Intergruppenforschung eingenommen. Die theoretische Grundlage bildet das Eigengruppenprojektionsmodell (Mummendey & Wenzel, 1999), welches annimmt, dass Eigengruppen die Merkmale und Charakteristiken der eigenen Gruppe auf eine übergeordnete Kategorie projizieren, der Eigengruppe und Fremdgruppe angehören. Durch diese Projektion der Eigengruppenmerkmale ist die Eigengruppe prototypischer für die übergeordnete Kategorie als die Fremdgruppe. Da der Prototyp der übergeordneten Kategorie als Bewertungsstandard dient, folgt aus der höheren Eigengruppen-Prototypikalität eine bessere Bewertung der Eigengruppe relativ zur Fremdgruppe. Meiser et al. (2005) stellen der eher motivationalen Sichtweise des Eigengruppenprojektionsmodells eine kognitive Sichtweise gegenüber. Der kognitive Ansatz nimmt an, dass Merkmale der Eigengruppe in dem Maße auf die übergeordnete Kategorie projiziert werden in dem sie prototyp-basiert repräsentiert sind. Basierend auf der kognitiven Sichtweise untersucht die vorliegende Arbeit, inwiefern Veränderungen der prototyp-basierten Repräsentation der Eigengruppe zu Veränderungen im Projektions- und Bewertungsprozess führen. Dieser Ansatz hebt sich ab von den meisten Modelle der Intergruppenforschung, die zur Veränderungen von Intergruppen-Bewertungen auf die Repräsentation der Fremdgruppe oder der übergeordneten Kategorie zielen (Gaertner et al., 1989; Garcia-Marques & Mackie, 1999; Mummendey & Wenzel, 1999).

Prototypen erleichtern die Orientierung in einer komplexen Umwelt (Sherman et al., 2000). Um diese Funktion zu erfüllen müssen sie notwendigerweise wenig komplex und variabel sein. Folglich sollten Veränderungen der Komplexität und Variabilität von Prototypen mit deren Funktion interferieren. Unter der Annahme, dass Eigengruppenmerkmale in dem Maße auf eine übergeordnete Kategorie projiziert werden in dem sie prototyp-basiert repräsentiert sind, sollten Veränderungen der prototyp-basierten Eigengruppen-Repräsentation zu Veränderungen im Projektionsprozess führen. Im Einzelnen wird erwartet, dass komplexere und variablere Eigengruppen-Repräsentationen zu weniger Projektion führen wohingegen die homogenisierte und vereinfachte Eigengruppen-Repräsentation zu mehr Projektion führt.

Des Weiteren wurde die Hypothese aufgestellt, dass die Beziehung von Eigengruppen-Prototypikalität und Eigengruppenfavorisierung durch die Repräsentation der Eigengruppe

beeinflusst wird. Judd und Park (1988) nehmen an, dass Informationen bezüglich der Variabilität von Gruppen wie jede andere Information prototyp-basiert repräsentiert sein kann. Folglich ist denkbar, dass Variabilitätsinformation auf die übergeordnete Kategorie projiziert wird. Hier wurde angenommen, dass die projizierte Variabilitätsinformation die Nutzbarkeit des Prototypen der übergeordneten Kategorie verändert (siehe auch Hogg et al., 1993). Das Ausmaß in dem der Prototyp der übergeordneten Kategorie als Bewertungsstandard genutzt werden kann, sollte determinieren inwieweit die wahrgenommene Prototypikalität der Eigengruppe ein Kriterium für die bessere Bewertung der Eigengruppe relativ zur Fremdgruppe ist. Entsprechend der Annahmen sollte die Variabilität und Komplexität der Eigengruppe die Höhe des Zusammenhangs zwischen Eigengruppen-Prototypikalität und Eigengruppenfavorisierung vorhersagen.

