



UNIVERSITY OF TRENTO
Department of Psychology and Cognitive Science

Doctoral School in Psychological Sciences and Education
XXVI Cycle

**COGNITIVE DETERMINANTS OF INFRA-HUMANIZATION:
THE ROLE OF ILLUSORY CORRELATION
AND ATTENTIONAL PROCESSES**

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Academic Year 2012/2013

*To Ottavio
and to my parents*

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Abstract

People commonly attribute more uniquely human characteristics to their in-group than to out-groups but do not differentially attribute the characteristics that we share with other animals. This process is called out-group de/infra-humanization. Up to now it has been conceptualized mainly as a motivated phenomenon serving many intergroup functions. Research so far has not investigated the possibility that animalistic de/infra-humanization might also have cognitive determinants. My research sought to fill this gap in the literature by suggesting that out-group infra-humanization can be conceived as an illusory correlation that people create between groups which represent (at least in one's own experience) the majority and humanness, which is a quality unique to and shared by all human beings. Recent research on illusory correlation explains this phenomenon in terms of Kruschke's (1996, 2001, 2003) Attention Theory of category learning (AT). AT proposes that, when learning about multiple groups, the features of the majority group are learned earlier than the features of the minority group. Once the features of the majority group are learned, attention is shifted to learn about the minority group. Impressions of the second-learned group form around those features that most clearly differentiate it from the first-learned group. Since the in-group often has a majority status and being uniquely human is a generally shared attribute, this model would suggest that we tend to associate humanness with the in-group. In turn, the association of humanness with the second-learned group (out-group) would be inhibited. Moreover, the out-group is more likely to be associated with the less common comparative attribute (i.e., non-uniquely human), strengthening out-group infra-humanization. Three experiments support this explanation of the infra-humanization effect as a result of associating humanity with the in-group. In Studies 1 and 2, we investigated whether out-group infra-humanization can result from the way people perceive and process information in case of illusory correlation where no real differences exist between the majority and minority groups. In Study 3, we investigated whether group identification modulates the basic illusory correlation effect. Implications for de/infra-humanization, illusory correlation, and stereotype formation are discussed.

Keywords: infra-humanization, cognitive processes, attention, illusory correlation, stereotype formation

Introduction

The denial of humanity is arguably the most dangerous intergroup bias that has played a critical role in many conflicts and crimes such as genocides throughout history. Haslam (2011) noted that, in ideologies spreading before and during harsh conflicts, enemies and victims are compared to vermin or other animals such as dogs, pigs, rats, parasites, or insects. Jahoda (1999) noted that ethnic and racial others have been represented as barbarians who lack culture, self-restraint, moral sensibility, and cognitive capacity both in popular culture and in scholarship. There is evidence that these representations still persist in the American context with Black Americans implicitly associated with apes. To the extent that individuals have this dehumanizing implicit association, they are more likely to support violence against Black Americans (e.g., jury decisions to execute defendants; Goff et al., 2008). Even today, analogous animal metaphors are common in images of immigrants (O'Brien, 2003) or other groups who are seen as threats to the social order. Only a few month ago (January 5, 2013), for instance, Zsolt Bayer, a founding member of Hungary's conservative governing Fidesz party and a close friend of Hungarian Prime Minister Viktor Orbán, wrote a newspaper column in which he compared the country's Roma minority to animals and called for a "final solution to the Gypsy issue." *"Most Gypsies are not suitable for cohabitation. They are not suitable to live among people. These Roma are animals, and they behave like animals. When they meet with resistance, they commit murder. They are incapable of human communication. Inarticulate sounds pour out of their bestial skulls. At the same time, these Gypsies understand how to exploit the 'achievements' of the idiotic Western world. But one must retaliate rather than tolerate. These animals shouldn't be allowed to exist. In no way. That needs to be solved immediately and regardless of the method."* Bayer wrote his article in reaction to a New Year's Eve bar fight in which several people were seriously injured and some of the attackers were reportedly Roma. In the past he referred to Jews "as stinking excrement called something like Cohen" (*Magyar Hirlap*, 5 January 2013).

All these examples raise a series of questions. Why is humanness often denied to other groups, especially minorities? What are the causes of such a phenomenon?

Social psychology research has only recently started to empirically unravel the reason why people are not seen as equally human. The studies presented in the present dissertation aim to contribute to this line of research by investigating for the first time cognitive determinants of out-group infra-humanization (i.e., the tendency to see the out-group as less human than the in-group). In chapter 1, a review of the recent literature on dehumanization/infra-humanization is presented and the main goal of the dissertation is put forward. Specifically, I advanced the idea that out-group infra-humanization can be conceived as an illusory correlation that people create between being member of a majority group (at least in one's own experience) and possessing uniquely human attributes, although these are likely equally shared by all human beings. Chapter 2 focuses thus on illusory correlation and its theoretical accounts, especially on recent work that puts on par this phenomenon with Kruschke's Attention Theory (AT) of category learning (Kruschke, 1996, 2001, 2003). In chapter 3, I will present 2 studies investigating the role of illusory correlation process in the differential appraisal of group humanity. In line with previous studies on this phenomenon, participants learned about human characteristics of members of two novel groups to which they did not belong. In chapter 4, a third study investigating whether motivational mechanisms (i.e., group identification) modulate the effects of illusory correlation on group humanity is presented. Finally, I discuss the implications of this research for de/infra-humanization, illusory correlation, and stereotype formation.

Chapter I

Review of the literature: Out-group Infra-humanization

*“So what of all these titles, names, and races?
They are mere worldly conventions.”*

(Sutta Nipata 648)

While history has well documented the denial of full humanness to others, as well as cruelty and suffering, social psychology has only recently started to unravel the reasons why people are not seen as equally human. Beginning from Infra-humanization theory (Leyens et al., 2000, 2001, 2007), the scope of dehumanization has been extended beyond the context of cruelty and ethnic hatred, describing it as a general, pervasive phenomenon in inter-group relations (that even occurs in a minimal group paradigm) (Miroslawska, 2006; Demoulin et al., 2009). Leyens and colleagues have shown that people commonly attribute more uniquely human characteristics (e.g., secondary emotions) to in-groups than to out-groups, whereas characteristics that we share with other animals (i.e., primary emotions) are not differentially attributed. For instance, considering the relationship between inhabitants of the Spanish peninsula, who represent the dominant group, and Canary Islanders (Leyens et al., 2001), both the dominant and the subordinate group attributed more secondary emotions to the in-group than to the out-group. No difference was found for primary emotions. The authors theorized this effect as evidence of a relative denial of the "humanness" to out-groups.

Infra-humanization theory broadened the original way of thinking about dehumanization in a way that emphasized the relative nature of the difference in humanness between the in-group and the out-group rather than the absolute denial of humanity to out-groups. Leyens and colleagues thus called the phenomenon infra-humanization and insisted on its relative and subtle meaning. In this way, the process of infra-humanization does not imply that out-group members are associated with non-human entities, such as animals, robots, or objects, but rather implies a relative difference between the in-group and the out-group in human terms. In this sense, depending on group comparison, the difference may involve attributing a higher humanity to the in-group, the denial of human characteristics to the out-group, or both. Infra-humanization has

also been shown to be different from more general negative attitudes toward the out-group, as both positive and negative secondary emotions are denied to out-groups (Leyens et al., 2001). Indeed, participants preferred to reserve a “fully human essence” to the in-group, even if it meant attributing negative secondary emotions to their own group. Moreover, it has been shown that groups that are infra-humanized are not necessarily the least liked ones, and, inversely, very liked groups are not necessarily free from being infra-humanized (Cortes et al., 2005; Vaes & Paladino, 2010). For example, Cortes and colleagues found that, when judged by French-speaking Belgians, residents of Paris were less liked than the Flemish-speaking Belgians but were not infra-humanized, while the latter were.

Importantly, Leyens and colleagues (Leyens et al., 2007) argued that people are often not aware of infra-humanizing out-group members. In this respect, many studies have focused on automatic or implicit measures (Boccatto et al., 2007; Gaunt et al., 2002; Paladino et al., 2002). For instance, Paladino and colleagues (Paladino et al., 2002) used the Implicit Association Test and found that people reacted more rapidly when the in-group was associated with secondary emotions and the out-group with primary emotions than the opposite. The classic IAT does not allow the researcher to identify the association that causes the effect. Clarifying this ambiguity, Boccatto and colleagues (Boccatto et al., 2007), in a series of priming experiments, found that people were particularly quick to associate the in-group with secondary emotions compared to the out-group, but no differences were found for primary emotions. Thus, these experiments confirm the central tenet of Infra-humanization theory: people tend to see the out-group as less human than the in-group.

Importantly, Haslam differentiated between two senses of humanness (2006; Haslam et al., 2008)¹. One includes uniquely human characteristics (HU) that differentiate us from animals, such as civility, refinement, moral sensibility, rationality, and maturity, while the other refers to core attributes of human nature (HN) that involve emotionality, warmth, cognitive openness, agency, and depth. The authors distinguish between two forms of dehumanization resulting from the denial of these two senses of humanness. One involves the perception of others as animal-like (*animalistic dehumanization*), denying them uniquely human attributes, while the other

¹ Note that Haslam and colleagues use the term dehumanization in the meaning of term infra-humanization, referring on relative nature of the phenomena.

occurs when we have a mechanized view of others (*mechanistic dehumanization*), denying them human nature traits.

The fact that in several studies group humanity has been operationalized as the extent of the attribution of uniquely human characteristics should not lead us to think that infra-humanization involves only the possession of uniquely human characteristics. Paladino and Vaes (2009) recently showed that the humanity of a characteristic does not depend only on its inherent human qualities, for example secondary emotions, but also on the target, i.e., the in-group or the out-group, to which the characteristic is attributed. Instead of focusing on human characteristics and measuring the difference of their attribution to the in-group and the out-group, in three studies Paladino and Vaes allocated traits and emotions to both groups and measured whether the humanity of these characteristics varied when associated to the in-group or the out-group. Results indicated that the characteristics were judged as more human when thought to be typical of the in-group rather than the out-group. These results pointed out that humanness is an intrinsic part of our category membership that gets generalized to all things that are associated to our in-group.

Analogies for this reasoning can be found in the in-group projection model (Mummendey & Wenzel, 1999; Wenzel et al., 2007), which claims that people tend to perceive the in-group and its characteristics as more prototypical of the superordinate category than the out-group and its characteristics. Assuming that “humanity” (as opposed to “animality”) is a relevant superordinate category, the in-group projection model would predict that in-group, but not out-group, characteristics would be projected into the human category and therefore would be seen as prototypically more uniquely human.

Vaes and Paladino (2010) further investigated this idea in the context of stereotypes. Specifically, they showed that traits included in in-group stereotypes were on average judged more human than traits of out-group stereotypes regardless of the group’s typology according to the Stereotype Content Model (SCM, Fiske et al., 2002, 2007). Specifically, group position in the SCM (i.e., competence and warmth) influenced the human perception of the out-group stereotypes, but not of the in-group stereotypes, which appeared to be invariably human. Early accounts in the domain of Infra-humanization theory claimed that the infra-humanization effect always involved simultaneously the tendency to favor the in-group and to derogate the out-group (Leyens et al., 2007). However, these recent empirical findings allow us to distinguish between

the role of in-group humanization and out-group dehumanization in the infra-humanization effect. The two biases can work together, but they don't have to. In the study reported by Vaes and Paladino, in some intergroup contexts the difference between in-group and out-group humanity was mainly in terms of the humanization of the in-group (i.e., when a Northern Italian in-group was compared with Southern Italians, Brazilians, and Americans); in other contexts, a combination of in-group humanization and the denial of humanity to the out-group caused the effect (i.e., when comparing the in-group with Gypsies, Albanians, Maroccans, Cubans, and Japanese). Such results suggest that people first of all humanize their own group, and whether they also dehumanize the out-group depends on specific socio-psychological variables that operate at any of the structural levels that characterize intergroup relations. Differentiating in-group humanization from out-group dehumanization is important, as specific factors may affect each of these processes. To fully understand the infra-humanization bias, it is important to analyze the two processes separately. In this respect, given that research in the domain of Infra-humanization theory has always emphasized the intergroup nature of the phenomenon (Cortes et al., 2005), Vaes and colleagues (2012) recently reviewed the specific moderators of in-group humanization and out-group dehumanization: namely group boundaries, the specific relations between the groups, and group members' ideologies. According to Vaes, Leyens, Paladino, and Miranda's (2012) recent review, the factors that moderate out-group dehumanization are the followings:

Re-categorization into a superordinate category. The Common In-group Identity Model (Gaertner & Dovidio, 2000) proposes that intergroup bias can be reduced by factors that transform members' perceptions of group boundaries from "us" and "them" to a more inclusive "we", the development of a common in-group identity. Gaunt (2009) applied this model to out-group dehumanization in two correlational studies with Israeli Jews and Israeli Arabs. The identification with the Israeli superordinate category was measured. The results revealed that the more participants identified with a common superordinate category, the more they attributed secondary emotions to the out-group.

In-group glorification and nationalism. Leidner and colleagues (2010) showed that in-group glorification, but not in-group attachment, led people to resist justice for the victims of their in-group's mistreatment. This effect of glorification was mediated by explicit dehumanization of the victim group and minimization of the emotional suffering of the victims'

families, the mechanisms of moral disengagement. Similarly, Viki and Calitri (2008) examined the role of nationalism and patriotism in the attribution of secondary emotions to the in-group and the out-group. Only nationalism was in a significant positive relationship with out-group dehumanization. In contrast, patriotism was negatively related to the differential attribution of secondary emotions to the in-group and the out-group.

Status and competence. For many years, reasoning in the domain of Infra-humanization theory was that status differences between groups did not play a role in the infra-humanization process, as it has been shown that both the dominant and the subordinate groups attribute more secondary emotions to the in-group than to the out-group (e.g., Leyens et al., 2001). Recently, Jones-Lumby and Haslam (2005, as reported in Haslam et al., 2008) have analyzed the relationship between the two senses of humanness proposed by Haslam and the dimensions of stereotype content. The results of their studies showed that human nature ratings were positively related to both warmth and competence, while human uniqueness ratings were positively related to competence, but not to warmth. On the basis of these results, it was expected that it would be high competent/low warm (high-status) out-groups that would be seen as more uniquely human compared to low competent/high warm (low-status) out-groups. Vaes and Paladino (2010) verified this hypothesis and revealed that overall the competent, high-status out-groups were seen as more human than the low-status, less competent out-groups. Moreover, Miranda and colleagues (2010a) used Gypsies and Blacks in Portugal as participants who judged the high-status White Portuguese out-group and showed that truly low-status disliked and marginalized groups do not infra-humanize the dominant group. One possible variable that can explain this last result can be the sense of lack of power.

Power over the out-group's outcomes. To test the importance of power, Miranda and colleagues (2010b), examined if the low-status and powerless groups infra-humanize the dominant out-group. Psychology (low-status group) and medical (high-status group) students were confronted. Participants, all psychology students, were allocated to high or low power condition, which was experimentally manipulated. The results suggest that a minimal sense of power is necessary for out-group infra-humanization to occur among low-status groups when confronted with high-status out-groups, as only participants in the high power condition infra-humanized the out-group.

Conservative ideology. DeLuca-McLean and Castano (2009) tested whether liberal and conservative Caucasian participants attributed uniquely human emotions differently to in-group (Caucasian) and out-group (Hispanic) victims of a natural disaster. Results showed that, whereas liberal participants did not attribute uniquely human emotions differently to the two targets, conservatives assigned significantly less uniquely human emotions to the Hispanic (vs. Caucasian) targets. No difference was found for the attribution of non-uniquely human (primary) emotions.

Since most research has aimed to explain the motivation behind the denial of humanness to out-groups, less is known about the underlying motivation to humanize the in-group. According to Vaes, Leyens, Paladino, and Miranda's (2012) review, what follows are brief descriptions of some known moderators.

To be motivated to humanize the in-group, people need to be categorized into and to identify with meaningful groups (Demoulin et al., 2009; Paladino et al., 2004). In a study reported by Demoulin and colleagues (2009), participants were either randomly assigned to a group or they chose their group as a function of their preferences for a color or the type of career they wished to pursue. The data showed that infra-humanization bias occurred only when participants belonged to meaningful categories. Moreover, in-group identification mediated the effect of the categorization criteria on out-group infra-humanization. Thus, it was concluded that, for infra-humanization to occur, the meaningful categorization is needed.

Existential concerns. Terror management theory (TMT; Greenberg et al., 1997) has been proposed to answer the question of why the human category is so important in shaping one's social identity (Goldenberg et al., 2009; Vaes et al., 2010). The basic concept of TMT is driven from the work of the cultural anthropologist Ernest Becker (1973), and it states that the combination of the basic animal instinct to survive and the awareness of the inevitability of death causes an existential terror. Humans are motivated to suppress the potential for such terror by investing in cultural belief systems (or worldviews) that inspire life with meaning and value and thus give people a subjective feeling of safety and death transcendence. In this respect, Castano and colleagues (2002) showed the critical role of the in-group for terror management, and Goldenberg and colleagues (2000) showed that, in order to minimize this existential terror, people deny their similarity to animals and engage in strategies that allow them to affirm the uniquely human aspects of the self. Recently, Vaes and colleagues (2010) showed, in three

studies, that people humanized their own group more when their mortality was salient. Moreover, in Study 3, humanizing the in-group functioned to reduce the accessibility of death thoughts. Together, all these findings provided support for TMT as an explanatory framework for in-group humanization.

Occupational status. Iatridis (2013) tested the role of occupational status differences in the humanization of the in-group and the out-group. Results from three studies demonstrated that high-status occupational groups (e.g., white-collar workers) infra-humanized low-status out-groups (e.g., blue-collar workers) while the opposite did not happen. Furthermore, in two of these experiments members of a low-status occupational group attributed fewer secondary emotions to the in-group than to a high-status occupational group. All together, these studies showed that occupational status moderates both out-group dehumanization and humanization of the in-group.

Neurobiologically induced cooperation. De Dreu and colleagues (2011) reported an experiment in which participants self-administered oxytocin, a neuropeptide shown to promote trust, empathy, and cooperation among in-group members, or a placebo, and they subsequently performed a task assessing the attribution of uniquely human emotions to the in-group and the out-group. The results showed that oxytocin determined the attribution of human emotion words to the in-group, but not to the out-group targets.

All these variables have been shown to moderate (change the extent) the infra-humanization bias, but the only variable that has been expected to create infra-humanization was meaningful categorization and identification (Demoulin et al., 2009). Indeed, it has been demonstrated that the infra-humanization bias occurs even in a minimal group paradigm as long as the categorization criteria are meaningful (Demoulin et al., 2009). Importantly, the motivation behind the role of categorization and identification with the in-group in out-group infra-humanization was conceptualized in terms of Social Identity Theory (Tajfel, 1982; Tajfel & Turner, 1979, for reviews) and the common agreement in the domain of Infra-humanization theory was that in-group membership necessarily needs to be involved for infra-humanization to occur. Thus, the central role of the in-group in the infra-humanization effect has been generally accepted in the realm of research on infra-humanization.

In this respect, out-group infra-humanization has only been conceptualized as a motivated phenomenon that promotes the relative value of one's in-group. Social Identity Theory states that individuals define themselves in terms of their group memberships and seek to maintain a positive identity through association with positively valued groups and through comparisons with other groups. In intergroup settings, individuals adopt comparison strategies that enhance differences between groups in ways that favor the in-group in order to maintain positive social identity. Consequently, the desire for a positive (more human) social identity was believed to drive the attribution of lesser humanness to out-groups and the infra-humanization effect was considered to be a form of evaluation or attitude. Thus, on the basis of Infra-humanization theory, in-groups were expected to have a more human social identity than out-groups.

The role of both cognitive and motivational processes in the formation and maintenance of intergroup bias and stereotyping has received a great deal of attention in social psychological research (Hamilton & Trolie, 1986). The possibility that the intergroup attribution of humanity may have both motivational and cognitive determinants and thus might be form of stereotyping, based on the way people perceive and process information, has been largely unexplored. In the present dissertation, I aimed to explore this novel possibility. In doing so, I focused on minimal instances of infra-humanization that may be based on pure cognitive processes of information processing rather than motivational in nature. One interesting cognitive model for the genesis of stereotypes is the distinctiveness-based illusory correlation, a phenomenon whereby observers perceive an association between distinctive groups and distinctive behaviors when, in fact, no such relationship exists (Hamilton & Gifford, 1976). In the original demonstration of the effect, two groups (Group A and Group B) are described by a series of positive and negative behaviors. There are twice as many members of Group A as Group B, and there are about twice as many positive than negative behaviors. For example, in the original experiment, members of Group A performed 18 positive and 8 negative behaviors, whereas members of Group B performed 9 positive and 4 negative behaviors. Thus, Group B and negative behaviors both are distinct because of their infrequency. Although Group A performs more behaviors than Group B, the ratio of positive to negative behaviors is the same in both groups. Consequently, there is no relationship between group membership and desirability. However, participants perceive Group A to be more favorable than Group B, as is reflected in different dependent measures. First, participants rate Group A more favorably than Group B on trait-rating tasks. Second, participants

often overestimate the numbers of negative versus positive behaviors performed by Group B. Finally, participants misattribute Group A's negative behaviors to Group B. These effects have drawn intense interest because they demonstrate the formation of differential group stereotypes in the absence of real group differences. We argue that intergroup perceptions of humanity might be sensitive to the cognitive process of illusory correlation as there is a direct parallel between illusory correlation and out-group infra-humanization, especially minority out-groups. Even though humanness is a generally shared attribute common to all social groups, people tend to attribute humanness more to the in-group than to out-groups. We propose that this effect/bias might be based on an erroneous perception of the association between groups and attributes. Given that generally people have less contact with and information about out-group than in-group members, in one's own experience the in-group is more likely to be a majority and the out-group a minority group. As such, a generally shared attribute such as humanness might become associated more with the in-group than with the out-group. Indeed, illusory correlation would suggest that the most frequent attribute (i.e., a generally shared attribute such as humanness) would become associated with the more frequent group (i.e., one's in-group), and the less frequent traits that distinguish the out-group from the in-group would preferentially describe the out-group. Thus, illusory correlation may serve as a model of how out-groups are more likely to be viewed as less human than in-groups.

A variety of explanations have been offered for the illusory correlation that are further explained in chapter 2. However, we base our argumentation on an account offered by Kruschke's Attention Theory (AT) of category learning (Kruschke, 1996, 2001, 2003) as we also see a parallel between infra-humanization and the AT account of illusory correlation. AT is a model of stereotype formation, and it claims that, when learning about multiple categories, one category is learned before others, either because it is more frequent or because it is encountered first. The frequent category becomes associated with more common features. Then attention shifts to learn about the infrequent category. The impressions about the second learned category form around features that differentiate this second learned category from the first learned category. Humanity is generally a shared attribute and as such might be associated with the first learned group, usually one's in-group. As a result, the association of humanness with the second learned group, usually an out-group, might be inhibited. Moreover, the out-group might become associated with features that best distinguish this group from the in-group. In the present

contribution we aimed to demonstrate the role of basic cognitive process of illusory correlation in infra-humanization.