Experiment 3 bestätigte die Hypothese, dass Eigengruppen-Prototypikalität eine Funktion der Variabilität der Eigengruppen-Repräsentation ist. Die Ergebnisse zeigen, dass mit einer eingeschränkten Variabilität der Eigengruppe ein Anstieg der wahrgenommenen Eigengruppen-Prototypikalität einhergeht. Die Experimente 1, 2 und 4 hingegen stützen die Hypothese, dass Variabilität und Komplexität der Eigengruppe die Höhe des Zusammenhangs zwischen Eigengruppen-Prototypikalität und Eigengruppenfavorisierung vorhersagen. Zusammengenommen zeigen die Ergebnisse, dass Eigengruppen-Prototypikalität ein guter Prädiktor für Eigengruppenfavorisierung ist, wenn die mentale Repräsentation der Eigengruppe durch geringe Variabilität und Komplexität geprägt ist. Hingegen waren die Ergebnisse bezüglich der Bedingungen mit hoher Variabilität und Komplexität zunächst unerwartet. In Experiment 1 glich die Bedingung hoher Komplexität der Kontrollbedingung, in Experiment 2 zeigen die Bedingungen hoher und niedriger Komplexität ähnliche Ergebnisse. Diese zunächst unerwarteten Ergebnisse machten es notwendig, die durch Komplexitätsmanipulationen ausgelösten Prozesse genauer zu untersuchen. In Übereinstimmung mit der Forschung zu „distinctiveness threat“ (Jetten & Spears, 2003) wurde hier angenommen, dass Komplexität und Variabilität der Eigengruppenrepräsentation die Distinktheit der Eigengruppe bedroht und dadurch die Favorisierung der Eigengruppe fördert. Diese Hypothese wurde explizit in Experiment 4 untersucht. In Übereinstimmung mit der Hypothese führte die Erhöhung der Variabilität der Eigengruppenrepräsentation zu einem größeren Gefühl der Bedrohung. Hypothesenkonform war das Gefühl der Bedrohung ein Prädiktor für Eigengruppenfavorisierung.

Zusammengenommen zeigen die vier Experimente der vorliegenden Dissertation, dass die mentale Repräsentation der Eigengruppe für Projektions- und Bewertungsprozesse im

Intergruppenkontext bedeutsam ist. In Übereinstimmung mit anderen Ansätzen der Intergruppenforschung (Brewer & Pierce, 2005; Richeson & Nussbaum, 2004; Roccas & Brewer, 2002; Waldzus 2003, 2005; Wolsko et al., 2000) konnte hier gezeigt werden, dass Variabilität und Komplexität vielversprechende Variablen bei der Veränderung von Intergruppenbewertungen darstellen. Allerdings konnte ebenfalls gezeigt werden, dass Variabilität und Komplexität die Gefahr bergen, die Distinktheit von Gruppen zu gefährden und somit die Favorisierung der Eigengruppe erneut auszulösen.

Appendix

Personal Need for Structure Scale – original version (Neuberg & Newsom, 1993)

1	It upsets me to go into a situation without knowing what I can expect from it.
2	I'm not bothered by things that interrupt my daily routine (reversed).
3	I enjoy having a clear and structured mode of life.
4	I like to have a place for everything and everything in its place.
5	I enjoy being spontaneous (reversed).
6	I find that a well-ordered life with regular hours makes my life tedious (reversed).
7	I don't like situations that are uncertain.
8	I hate to change my plans at the last minute.
9	I hate to be with people who are unpredictable.
10	I find that a consistent routine enables me to enjoy life more.
11	I enjoy the exhilaration of being in unpredictable situations (reversed).
12	I become uncomfortable when the rules in a situation are unclear.

Personal Need for Structure Scale – German version (Machunsky & Meiser, in press)

1	Es bringt mich aus der Fassung, wenn ich in eine Situation komme ohne zu wissen, was mich zu erwarten hat.
2	Es stört mich nicht, wenn mich Dinge aus meiner täglichen Routine bringen (reversed).
3	Es gefällt mir, wenn ich ein klares und strukturiertes Leben habe.
4	Ich mag es, wenn alles seinen Platz hat und alles an seinem Platz ist.
5	Ich genieße es, spontan zu sein (reversed).
6	Ich finde, dass ein wohlgeordnetes Leben mit regelmäßigen Abläufen langweilig ist (reversed).
7	Ich mag unklare Situationen nicht.
8	Ich hasse es, meine Pläne in der letzten Minute zu ändern.
9	Ich bin ungern mit Leuten zusammen, deren Verhalten nicht vorhersehbar ist.
10	Ich finde, dass eine gewisse Routine es mir ermöglicht, mein Leben mehr zu genießen.
11	Ich genieße die Herausforderung, mich in unvorhersehbaren Situationen zu befinden. (reversed).
12	Ich fühle mich unwohl, wenn die Regeln in einer Situation unklar sind.

Diversity Beliefs Scale in Experiment 2 – English version

1	I believe that work groups with members from different disciplines are very productive.
2	I am sure that creativity of scientific work groups is a question of multidisciplinarity.
3	I would favor working in a workgroup with only scientists of my own subject (reversed).
4	Diversity is an enrichment in all respects.
5	I think that scientific workgroups with very different members have high productivity losses (reversed).
6	I believe that very heterogeneous work groups waste too much time with getting ideas across (reversed).
7	The different scientific disciplines can learn a lot from each other.
8	Only looking at scientific results from different professional perspectives makes sense.