But how would this new cognitive approach change our knowledge of the phenomenon? First of all, it would demonstrate that differently from how it has been theorized up to now, group categorization and identification with the in-group are not the necessary and the only sufficient conditions for infra-humanization to occur. Rather, it would show that the infra-humanization bias can be driven by the way people perceive and process information. Thus it would change the way of thinking about infra-humanization as primarily a motivated phenomenon driven by need for positive social identity as explained by Social Identity Theory. It would also confirm the recent thesis of the primacy of in-group humanization (with respect to denial of humanity to the out-group) in the infra-humanization effect, as it would result from the association between humanity and the majority group (in-group). As already brought into focus by Vaes and Paladino (2010), it is important to determine the behavioral consequences. While the infra-humanization effect originated from the humanization of the in-group should be relatively harmless, the one based on denial of humanness to the out-group is likely to lead to negative behavioral consequences for out-group members. Previous research showed that out-group infra-humanization can have several more subtle negative behavioral consequences, using different paradigms and examining different contexts, involving, for example, political credibility (Vaes et al., 2011), helping behavior (Vaes et al., 2003; Carella & Vaes, 2006), or avoidance reactions (Vaes et al., 2003). In all these contexts, a similar pattern of results was reported, such as out-group members expressing secondary emotions raised less positive or more negative behavioral reactions compared to in-group members expressing the same secondary emotions. No difference was found when primary emotions were involved. Other research has shown that it can be used to justify acts of violence toward out-group members (e.g., Goff et al., 2008; Struch & Schwartz, 1989). However, all these consequences have been explained in terms of differences in perceptions of humanity between groups, without taking into account the differences between humanization of the in-group and denial of humanity to the out-group. It is important to look at these outcomes in terms of the in-group or out-group humanity that is driving the effects. Thus, research on infra-humanization might start to see the phenomenon as a result of basic cognitive differentiation between social categories and not only and primarily as a motivated phenomenon that implies negative behavioral consequences for out-group members.

Since stereotypes are often the cognitive basis for prejudice and together with the latter lead to discrimination, it is important to study how to eliminate this cognitive bias. This might open a new line of research on moderators of such a cognitive bias and on interventions/variables that can attenuate it. Besides research on known moderators that operate in intergroup relations, research could start to think about cognitive interventions that weaken stereotypes and thus might also reduce the infra-humanization bias, such as, for example, engagement in attribute-driven processing instead of category-driven processing (Fiske et al., 1987).

To sum up, until now the infra-humanization bias was always analyzed in intergroup situations. Differently, we propose that the same infra-humanization effect can be obtained without the need for in-group and out-group to be even involved. Our approach suggests that such an effect depends on information processing, i.e., on how people perceive and process information. We based our reasoning on the fact that often the out-group is the minority (i.e., less frequent) group (at least in one's own experience), and AT explains that we first learn about the majority (i.e., more frequent group and the in-group) associating it with the most frequent attribute (such as humanness) and only then do we learn about the out-group, associating it with features that best distinguish this second group from the first one. Importantly, this new cognitive approach of infra-humanization would change our knowledge of the phenomenon in a substantial way, as it would reveal different minimal conditions for infra-humanization to occur. Moreover, it would open new lines of research on moderators and interventions that can attenuate this cognitive bias.

Chapter II

Review of the literature: Illusory Correlation and Attention Theory

Following the pioneering work by Hamilton and Gifford (1976), illusory correlations have been replicated in numerous studies (see Mullen & Johnson, 1990, for a review), and as already mentioned, different accounts have been proposed for their explanation. What follows are brief descriptions of the main theoretical accounts.

Hamilton and Gifford (1976) explained the illusory correlation effect in terms of the notion that infrequent, and thereby distinctive, information draws attention. The co-occurrence of infrequent events was presumed to attract particular attention and to lead to enhanced encoding. Because minority group (Group B) members and negative behaviors are both numerically distinct, the combination of Group B members performing negative behaviors will be particularly salient. The increased attention given to these paired distinctive events results in the observed judgmental biases (i.e., creates the misperception that Group B is, in fact, less positive than Group A).

In contrast, Rothbart (1981) argued that, because the positive behaviors performed by members of the majority group (Group A) are the most common ones, they would be the most accessible in memory, resulting in more favorable judgments of Group A than Group B. In this case, it is the positivity of Group A rather than the negativity of Group B that drives the effect.

Smith (1991) explained the illusory correlation using Hintzman's (1986) memory-trace model. According to this account, the illusory correlation is based on the ways that group behaviors are retrieved and aggregated during the judgment process. The key feature of the model is that retrieval and aggregation of group behaviors are sensitive to differences rather than ratios in the numbers of positive and negative behaviors describing each group. According to this argument, Group A is evaluated more favorably than Group B because the difference in the numbers of positive and negative behaviors is greater for Group A ($18 - 8 = 10$) than for Group B ($9 - 4 = 5$).

Fiedler (1991) proposed an information loss account of illusory correlations based on the observation that distortion and forgetting processes may take place at various stages of memory-based impression formation. Participants do not perfectly encode the ratios of positive to

negative behaviors in Groups A and B. As a result, when judging the favorability of the groups, estimates of the prevalence of positive and negative behaviors regress to the mean of all behaviors within each group (i.e., the average of the numbers of positive and negative behaviors). This leads to an overestimation of negative behaviors and an underestimation of positive behaviors. However, because Group B is smaller than Group A, the true ratio of positive to negative behaviors is learned less well in Group B than Group A. Consequently, there is more extensive regression to the mean in judgments of Group B than Group A, leading to a greater underestimation of the ratio of positive to negative behaviors for Group B. In sum, illusory correlation results from greater extraction of information about Group A than Group B, leading to greater regression to the mean in perceptions of the positivity/negativity of Group B.

Finally, McGarty and his colleagues (e.g., McGarty, Haslam, Turner, & Oakes, 1993; for a review, see McGarty & De la Haye, 1997) argued that the illusory correlation is not, in fact, illusory. They reasoned that the greater difference in the numbers of positive versus negative behaviors for Group A ($18 - 8 = 10$) than for Group B ($9 - 4 = 5$) constitutes a real group difference, i.e., that Group A is objectively more favorable than Group B. They further suggested that participants are motivated to differentiate the two groups and therefore seek to amplify this real group difference via category accentuation processes, such as biased perceptions of group behaviors (e.g., Berndsen, Van der Pligt, Spears, & Mc-Garty, 1996) and other confirmatory hypothesis-testing strategies (e.g., Berndsen, McGarty, Van der Pligt, & Spears, 2001). Thus, in this view, the illusory correlation is a special case of the broader phenomenon of category accentuation explored by Tajfel and others.

Recently, a new interesting explanation of illusory correlation has been proposed called the Attention Theory model of category learning (AT; Kruschke, 1996, 2001, 2003). AT was developed, in part, to account for the *inverse base-rate effect* in human learning that was originally demonstrated by Medin and Edelson (1988). In the original experiment, participants were presented with a task in which they were asked to diagnose different diseases from patterns of symptoms. On each trial of the learning sequence, a list of symptoms was presented, and participants were asked to diagnose the hypothetical patient as having one of several possible fictitious diseases. After each trial, participants were told the correct diagnosis. The basic design involved a pair of diseases, designated C (for common) and R (for rare), which occurred in random order with base rates of a 3:1 ratio. During the training phase, every instance of disease

C had two symptoms, labeled I and PC, and every instance of disease R had two symptoms, labeled I and PR. Symptom I occurred on all trials, that is it was a predictor of the two diseases and thus an imperfect predictor. Symptom PC was a perfect predictor of the common disease C, and symptom PR was a perfect predictor of the rare disease R. The perfect predictor of each disease was present on all the trials referring to its distinctive disease and never present with the other disease. In the original design, there were three pairs of diseases with this structure with a total of nine possible symptoms. After training, participants were tested with combinations of symptoms not shown during training phase. When presented with the ambiguous symptom I alone, people tended to choose the common disease, consistent with the base rates (during training, I appeared with C three times as often as it appeared with R). When tested with the ambiguous combination I + PC + PR, people again tended to choose the common disease, even though to a lesser extent. However, when presented with the conflicting symptoms PC + PR, participants tended to choose the rare disease, contrary (or inverse) to the base rates. AT explains the results as follows: During training, people first learn that symptoms I and PC are typical of disease C because that case occurs very often. They also learn that disease C occurs much more frequently than disease R. Subsequently, they learn the rare disease. They note that the shared symptom I is misleading and does not help to learn about disease R, as they already associated it with disease C. As a result, attention shifts away from I and is focused on the distinctive symptom of R, PR. The purpose of this is to preserve and protect previous learning and to accelerate new learning. When tested with PC + PR, people choose disease R because the symptom list contains the key distinctive symptom of disease R but only one of the two typical symptoms of disease C. Even though participants learned that disease R is rare and unlikely, the distinctiveness of PR is so strong that there is a tendency to choose R anyway. When tested with symptoms I + PC + PR, people show a preference for disease C because two of the three symptoms are typical of that disease. However, this preference may be muted because the numerical advantage of symptoms for disease C is offset by the strength of the relationship between PR and disease R. Importantly, if people learn the symmetry, then cue I should not be differentially predictive of the two diseases, and cues PC and PR should be equally predictive of their respective diseases. The results showed that people's knowledge is asymmetric, as symptom I was more strongly associated with common disease than with rare disease, but

symptom PR was more strongly associated with rare disease than symptom PC was associated with common disease.

AT (Kruschke, 1996) explains another related learning phenomena called the *apparent base-rate neglect* originally observed by Gluck and Bower (1988). The effect was demonstrated to be an attenuated case of the inverse base-rate effect and was explained in the same way (Kruschke, 1996). In both situations, one of the symptoms is encoded as distinctive of the rare disease. The only difference is in magnitude of the effect. In the inverse base-rate effect, the distinctive symptom occurs for every instance of the rare disease and for no instance of the common disease. In apparent base-rate neglect, the “distinctive” symptom is only partially distinctive, as it occurs with equal probability for both diseases. The most important result was that, when presented with this “distinctive” symptom alone, people tended to choose the rare disease significantly more often than 50%. This effect has been called *apparent base-rate neglect*, as it reflects participants’ underestimating of the extremeness of the base rates. According to AT, the effect is explained as follows: Participants learn the typical features of the common disease more quickly compare to the typical features of the rare disease because the common disease is encountered more frequently. They learn that one of the symptoms is very typical, the other two symptoms are sufficiently typical, and one symptom is only slightly typical of common disease. Participants then learn about the distinctive features of the rare disease. The most distinctive feature is a symptom that occurs frequently in cases of that disease (other three symptoms occur with greater proportion in the common diseases than in the rare disease) and has not been encoded as a very typical symptom of the common disease. When people are tested with that single symptom, they tend to respond that it is a case of the rare disease because they have encoded it as the distinctive symptom of that disease, despite the fact that they are also influenced by base-rate bias to choose the common disease.

The AT posits covert attentional mechanisms as critical in category learning. Specifically, as category representations develop, the increased attention is directed at exemplars that accentuate perceived differences between categories and similarities within categories. Indeed, Kruschke and colleagues (2005) gave independent evidence that selective attention to cues is involved by monitoring eye gaze. The participants gazed longer at cues she or he had learned to attend to than at cues she or he had learned to ignore (attention shifted toward features

of exemplars that accentuated between-category differences and within-category similarities) and these changes in gaze time (shifts in attention) predicted categorization judgments.

AT does not require the differences between categories to be real. Two categories may be described identically but still produce differentiated representations as long as one category is learned before the other. Indeed, any factor that causes one category to be learned prior to another (e.g., frequency of exposure, group size, sequence of exposure) will lead to attentional accentuation and to different and accentuated impressions of the categories (e.g., group stereotypes). The first category will be associated with its most common attributes, and driven by attentional accentuation, impressions of the second category will form around those features that most clearly differentiate it from the first category. These same processes may also produce the distinctiveness based illusory correlation. According to AT, because Group A is larger than Group B, people learn about Group A first. Because positive behaviors are more frequent than negative behaviors, the impression formed of Group A is a positive one. Subsequently, in forming impressions of Group B, it must be the negative behaviors (the only remaining behaviors) that distinguish it from Group A, and they receive particularly close attention. Thus, to distinguish Group B from Group A, perceivers focus attention on Group B's negative behaviors because of their contextual distinctiveness. The greater attention given to the distinctive negative Group B behaviors creates the misperception that Group B is, in fact, less favorable than Group A. Importantly, according to the explanation of AT, Group A is more strongly associated with positive attributes than Group B, and Group B is more strongly associated with negative attributes than Group A, thereby producing the typical illusory correlation findings.

However, it is not possible to provide a clear test of the AT account in the standard illusory correlation paradigm because there are not two distinct dimensions. Rather, the group descriptions differ in terms of a single global evaluative dimension (positive–negative). The standard illusory correlation results show that Group A is judged more favorably along this evaluative dimension than is Group B but cannot show that Groups A and B are associated differentially with different dimensions. That is, it is impossible to identify independent positive and negative impressions of the two groups. Thus, one cannot distinguish whether Group A is more positive than Group B, Group A is less negative than Group B, or Group A is both more positive and less negative than Group B. Because drawing these distinctions is critical for testing

an AT account of the effect, Sherman et al. (2009) used a modified version of the standard illusory correlation paradigm. The common and rare attributes of the majority and minority groups were independent trait dimensions. Thus, for example, for half of the participants, Group A consisted of 16 intelligent and 8 friendly members, whereas Group B consisted of 8 intelligent and 4 friendly members. This design maintained the essential features of the illusory correlation paradigm: The majority group was twice the size of the minority group, one trait was more frequent than the other, and the ratios of the two traits were identical both between and within the two groups. However, in this case, it was possible to examine differences in perceptions of the two groups independently for the common and rare trait attributes. Results of Sherman et al. demonstrated that AT processes can account for the formation of illusory correlations. Though there was no real difference in the extent to which different traits described the groups, the features of one group were learned prior to the features of the other group because of their different base rates. This was sufficient to produce the AT attention-shifting process. Sherman et al. showed that, whereas the minority group was perceived as possessing the rare descriptor to a greater degree, the majority group was perceived as possessing the common descriptor to a greater degree. Thus, it was not simply the case that one group possessed a key dimension to a greater or lesser extent than the other group. Rather, independent stereotypes were developed for each group. Moreover, attention was directed differentially toward group–dimension pairings that reinforced these distinct group impressions. These findings suggest that attributes that occur with high frequency in both majority and minority groups are unlikely to become associated with minority groups regardless of how prevalent the attributes may be among those groups. The more general point is that the features that are deemed typical of known groups will constrain the types of impressions we may form of unknown groups. Once a trait is taken by one group, the association of the trait with other groups may be inhibited. According to AT, the features of majority groups are learned earlier than the features of minority groups. In turn, the features that become associated with the minority are those that most distinguish it from the majority. Importantly, because of the additional attention paid to the distinctive features of the minority group in order to differentiate it from the majority, the association between the minority group and the infrequent attributes is predicted to be stronger than the association between the majority group and the frequent attributes, which results in stronger stereotypes for minority group members.

Chapter III

Study 1 and Study 2

Overview and predictions

In the present research, we investigated the possibility of cognitive determinants of infra-humanization. Specifically, we advanced the idea that out-group infra-humanization can be conceived as an illusory correlation that people create between being member of a majority group (at least in one's own experience) and possessing uniquely human attributes, although these are equally shared by all human beings. To establish the role of illusory correlation and Kruschke's Attention Theory (AT) of category learning (Kruschke, 1996, 2001, 2003) in the differential appraisal of group humanity, two studies were conducted. In both studies, participants learned about members of two novel groups to which they did not belong. The two groups were either described by 2/3 uniquely human characteristics (personality traits and emotions) and 1/3 non-uniquely human characteristics (i.e., shared with animals or animal-like personality traits and emotions) or 2/3 non-uniquely human and 1/3 uniquely human characteristics.

In line with previous studies on illusory correlation, the assignment of uniquely human (and consequentially of non-uniquely human) characteristics to common and rare status was counterbalanced between subjects. For half of the participants, humanity was the common and animality was the rare attribute (Condition: Humanity as the common quality); for the rest of the participants it was the other way around (Condition: Animality as the common quality). Specifically, when humanity was the common quality, out of twenty four members of the majority group sixteen were described by uniquely human characteristics and eight were described by animal-like characteristics. Out of twelve members of the minority group, eight were described by uniquely human characteristics and four were described by animal-like characteristics. When animality was the common quality, out of twenty four members of the majority group sixteen were described by animal-like characteristics and eight were described by uniquely human characteristics. Out of twelve members of the minority group, eight were described by animal-like characteristics and four were described by uniquely human

characteristics. The ratio of the two characteristics was identical both between and within the two groups. Thus the groups did not differ from each other except for members numerosity. Indeed one group (i.e., the majority) was twice as large as the other (i.e., the minority).

Following illusory correlation and its recent account (AT), the majority group would be learned first and become associated with the more frequent and common characteristics, whereas the rare characteristics would be associated with the minority group. Thus, we expected that ratings of majority and minority groups in terms of their attributes would depend on whether uniquely human characteristics were frequent and common or infrequent and rare qualities (Hp1). When uniquely human characteristics were the common qualities (and animal-like characteristics were the rare ones), we predicted that these characteristics would be associated more with the majority (vs. minority) group (Hp1a). On the other hand, when uniquely human characteristics were the rare qualities (and animal-like characteristics were the common qualities), we expected that these characteristics would be associated more with the minority (vs. majority) group (Hp1b).

To further establish the contribution of cognitive process of illusory correlation in the infra-humanization effect, we also investigated whether this differential perception of groups in terms of uniquely human and non-uniquely human (i.e., animal-like) characteristics would spillover and affect the general perception of the groups' humanity. In this regard, we expected that group (majority vs. minority) humanity would depend on whether the uniquely human characteristics were the common or the rare qualities (Hp2). Specifically, we predicted that the majority (vs. minority) group would be judged as more uniquely human (i.e., more human and less animal-like) when uniquely human characteristics were the common qualities (Hp2a), whereas, when uniquely human characteristics were the rare qualities, it would be the minority that would be seen as more uniquely human (Hp2b).

Furthermore, we expected that this illusory correlation effect would be reflected in the categorization of novel group members (Hp3). Given the expected association between the majority group and the common characteristics, and between the minority and the rare characteristics, we expected that individuals described by the common characteristics would be more likely to be assigned to the majority group (Hp3a), and at the same time individuals showing the rare characteristics would be more likely assigned to the minority group (Hp3b).

According to the AT explanation of the illusory correlation claiming that the strength of association between the minority group and the rare quality is stronger than the strength of association between the majority group and the common quality, we expected that individuals described by both a common and a rare attribute would be more likely to be assigned to the minority than to the majority group (i.e., inverse base-rate effect) or to be assigned to the majority group to the lesser extent compared to the base-rate (i.e., base-rate neglect effect).

To more directly test the attentional mechanism as the cognitive process underlying illusory correlation, in Study 2 a probe reaction time task during the impression formation task was introduced to monitor the attention paid to members of each group and their traits and emotions. Our prediction was that, when reading about members of the majority group, targets possessing the common characteristic (uniquely human or animal-like) would be attended to more carefully (seen in reaction time) (Hp4a), while when reading about members of the minority group, targets possessing the rare characteristic (animal-like or uniquely human) would be attended to more carefully (Hp4b).

Taken together, this pattern of predictions would provide the first empirical support to the idea that group humanity perception is based on an illusory correlation and thus has cognitive determinants.

Study 1

Method

Participants. For their participation, 78 (59 female and 19 male, M age=18.96 years, SD =1.294) students at Indiana University Bloomington were given one course credit. Participants were run in sessions of 1-5 people.

Materials. Two uniquely human characteristics, rational and guilty, and two non-uniquely human (i.e., shared with animals or animal-like) characteristics, instinctive and angry, were used in the impression formation task. These were chosen on the basis of the pre-test in which students ($N = 22$) rated a series of characteristics on humanity (1=not at all uniquely human, 7=completely uniquely human) and valence (1=not at all positive, 4=neutral, 7=completely positive). A 2

(traits' humanity rating vs. emotions' humanity rating) X 2 (uniquely human qualities vs. animal-like qualities) ANOVA with repeated measures on both factors on humanity ratings revealed a significant main effect of uniquely human qualities vs. animal-like qualities factor, $F(1, 21) = 66.528, p < .001, \eta^2 = .760$. This shows that the uniquely human qualities (i.e., the trait rational and the emotion guilt) were rated as more human ($M = 5.36, SD = 1.464$) than the animal-like qualities (i.e., the trait instinctive and the emotion anger) ($M = 2.36, SD = 1.5225$). No other effect was significant. A 2 (traits' likeability rating vs. emotions' likeability rating) X 2 (uniquely human qualities vs. animal-like qualities) ANOVA with repeated measures on both factors on valence ratings was conducted. The analysis revealed two significant main effects, one for traits' likeability rating vs. emotions' likeability rating factor, $F(1, 21) = 171.444, p < .001, \eta^2 = .891$, showing that the traits were rated more positively ($M = 5.5, SD = 1.23$) than the emotions ($M = 2.091, SD = 1.035$), and another main effect of uniquely human qualities vs. animal-like qualities factor, $F(1, 21) = 6.831, p = .016, \eta^2 = .245$, showing that the uniquely human qualities were rated as more positive ($M = 4.000, SD = 1.17$) than the animal-like qualities ($M = 3.591, SD = 1.095$).

Procedure. Participants were told that they would be learning about two groups of people, Group F and Group G, and that their task was to form an impression of each group based on descriptions of group members' typical characteristics. Depending on the experimental condition, these consisted of either uniquely human characteristics (trait and emotion; i.e., Rational and Guilt) or animal-like characteristics (trait and emotion; i.e., Instinctive and Anger). First, participants completed the impression formation task with uniquely human and animal-like traits (i.e., rational and instinctive). This was a modified version of the standard illusory correlation task (see Sherman and colleagues' Study 2 (2009) for a similar paradigm) that presented the basic features of the experimental paradigm generally used in this line of research: The majority group (24 members) was twice as big as the minority group (12 members), and the common characteristic was twice as frequent as the rare characteristic. Moreover, the ratio of the two characteristics was identical both between and within the two groups. This task was followed by a testing phase in which participants categorized some new individuals and answered to a series of questions assessing the perceptions of the groups. Then, participants completed the second impression formation task with secondary/uniquely human and primary/in

common with animals emotions (i.e., guilt and anger) and responded to questions assessing the perception of groups in terms of these emotions. Thus, each impression formation task was followed by a testing phase in which dependent variables were assessed. Instructions, task, and dependent variables were presented on a computer screen via Inquisit 3.0.6.0.

Impression formation task. Twenty four descriptions of members of the majority group and twelve descriptions of members of the minority group were presented for 3,500 ms each. Of the twenty four descriptions of the majority group, sixteen referred to the common and eight to the rare characteristic. Of the twelve descriptions of the minority group, eight referred to the common and four referred to the rare characteristic. Thus, when humanity was the common quality, 2/3 of the members of the majority and 2/3 of the members of the minority group were described by uniquely human characteristics, and 1/3 by animal-like characteristics. When animality was the common quality, 2/3 of the members of the majority and 2/3 of the members of the minority group were described by animal-like characteristics and 1/3 by uniquely human characteristics. In the first part of the impression formation task in which traits were used, all descriptions were as follows “Name (e.g., Dave), a member of Group F (or G), is Rational (or Instinctive)”. In the second part of the impression formation task in which emotions were used, all descriptions were “Name (e.g., Dave), a member of Group F (or G), feels Guilty (or Angry)”.

Group member assignment task. After the first impression formation task, participants completed the group member assignment task, in which they were presented with twelve novel group members whom they had not seen before and were told about their typical traits. Two of the targets were described by the uniquely human trait (i.e., rational), two were described by the animal-like trait (i.e., instinctive), two were described by one of each the uniquely human and the animal-like trait (i.e., rational and instinctive), two were described by the uniquely human trait and a new neutral, neither uniquely human nor animal-like trait (i.e., lazy), two were described by the animal-like trait and the neutral trait, and finally two new people were described by all three traits, i.e., uniquely human, animal-like, and neutral. Participants were asked to guess the group to which each of these new targets belonged. These test items were as follows “Name (e.g., Dave), a member of _____, is (e.g., Rational). Is Dave a member of Group F, or Group G?”. No feedback was provided for these trials. After the second impression formation

task, participants completed the second group member assignment task, in which they were presented with twelve novel group members whom they had not seen before and were told about their typical emotions. In particular, two of these targets were described as feeling guilty, two were described as feeling angry, two were described by one of each the uniquely human and the animal-like emotion (i.e., as feeling guilty and angry), two were described by the uniquely human emotion and one new neutral, neither uniquely human nor animal-like emotion (i.e., sadness), two were described by the animal-like and the neutral emotion, and finally two new people were described as feeling all three emotions, i.e., guilt, anger, and sadness. Participants were again asked to guess the group to which each target belonged. These test items had the form "Name (e.g., Bill), a member of _____, feels (e.g., Guilty and Sad). Is Bill a member of Group F, or Group G?" Again, no feedback was provided for these trials. The percentage of assignment of common, rare, or mixed (i.e., both common and rare) quality targets (from the two impression formation tasks) to the majority group served as the dependent measure.