Diversity Beliefs Scale in Experiment 2 – German version

1	Ich glaube, dass Arbeitsgruppen, denen Wissenschaftler aus verschiedenen Fachrichtungen angehören, sehr produktiv sind.
2	Ich bin davon überzeugt, dass Kreativität von wissenschaftlichen Arbeitsgruppen eine Frage von Interdisziplinarität ist.
3	Ich würde es bevorzugen, in einer Arbeitsgruppe zu arbeiten, in der ausschließlich Wissenschaftler meines Fachgebietes arbeiten (reversed).
4	Vielfältigkeit halte ich in jeglicher Hinsicht für eine große Bereicherung.
5	Ich denke, dass wissenschaftliche Arbeitsgruppen mit sehr unterschiedlichen Mitgliedern hohe Produktivitätsverluste haben (reversed).
6	Ich glaube, dass sehr heterogene Arbeitsgruppen einfach zu viel Zeit damit verschwenden, sich den anderen verständlich zu machen (reversed).
7	Die verschiedenen wissenschaftlichen Disziplinen können eine Menge voneinander lernen.
8	Erst unter verschiedenen fachlichen Perspektiven machen wissenschaftliche Erkenntnisse wirklich Sinn.

Distinctiveness Threat Scale in Experiment 4 – English version

1 I am worried that Germany loses its particularities through the European unification.

2 If it was up to me, all countries of Europe should give up their specific features as soon as possible (reversed).

3 I think it is good that Germany and other European countries clearly differ from each other.

4 I am relieved when I see that Germany is keeping its idiosyncrasy despite the European unification.

5 In my opinion, Germany and the other European countries should take common positions inwards as well as outwards, preferably at all times (reversed).

6 I am scared because the European Union withdraws the individual member states' identities.

Distinctiveness Threat Scale in Experiment 4 – German version

1 Ich bin besorgt, dass Deutschland durch den europäischen Einigungsprozess seine Besonderheiten verliert.

2 Wenn es nach mir ginge, sollten alle Länder Europas so schnell wie möglich ihre jeweiligen spezifischen Eigenheiten aufgeben (reversed).

3 Ich finde es gut, dass Deutschland und andere europäische Länder sich deutlich voneinander unterscheiden.

4 Es beruhigt mich, wenn ich sehe, dass Deutschland seine Eigenheiten trotz des europäischen Einigungsprozesses wahrt.

5 Meiner Meinung nach sollten Deutschland und die anderen europäischen Länder nach innen wie nach außen möglichst immer gemeinsame Positionen vertreten (reversed).

6 Es macht mir Angst, dass die europäische Union den einzelnen Mitgliedsstaaten die Identität nimmt.

Curriculum Vitae

Persönliche Angaben

Name:	Maya Julia Alexandra Machunsky
Geburtsdatum:	02.02.1976
Geburtsort:	Stuttgart
Familienstand:	ledig
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Werdegang

1982 - 1983	Odenwaldschule Ernsthofen
1983 - 1986	Gemeinschaftsgrundschule Rheinberg-Millingen
1986 - 1995	Amplonius-Gymnasium Rheinberg
Juni 1995	Abitur
Oktober 1995 – März 2001	Studium der Psychologie an der Justus-Liebig-Universität Giessen
März 2001	Diplom in Psychologie
April 2002 – September 2002	Mitarbeiterin am Zentrum für angewandte Psychologie, Umwelt- und Sozialforschung, Bochum
Seit Oktober 2002	Wissenschaftliche Mitarbeiterin der Nachwuchsgruppe „Mentale Repräsentation sozialer Kategorien“ unter der Leitung von PD Dr. Thorsten Meiser an der Friedrich-Schiller-Universität Jena. Doktorandin an der Fakultät für Sozial- und Verhaltenswissenschaften.

Ehrenwörtliche Erklärung

Ich erkläre hiermit, dass mir die Promotionsordnung der Fakultät für Sozial- und Verhaltenswissenschaften bekannt ist.

Ferner erkläre ich, dass ich die vorliegende Arbeit selbst und ohne unzulässige Hilfe Dritter angefertigt habe. Alle von mir benutzten Hilfsmittel, persönliche Mitteilungen und Quellen sind in der Arbeit angegeben. Bei der Auswahl und Auswertung des folgenden Materials haben mir die nachstehend aufgeführten Personen in der beschriebenen Weise geholfen:

> Stefanie Ganz, Carina Giesen, Rebecca Kosan, Beatrix Mauder, Claudia Pohl, Sebastian Pohlack und Kerstin Weißer haben als studentische Hilfskräfte der Nachwuchsgruppe "Mentale Repräsentation sozialer Kategorien" bei der Durchführung der Experimente sowie der Eingabe der Daten geholfen.

Weitere Personen waren an der inhaltlich-materiellen Erstellung der Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die Hilfe eines Promotionsberaters in Anspruch genommen und Dritte haben weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die Arbeit wurde weder im In- noch im Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt. Weder früher noch gegenwärtig habe ich an einer anderen Hochschule eine Dissertation eingereicht.

Ich versichere, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

Ort, Datum Unterschrift