Group humanity: Traits and emotions ratings. After the first group member assignment task (with traits), participants completed a trait-rating task, in which they rated each group on rationality and instinctiveness on scales ranging from 1 (*not at all*) to 9 (*very much*). After the second group member assignment task (with emotions), participants completed an emotion-rating task, in which they were asked to rate the two groups in terms of guilt and anger on scales ranging from 1 (*not at all*) to 9 (*very much*).

Group humanity and likeability: General judgment. After both impression formation tasks, group member assignment tasks and traits and emotions rating tasks, participants answered explicit questions assessing groups' humanity (e.g., How human are the traits and emotions of Group F?, How animal-like are the traits and emotions of Group F? reversed score), and likeability (e.g., How likeable is Group F?). The answers were registered on scales ranging from 1 (*not at all*) to 9 (*very much*).

Finally, participants answered demographic questions on gender, age, nationality, and native language, and then were debriefed and thanked for their participation.

[See instructions and stimuli for all the measures in the Appendix section.]

Results

Group member assignment task. The scores for assignments (percentage) of uniquely human (i.e., 2 rational and 2 guilty), uniquely human and neutral (i.e., 2 rational and lazy; and 2 guilty and sad), animal-like (i.e., 2 instinctive and 2 angry), animal-like and neutral (i.e., 2 instinctive and lazy; and 2 angry and sad), uniquely human and animal-like (i.e., 2 rational and instinctive; and 2 guilty and angry), and uniquely human, animal-like, and neutral (i.e., 2 rational, instinctive, and lazy; and 2 guilty, angry, and sad) novel group members to the majority group were calculated for each participant. The score for each type of novel group members was submitted to a one-way ANOVA (humanity as the common quality vs. animality as the common quality). As far as uniquely human quality members are concerned, the ANOVA yielded a significant effect, $F(1, 76) = 19.77, p < .001$. When the individual was described as possessing only uniquely human characteristics, participants in the humanity common quality condition tended to choose the majority group (62%), whereas participants in the animality common quality condition tended to choose the minority group (31% of assignments to the majority group). When presented with animal-like quality members, in the humanity common quality condition participants tended to choose the minority group (48% of assignments to the majority group) in contrast with the animality common quality condition in which participants chose the majority group (69%), which led to a significant effect, $F(1, 76) = 9.32, p = .003$. Thus participants categorized individuals with common characteristics more as members of the majority group and categorized individuals with rare characteristics more as members of the minority group, even though there were twice as many majority group members as minority group members described by the rare quality. Results thus provided strong support for an illusory correlation effect (see Table 1).

As expected, the ANOVA for targets possessing one of each, the common and the rare, quality did not yield a significant effect, $F(1, 76) = .056, p = .814$. However, different from what was expected, these targets were more likely assigned to the majority group than to the minority group, both when humanity (61%) and when animality (59%) was the common quality. This pattern of data (percentages of assignment of mixed quality members to the majority group) is

however suggestive of a base-rate neglect effect. Indeed, participants tended to categorize the mixed (i.e., both common and rare) quality individuals to the majority group to a lesser extent than expected by the base rate, for the animality common quality condition 59% vs. 67%, $t(37) = -1.925$, $p = .03$, one-tailed, and for the humanity common quality condition, 61% vs. 67%, $t(39) = -1.457$, $p = .08$, one-tailed. A base-rate neglect effect emerged also for the assignment of mixed quality individuals described by all three characteristics (i.e., a uniquely human, an animal-like, and a neutral trait and emotion). The ANOVA was again, as expected, not significant, $F(1, 76) = .363$, $p = .549$. However, participants assigned individuals with all three qualities more to the majority group than to the minority group both when humanity was the common quality (57%) and when animality (53%) was the common quality. Again, participants tended to neglect the base rate, as these percentages were different from the base rate both when humanity, $t(39) = -2.177$, $p = .02$, one-tailed, and when animality, $t(37) = -2.703$, $p = .005$, one-tailed, was the common quality. In line with the predictions, the ANOVA for targets possessing a uniquely human and a neutral quality yielded a significant effect, $F(1, 76) = 9.255$, $p = .003$. Participants in the humanity common quality condition tended to choose the majority group (59%), whereas participants in the animality common quality condition tended to choose the minority group (38% of assignments to the majority group). Finally, for targets described by an animal-like and a neutral quality, as expected, the ANOVA yielded a significant effect, $F(1, 76) = 7.641$, $p = .007$. Participants in the humanity common quality condition tended to choose the minority group (45% of assignments to the majority group), whereas participants in the animality common quality condition tended to choose the majority group (64%).

Group Attributes	Percentage of assignments to the majority group		
	Humanity Common	Animality Common	<i>p</i>
Uniquely human	62%	31%	(< .001)
Uniquely human + Neutral	59%	38%	(.003)
Animal-like	48%	69%	(.003)
Animal-like + Neutral	45%	64%	(.007)
Uniquely human + Animal-like	61%*	59%*	(.814)
Uniquely human + Animal-like + Neutral	57%*	53%*	(.549)

Table 1. Results from Group member assignment task. Note. * = base-rate neglect effect.

Group humanity: Traits and emotions ratings. We expected that the majority group would be rated higher than the minority group on the common quality, whichever it was (uniquely human or animal-like), whereas the minority group would be rated higher than the majority group on the rare quality. A score (average) for each group was created for the ratings on the uniquely human trait (rational) and emotion (guilt) ($r = .335, p = .001$, one-tailed for Group F; $r = .182, p = .055$, one-tailed for Group G). These scores were submitted to a 2 (uniquely human qualities rating of the majority group vs. uniquely human qualities rating of the minority group) X 2 (humanity vs. animality as the common quality) analysis of variance (ANOVA) with repeated measures on the first factor. As predicted, the analysis revealed a significant interaction, $F(1, 76) = 12.17, p = .001, \eta^2 = .138$ (see Figure 1). When humanity was the common quality, the majority group was seen as possessing the uniquely human characteristics to a greater extent ($M = 6.94, SD = 1.70$) than the minority group ($M = 6.11, SD = 1.34$), $F(1, 76) = 5.41, p = .023$. When humanity was the rare quality (i.e., animality was the common quality), the minority group was seen as possessing the uniquely human characteristics to a greater extent ($M = 6.42, SD = 1.61$) than the majority group ($M = 5.47, SD = 1.51$), $F(1, 76) = 6.78, p = .011$. This pattern of results is consistent with an illusory correlation effect.

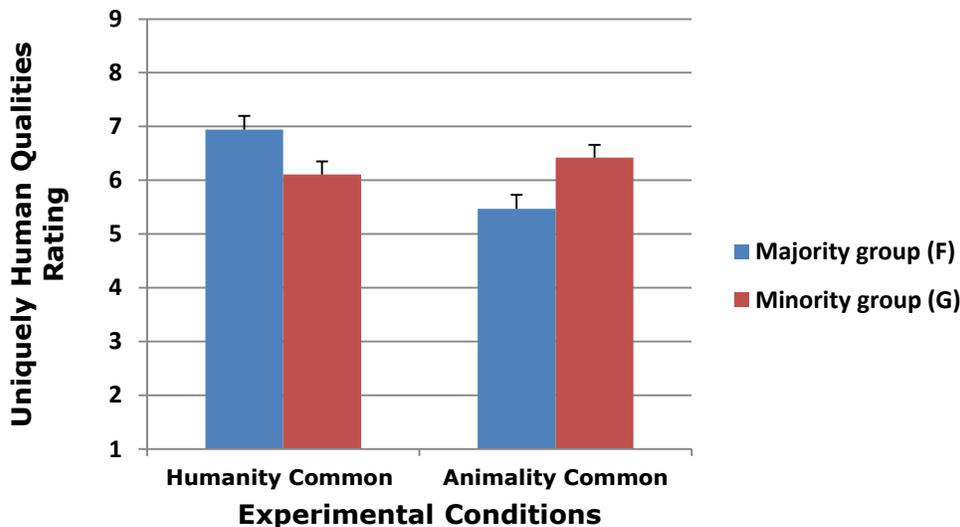


Figure 1. Uniquely human qualities ratings of the majority (F) and minority (G) groups in two experimental conditions.

Another score (average) for each group was created for the ratings on the non-uniquely human (i.e., animal-like) trait (instinctive) and emotion (anger) ($r = .254, p = .012$, one-tailed for Group F; $r = .092, p = .211$, one-tailed for Group G). These scores were entered into a 2 (group status: animal-like qualities rating of the majority group vs. animal-like qualities rating of the minority group) X 2 (quality status: humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. This analysis revealed a main effect for the group status factor, $F(1, 76) = 14.02, p < .001, \eta^2 = .156$, showing that the majority group was described by non-uniquely human (i.e., animal-like) characteristics to a greater extent ($M = 6.64, SD = 1.54$) than the minority group ($M = 5.75, SD = 1.48$). This effect was qualified by the expected interaction $F(1, 76) = 8.39, p = .005, \eta^2 = .099$ (see Figure 2). When animality was the common quality, the majority group was seen as possessing the non-uniquely human (i.e., animal-like) characteristics to a greater extent ($M = 7.22, SD = 1.25$) than the minority group ($M = 5.66, SD = 1.43$), $F(1, 76) = 21.49, p < .001$. When animality was the rare quality (i.e., humanity was the common quality), the majority ($M = 6.05, SD = 1.59$) and the minority group ($M = 5.85, SD = 1.54$) possessed the non-uniquely human (i.e., animal-like) characteristics to the same extent, $F(1, 76) = .369, p = .545$.

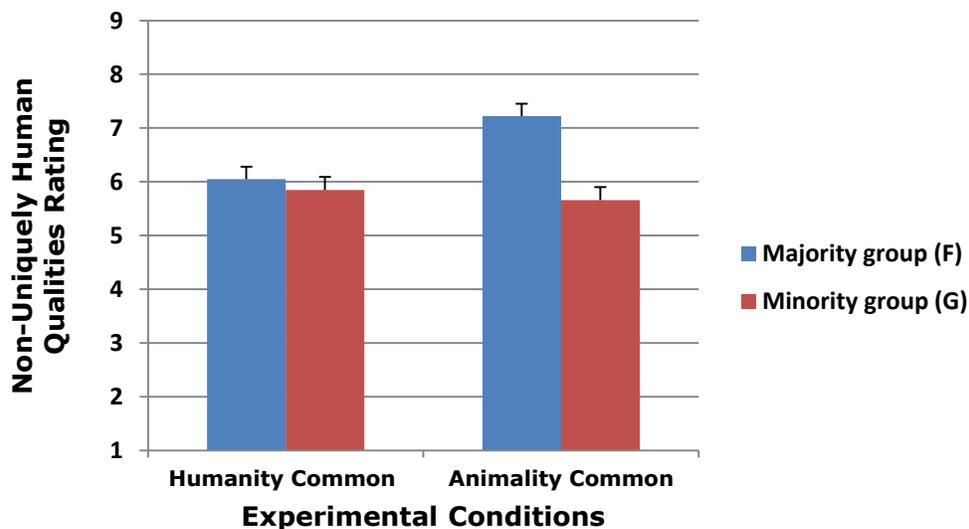


Figure 2. Non-uniquely human (i.e., animal-like) qualities ratings of the majority (F) and minority (G) groups in two experimental conditions.

Group humanity: General judgment. A score (average) for each group was created for humanity and animality (reversed score) ratings ($r = -.277$, $p = .007$, one-tailed, for humanity and animality ratings of Group F; $r = -.164$, $p = .076$, one-tailed, for humanity and animality ratings of Group G). These scores were entered into a 2 (humanity rating of the majority group vs. humanity rating of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor, testing the effect on groups' humanity perceptions. This analysis revealed a marginally significant main effect for majority and minority group ratings, $F(1, 76) = 2.798$, $p = .099$, $\eta^2 = .036$, showing that the minority group was rated as overall more human ($M = 6.08$, $SD = 1.37$) than the majority group ($M = 5.71$, $SD = 1.72$). This effect was qualified by the expected interaction, $F(1, 76) = 5.769$, $p = .019$, $\eta^2 = .071$ (see Figure 3). When humanity was the rare quality (animality was the common quality), the minority group was seen as more human ($M = 6.34$, $SD = 1.40$) than the majority group ($M = 5.43$, $SD = 1.60$), $F(1, 76) = 8.094$, $p = .006$. When humanity was the common quality, the majority group was rated as equally human ($M = 5.99$, $SD = 1.81$) as the minority group ($M = 5.83$, $SD = 1.30$), $F(1, 76) = .273$, $p = .603$. Also, following the predictions, the difference in humanity ratings of the majority group between the two conditions was marginally reliable, $F(1, 76) = 2.039$, $p < .08$, one-tailed, such that the majority group was rated as more human ($M = 5.99$, $SD = 1.81$) when humanity was the common quality compare to when humanity was the rare quality (animality was the common quality) ($M = 5.43$, $SD = 1.60$). Respectively, the minority group was rated as more human ($M = 6.34$, $SD = 1.40$) when humanity was the rare quality (animality was the common quality) compared to when humanity was the common quality ($M = 5.83$, $SD = 1.30$). This difference was reliable, $F(1, 76) = 2.863$, $p < .05$, one-tailed. These results demonstrated the illusory correlation effect for groups' humanity general judgments.

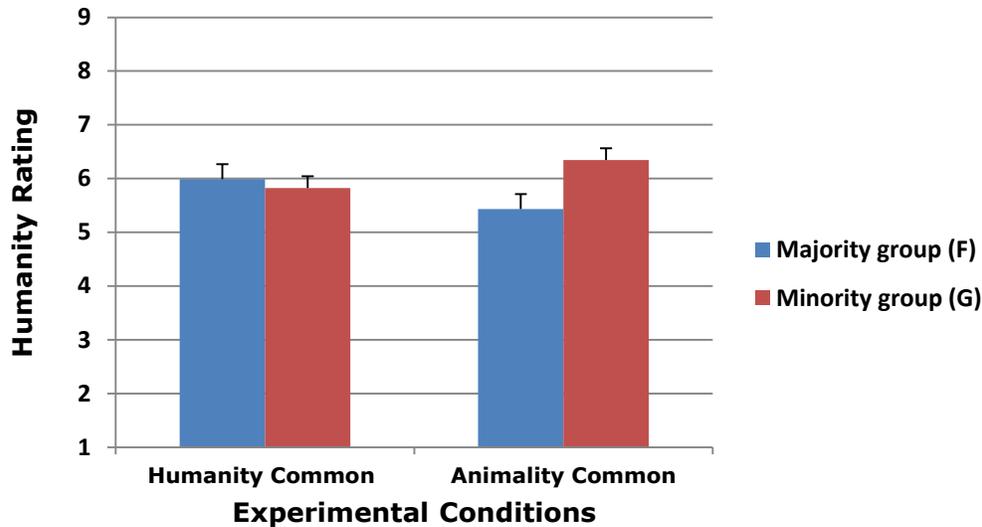


Figure 3. Humanity ratings of the majority (F) and minority (G) groups in two experimental conditions.

Group likeability: General judgment. To test the effect on groups' likeability, a 2 (likeability rating of the majority group vs. likeability rating of the minority group) X 2 (humanity vs. animality as the common quality) analysis of variance (ANOVA) was performed on likeability ratings. The analysis revealed no significant main effects and no interaction, $F(1, 76) = 1.47, p = .229, \eta^2 = .019$ (see Figure 4), showing no difference in the likeability of the two groups.

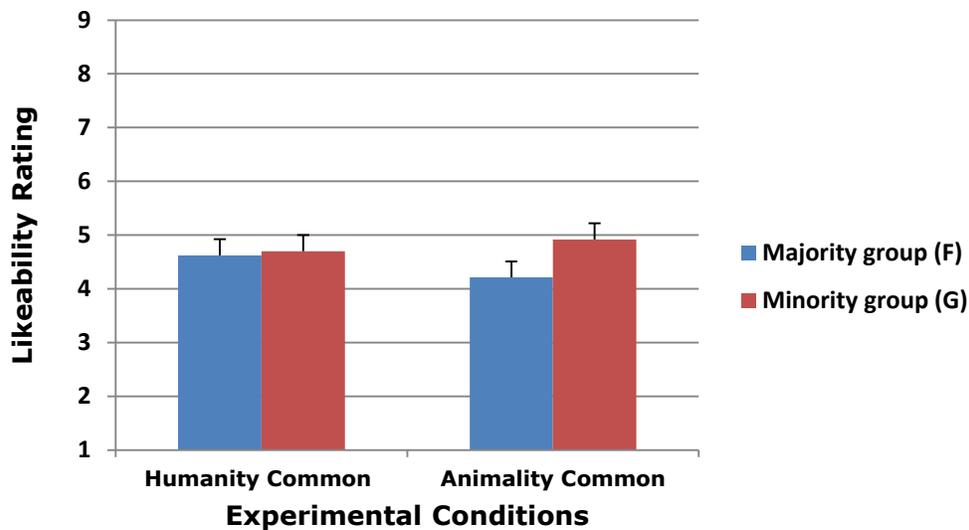


Figure 4. Likeability ratings of the majority (F) and minority (G) groups in two experimental conditions.

Discussion

The results of Study 1 support our prediction that a differential perception of majority and minority group's humanity can be the outcome of an illusory correlation. Although participants received exactly the same mix of information about the members of two novel groups, they tended to associate the common and more frequent quality with the majority rather than with the minority group. This clearly emerged when participants were asked to describe the two groups on uniquely human as well as on non-uniquely human (i.e., animal-like) traits and emotions. However, this tendency did not appear when a general uniquely human impression of the majority group was assessed. When the common characteristics were high in humanity, the majority group was judged equally human as the minority group. In addition to associating the majority group with the common quality, we also predicted an association between the rare quality and the minority group. Our results offer mixed support for this hypothesis. The minority group was described as more rare quality-like when uniquely human impressions were assessed. Indeed the minority group was described as more uniquely human qualities-like, i.e., rational and guilty, as well as in general more uniquely human (more human and less animal-like) when the uniquely human characteristics were the rare qualities. On the other hand, regarding the non-uniquely human (i.e., animal-like) group impressions, the minority group did not differ from the majority on the rare quality. Indeed, the minority group was rated as equally non-uniquely human qualities-like, i.e., instinctive and angry, as the majority group when non-uniquely human characteristics were the rare qualities. This latter result could be attributed to the fact that twice as many members of the majority group compared to the minority group were described by the rare qualities, thus making it difficult to consolidate the association of these characteristics with the minority group. Importantly, for all these findings, the interaction effects demonstrate formation of the illusory correlations. Uniquely human (and animal-like) qualities, as well as humanity in general, differently characterized the two groups depending on the experimental condition. The results on the categorization of novel group members were also consistent with the formation of an illusory correlation. Individuals described by the common quality were assigned more frequently to the majority group, and individuals described by the rare quality were assigned more frequently to the minority group, despite the fact that the majority group was described by the rare quality twice as frequently as the minority group. Moreover, importantly

for the AT explanation of illusory correlation, members showing both the common and rare qualities were assigned to the majority group to a lesser extent than the base-rate of 67%, a result indicative of base-rate neglect. All together the results of Study 1 provide the first demonstration of the role of illusory correlation in the perception of group humanity. Importantly, consistent with recent research on illusory correlation, the AT is the only account that can explain these findings. This issue will be addressed further in the general discussion. Even though in the pre-test the uniquely human and non-uniquely human (i.e., animal-like) characteristics used in the impression formation task differed in terms of valence, we did not find any difference in the likeability of the two groups. Despite the difference in the valence of the characteristics, Study 1 showed the illusory correlation results on groups' humanity general judgments and not on groups' likeability judgments. This suggests that the effect on humanity was not driven by the slight difference in valence between the two types of characteristics. To replicate the findings of Study 1 and overcome its limitation (i.e., difference in valence of uniquely human and non-uniquely human characteristics), we conducted Study 2.

Study 2

Overview and Predictions

In Study 2 we aimed at replicating and extending the effects of Study 1 using other uniquely human and non-uniquely human (i.e., animal-like) characteristics that, most importantly, were equivalent in terms of valence. In addition, we further verified the effect on groups' humanity using several measures assessing this perception. As in Study 1 we predicted that uniquely human qualities and humanness in general would differently characterize the two groups depending on whether these qualities were common or rare. When uniquely human characteristics were the common qualities, the majority group was expected to be rated as more uniquely human (more human and less animal-like) than the minority group. On the other hand, when uniquely human characteristics were the rare qualities, the minority group was expected to be rated as more uniquely human than the majority group. As in the previous study, we also expected that novel group members described by a common quality would be more likely

categorized as members of the majority group and novel group members described by a rare quality would be more likely categorized as members of the minority group. Finally, we expected that participants would assign mixed quality members more to the minority than to the majority group or would at least neglect the base-rate.

To better test the AT account of illusory correlation findings, in this study we added a probe reaction time task. AT posits the involvement of covert attentional mechanisms as critical in category learning. Once the characteristics of the majority group are learned, attention shifts to exemplars of the minority group that accentuate the difference from the majority group. A probe reaction time task allowed us to detect to which members of each group (ones described by the common trait or emotion or ones described by the rare trait or emotion) participants paid attention during the impression formation task. We predicted that, because the common quality becomes first associated with the majority group, majority group members who possessed the common quality would receive more attention compared to majority group members who possessed the rare quality. Conversely, because the rare quality is used to differentiate the minority from the majority group, members of the minority group who possessed the common quality should have received less attention compared to members of the minority group who possessed the rare quality. The attention-shifting component of AT was developed specifically to account for cases in which common and rare attributes directly compete for attention (e.g., Kruschke, 1996; Kruschke et al., 2005). Such situations provide the strongest test of selective attention because the attention directed toward common (rare) attributes comes at the direct expense of attending to rare (common) attributes. The purpose of this task was to test the AT attention-shifting mechanism as the cognitive process underlying infra-humanization in an illusory correlation design in which the common and rare (i.e., uniquely human and animal-like or animal-like and uniquely human) attributes directly competed for attention.

Moreover, as uniquely human and non-uniquely human (i.e., animal-like) characteristics used in the present study did not differ in terms of valence, we expected no difference in the likeability of the two groups.

Method

Participants. For their participation, 93 (42 female and 51 male, M age=19.15 years, $SD=1.16$) students at Indiana University Bloomington were given one course credit. Participants were run in sessions of 1-5 people.

Materials. Two uniquely human characteristics, rational and guilty, and two non-uniquely human (i.e., shared with animals or animal-like) characteristics, instinctive and fearful, were used in the impression formation task. These were chosen on a basis of the same pre-test as for Study 1. A 2 (traits' humanity rating vs. emotions' humanity rating) X 2 (uniquely human qualities vs. animal-like qualities) ANOVA with repeated measures on both factors on humanity ratings revealed a significant main effect of uniquely human qualities vs. animal-like qualities factor, $F(1, 21) = 81.327, p < .001, \eta^2 = .795$. This shows that the uniquely human qualities (i.e., the trait rational and the emotion guilt) were rated as more human ($M = 5.36, SD = 1.46$) than the animal-like qualities (i.e., the trait instinctive and the emotion fear) ($M = 2.205, SD = 1.49$). No other effect was significant. A 2 (traits' likeability rating vs. emotions' likeability rating) X 2 (uniquely human qualities vs. animal-like qualities) ANOVA with repeated measures on both factors on valence ratings was conducted. The analysis revealed a significant main effect of traits' likeability rating vs. emotions' likeability rating factor, $F(1, 21) = 135.286, p < .001, \eta^2 = .866$, showing that the traits were rated more positively ($M = 5.5, SD = 1.23$) than the emotions ($M = 2.43, SD = 1.2$). No other effect was significant.

Procedure. The procedure was similar to that of Study 1 with some exceptions. First of all, we used a different animal-like emotion (i.e., fear) for the impression formation task, such that uniquely human and non-uniquely human (i.e., animal-like) characteristics differed in humanity, but were equivalent in terms of valence. We changed the groups' names from Group F and Group G to Group J and Group K, introduced two additional measures of group humanity, and added a dot probe task that are described in detail.

Group member assignment task. As in Study 1, just after each impression formation task, participants performed the group member assignment task. A different neutral trait, i.e., quiet,

and emotion, i.e., bored, for the first and the second group member assignment task were used. In the first group member assignment task, as in Study 1, participants were presented with twelve novel group members whom they had not seen before. Two of the targets were described by the uniquely human trait (i.e., rational), two were described by the animal-like trait (i.e., instinctive), two were described by one of each the uniquely human and the animal-like trait (i.e., rational and instinctive), two were described by the uniquely human trait and a new neutral, neither uniquely human nor animal-like trait (i.e., quiet), two were described by the animal-like trait and the neutral trait, and finally two new people were described by all three traits, i.e., uniquely human, animal-like, and neutral. After the second impression formation task, participants completed the second group member assignment task, in which they were presented with twelve new group members who were characterized by their typical emotions. Two of these targets were described as feeling guilty, two were described as feeling fearful, two were described by one of each the uniquely human and the animal-like emotion (i.e., as feeling guilty and fearful), two were described by the uniquely human emotion and one new neutral, neither uniquely human nor animal-like emotion (i.e., boredom), two were described by the animal-like and the neutral emotion, and finally two new people were described as feeling all three emotions, i.e., guilt, fear, and boredom. Participants were asked to assign each target to the group they felt was most appropriate. For the first group member assignment task, the items were as follows “Name (e.g., Dave), a member of _____, is (e.g., Rational). Is Dave a member of Group J, or Group K?”. For the second group member assignment task, the items were as follows “Name (e.g., Bill), a member of _____, feels (e.g., Guilty and Bored). Is Bill a member of Group J, or Group K?” The percentage of assignment of common, rare, or mixed (i.e., both common and rare) quality targets (from the two impression formation tasks) to the majority group served as the dependent measure.

Group humanity: Traits and emotions ratings. After the first group member assignment task, participants completed a trait-rating task, in which they were asked to rate each group on rationality and instinctiveness on scales ranging from 1 (*not at all*) to 9 (*very much*). After the second group member assignment task, participants completed an emotion-rating task, in which they were asked to rate the two groups in terms of guilt and fear on scales ranging from 1 (*not at all*) to 9 (*very much*).

Group humanity and likeability: Ratings of attributes generated by the participants. Participants were asked to write down four characteristics that they associated with each group (the order of group presentation was counterbalanced). They were explicitly asked to not write down the same traits and emotions they were presented with during the initial impression formation tasks. Afterwards, they were asked to evaluate (in mixed fixed order – J1, K1, J2, K2, J3, K3, J4, K4) how human (1 = not at all human or animal-like, 9 = completely human) and how positive (1 = not at all positive, 5 = neutral, 9 = completely positive) were the characteristics that they previously wrote down for each of the two groups.

Group humanity and likeability: General judgment. Subsequently, as in Study 1, we asked participants to indicate how human, animal-like, and likeable was each group on scales ranging from 1 (*not at all*) to 9 (*very much*). Humanity rating questions were changed from “How human are the traits and emotions of Group F (or Group G)?” and “How animal-like are the traits and emotions of Group F (or Group G)?” (reversed score) to “How human is Group J (or Group K)?” and “How animal-like is Group J (or Group K)?” (reversed score).

Dot-probe Task. Then, participants were told that the impression formation task would continue but that they would now be presented with two items at a time, one item on the left side of their screen and one on the right side of their screen. They were told that they would also have to monitor the appearance of a dot that would appear on either the left or right side of their screen, and press one of two keys on the keyboard (i.e., “E” or “I”) to indicate the location of the dot when it appeared. On each trial, the two items described two different members of the same group (majority or minority). Four pairs of items included one common (uniquely human or animal-like) trait and one rare (animal-like or uniquely human) trait indicative of different members of the majority group, four pairs of items included one common (uniquely human or animal-like) trait and one rare (animal-like or uniquely human) trait indicative of different members of the minority group, four pairs of items included one common (uniquely human or animal-like) emotion and one rare (animal-like or uniquely human) emotion experienced by different members of the majority group, and four pairs of items included one common (uniquely human or animal-like) emotion and one rare (animal-like or uniquely human) emotion experienced by different members of the minority group. For each trial, the two targets were

presented for a total of 4500 ms. During the presentation of each pair of items, the dot appeared on the same side of the screen as either the target with the common characteristic (trait or emotion) or the target with the rare characteristic (trait or emotion). The onset of the dot probes was manipulated to occur randomly on either the left or right side of the screen at either 2000 ms, 2500 ms, 2750 ms, or 3000 ms after the presentation of the sentences. This variation in the onset of the probes prevented participants from being able to predict precisely when it would appear. The measure of interest was the reaction time to identify the location of the dot probe as a function of where the dot appeared (i.e., on the same side of the screen as a common quality member or a rare quality member). These latencies provide a proxy of the extent to which participants were attending to the common or rare characteristic when the dot appeared. The more attention is focused on a particular item, the less time it should take to respond to a dot probe that appears located in the same position as that item. Thus the prediction was that, when reading about members of the majority group, participants would identify the location of the dot probe more quickly when it appeared on the same side of the screen as the target described by the common characteristic (trait or emotion). In contrast, when reading about members of the minority group, participants would identify the location of the dot probe more quickly when it appeared on the same side of the screen as the target described by the rare characteristic (trait or emotion).

As the last computerized part of the experiment, we asked participants to indicate their gender, age, nationality, and native language.

Group humanity: Words attribution. Finally, participants completed a paper and pencil measure on groups' humanity (as opposed to animality) perceptions (Viki et al., 2006, Experiment 3). This measure was presented as an association task. Participants were asked to choose 10 out of 20 words that they best associated with each of the two groups and their members (for each group separately in counterbalanced order of group presentation). The 20 words were pretested to be 10 uniquely human and 10 animal-like characteristics, but equivalent in terms of valence (Fasoli, Paladino, Carnaghi, Jetten, Bastian, & Bain, 2013).

Finally, participants were debriefed and thanked for their participation.

[See instructions and stimuli for all the measures in the Appendix section.]

Results

Group member assignment task. As in Study 1, the scores for assignments (percentage) of uniquely human (i.e., 2 rational and 2 guilty), uniquely human and neutral (i.e., 2 rational and quiet; and 2 guilty and bored), animal-like (i.e., 2 instinctive and 2 fearful), animal-like and neutral (i.e., 2 instinctive and quiet; and 2 fearful and bored), uniquely human and animal-like (i.e., 2 rational and instinctive; and 2 guilty and fearful), and uniquely human, animal-like, and neutral (i.e., 2 rational, instinctive, and quiet; and 2 guilty, fearful, and bored) novel group members to the majority group were calculated for each participant. The score for each type of novel group members was submitted to a one-way ANOVA (humanity as the common quality vs. animality as the common quality). As far as uniquely human quality members are concerned, the ANOVA yielded a significant effect, $F(1, 91) = 25.17, p < .001$. When the individual was described as possessing only the uniquely human characteristics, participants in the humanity common quality condition tended to choose the majority group (76%), whereas participants in the animality common quality condition tended to choose the minority group (43% of assignments to the majority group). When presented with animal-like quality members, participants in the humanity common quality condition tended to choose the minority group (34% of assignments to the majority group). In contrast, participants in the animality common quality condition tended to choose the majority group (67%). The difference between the two conditions (humanity and animality as a common quality) in assignments of animal-like quality members was also significant, $F(1, 91) = 23.41, p < .001$. Thus, as in the previous study, participants categorized individuals presenting the common characteristics more likely as members of the majority group and categorized individuals presenting the rare characteristics more likely as members of the minority group, even though there were twice as many majority group members as minority group members described by the rare quality. These results provided strong support for the illusory correlation effect (see Table 2). As expected, the ANOVA for the targets possessing both the common quality and the rare quality did not yield a significant effect, $F(1, 91) = .638, p = .427$. However, different from predictions, these targets were more likely

assigned to the majority group than to the minority group, both when humanity (65%) and when animality (70%) was the common quality. These percentages did not differ significantly from the base rate (67%), $t(1, 46) = -.418, p = .339$, one-tailed, and $t(1, 45) = .722, p = .237$, one-tailed, for humanity and animality common quality condition respectively. However, a base-rate neglect effect emerged for the assignment of individuals described by all three characteristics (i.e., a uniquely human, an animal-like, and a neutral). The ANOVA was again not significant, $F(1, 91) = .558, p = .457$, as participants assigned individuals presenting all three qualities more frequently to the majority group than to the minority group both when humanity (53%) and when animality (58%) was the common quality. Importantly, when a neutral characteristic was present, the difference from the base rate was significant both when humanity, $t(1, 46) = -2.922, p = .0025$, one-tailed, and when animality, $t(1, 45) = -1.896, p = .032$, one-tailed, was the common quality. In line with predictions, the ANOVA for targets possessing a human and a neutral quality yielded a significant effect, $F(1, 91) = 17.588, p < .001$, as participants in the humanity common quality condition tended to choose the majority group (65%), whereas participants in the animality common quality condition tended to choose the minority group (39% of assignments to the majority group). Finally, testing targets described by an animal-like and a neutral quality, as expected, the ANOVA yielded a significant effect, $F(1, 91) = 15.732, p < .001$, as participants in the humanity common quality condition tended to choose the minority group (32% of assignments to the majority group), whereas participants in the animality common quality condition tended to choose the majority group (57%).

Group Attributes	Percentage of assignments to the majority group		
	Humanity Common	Animality Common	<i>p</i>
Uniquely human	76%	43%	(< .001)
Uniquely human + Neutral	65%	39%	(< .001)
Animal-like	34%	67%	(< .001)
Animal-like + Neutral	32%	57%	(< .001)
Uniquely human + Animal-like	65%	70%	(.427)
Uniquely human + Animal-like + Neutral	53%*	58%*	(.457)

Table 2. Results from Group member assignment task. Note. * = base-rate neglect effect.

Group humanity: Traits and emotions ratings. A score (average) for each group was created for the ratings on uniquely human trait (i.e., rational) and emotion (i.e., guilt) ($r = .484, p < .001$, one-tailed for Group J; $r = .328, p = .001$, one-tailed for Group K). These scores were entered into a 2 (uniquely human qualities rating of the majority group vs. uniquely human qualities rating of the minority group) X 2 (humanity vs. animality as the common quality) analysis of variance (ANOVA) with repeated measures on the first factor. First of all, we found a significant main effect of the majority and minority group ratings, $F(1, 91) = 9.22, p = .003, \eta^2 = .092$, such that the majority group was seen as possessing the uniquely human qualities of rationality and guilt to a larger extent, $M = 6.28, SD = 1.74$, than the minority group $M = 5.61, SD = 1.57$. This is not surprising as the majority group was described by twice as many uniquely human qualities members as the minority group in both conditions, both when humanity and when animality was the common quality. More importantly, as predicted, the analysis revealed a significant interaction between the two factors, $F(1, 91) = 18.93, p < .001, \eta^2 = .172$ (see Figure 5), showing that the majority group was seen as being more rational and guilty ($M = 7.39, SD = 1.13$) than the minority group ($M = 5.75, SD = 1.46$), $F(1, 91) = 27.574, p < .001$, only when uniquely human characteristics were the common qualities. When uniquely human characteristics were the rare qualities (i.e., animality was the common quality), being rational and guilty indeed no longer characterized the majority group, but equally described the minority ($M = 5.47, SD = 1.67$) and the majority group ($M = 5.17, SD = 1.54$), $F(1, 91) = .855, p = .358$.

A score (average) for each group was created for the ratings on non-uniquely human (i.e., animal-like) trait (i.e., instinctive) and emotion (i.e., fear) ($r = .296, p = .002$, one-tailed for Group J; $r = .148, p = .078$, one-tailed for Group K). These scores were entered into a 2 (animal-like qualities rating of the majority group vs. animal-like qualities rating of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. This analysis again revealed a significant main effect for the majority and minority group ratings factor, $F(1, 91) = 5.44, p = .022, \eta^2 = .056$, showing that the majority group was rated as more instinctive and fearful, $M = 6.23, SD = 1.52$, than the minority group, $M = 5.75, SD = 1.53$. The main effect was qualified by the expected interaction, $F(1, 91) = 20.85, p < .001, \eta^2 = .186$ (see Figure 6). When animality was the common quality, the majority group was seen as being more instinctive and fearful ($M = 7.1, SD = 1.15$) than the minority group ($M = 5.69, SD = 1.65$), $F(1, 91) = 23.54, p < .001$. Whereas, when animality was the rare quality (i.e., humanity was the

common quality), the minority group was seen as possessing the non-uniquely human (i.e., animal-like) characteristics, i.e., instinctiveness and fear, to the same extent ($M = 5.82$, $SD = 1.41$), as the majority group ($M = 5.36$, $SD = 1.35$), $F(1, 91) = 2.521$, $p = .116$.

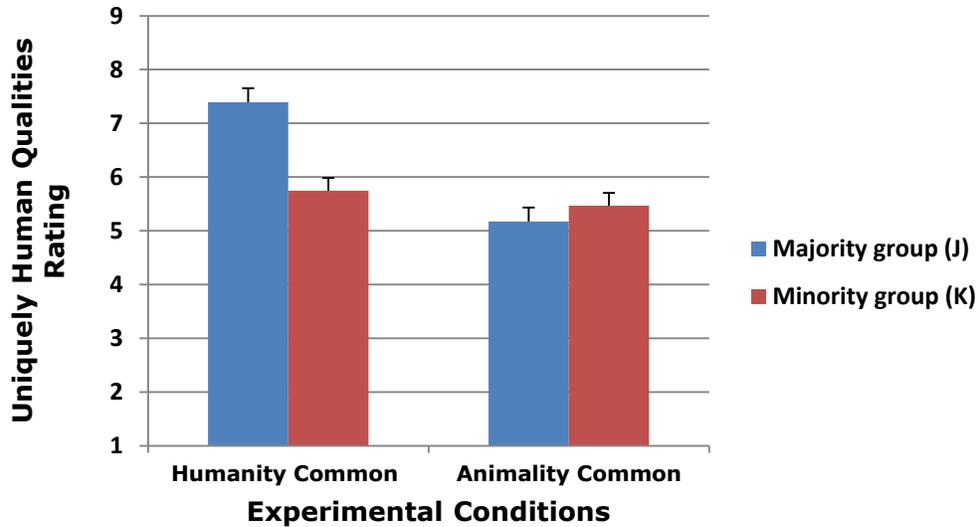


Figure 5. Uniquely human qualities ratings of the majority (J) and minority (K) groups in two experimental conditions.

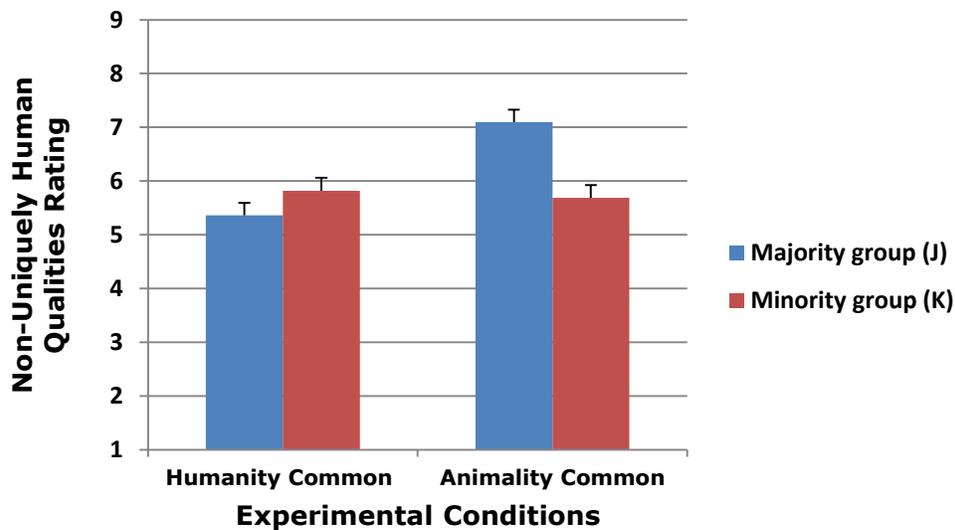


Figure 6. Non-uniquely human (i.e., animal-like) qualities ratings of the majority (J) and minority (K) groups in two experimental conditions.

Group humanity: Ratings of attributes generated by the participants. A score (average) for each group was created for humanity ratings of group's attributes generated by the participants ($\alpha =$

.115 for Group J; $\alpha = .504$ for Group K). These scores were submitted to a 2 (humanity of the majority group vs. humanity of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. Supporting our predictions, the analysis revealed a significant crossover interaction between the two factors, $F(1, 91) = 5.22, p = .025, \eta^2 = .054$ (see Figure 7). When humanity was the rare quality (i.e., animality was the common quality), the minority group was seen as more human ($M = 6.21, SD = 1.29$) than the majority group ($M = 5.86, SD = .88$), $F(1, 91) = 4.605, p = .035$. Whereas when humanity was the common quality, the majority group was seen as equally human ($M = 6.38, SD = 1.17$) as the minority group ($M = 6.21, SD = 1.37$), $F(1, 91) = 1.162, p = .284$. Importantly, the difference in humanity of the majority group between the two conditions was reliable, $F(1, 91) = 5.93, p = .017$, such that the majority group was rated as more human when humanity was the common quality ($M = 6.38, SD = 1.17$) compared to when humanity was the rare quality (animality was the common quality) ($M = 5.86, SD = 0.88$). On the other hand, the minority group was rated as equally human when humanity was the rare quality (animality was the common quality) ($M = 6.212, SD = 1.29$) and when humanity was the common quality ($M = 6.207, SD = 1.37$), $F(1, 91) = .00, p = .987$.

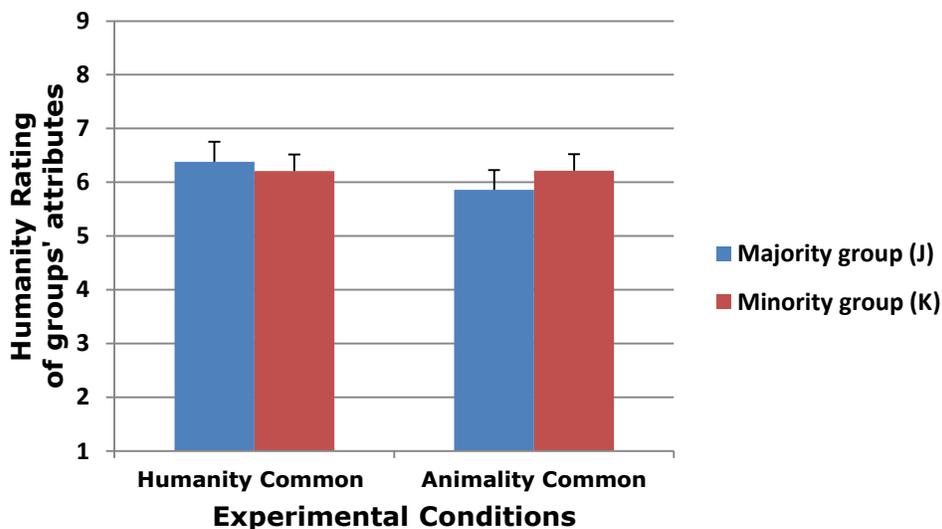


Figure 7. Humanity ratings of the majority (J) and minority (K) groups' attributes in two experimental conditions.

Group humanity: General judgment. A score (average) for each group was created for humanity and animality (reversed score) ratings ($r = -.423, p < .001$, for humanity and animality ratings of the majority group; $r = -.508, p < .001$, for humanity and animality ratings of the minority group). These scores were submitted to a 2 (humanity rating of the majority group vs. humanity rating of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor to test the effect on groups' humanity perceptions. As predicted, the analysis revealed a significant crossover interaction, $F(1, 91) = 5.486, p = .021, \eta^2 = .057$ (see Figure 8). In the humanity common quality condition, the majority group was rated as more human ($M = 6.19, SD = 1.27$) than the minority group ($M = 5.28, SD = 1.69$), $F(1, 91) = 7.382, p = .008$, while in the humanity rare quality condition (animality common quality condition), the minority group was rated as equally human ($M = 5.92, SD = 1.29$) as the majority group ($M = 5.72, SD = 1.60$), $F(1, 91) = .368, p = .546$. Importantly, the difference in humanity ratings of the majority group between the two conditions was marginally reliable, $F(1, 91) = 2.515, p < .06$, one-tailed, such that the majority group was rated as more human when humanity was the common quality ($M = 6.19, SD = 1.27$) compared to when humanity was the rare quality (animality was the common quality) ($M = 5.72, SD = 1.60$). On the other hand, the minority group was rated as more human when humanity was the rare quality (animality was the common quality) ($M = 5.92, SD = 1.29$) compared to when humanity was the common quality ($M = 5.28, SD = 1.69$). The difference in humanity ratings of the minority group between the two conditions was reliable, $F(1, 91) = 4.295, p = .02$, one-tailed. As in Study 1, the results again demonstrated the illusory correlation effect for groups' humanity general judgments.

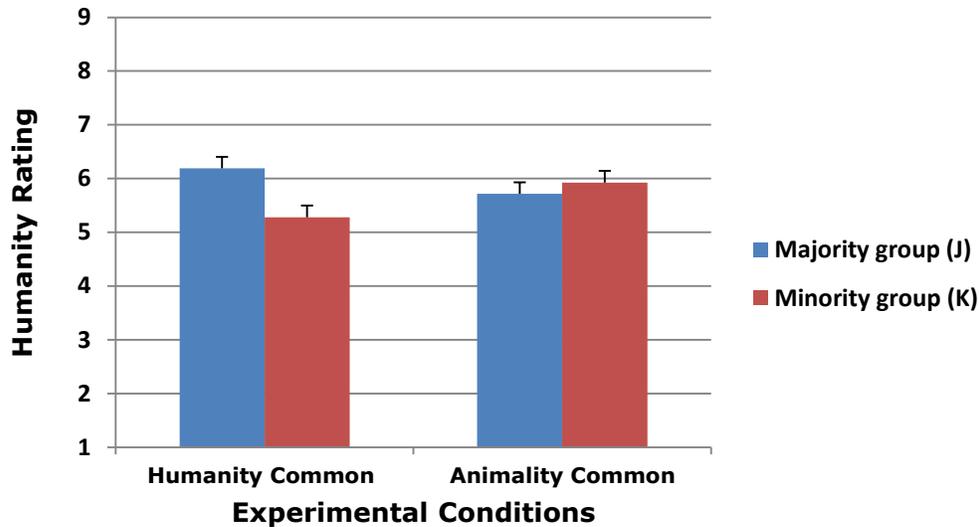


Figure 8. Humanity ratings of the majority (J) and minority (K) groups in two experimental conditions.

Group humanity: Words attribution. For data analysis purposes, we calculated the number of uniquely human words attributed to each of the two groups to obtain humanity J (majority group) and humanity K (minority group) scores. Due to an error during the data coding, we were able to analyze data from only 55 participants instead of 93 participants. We conducted a 2 (number of human words attributed to the majority group vs. number of human words attributed to the minority group) X 2 (humanity vs. animality as the common quality) ANOVA, and we found a significant crossover interaction between the two factors, $F(1, 53) = 23.17, p < .001, \eta^2 = .304$ (see Figure 9), showing that participants in the humanity common quality condition attributed significantly more human words to the majority group ($M = 7.39, SD = 2.5$) than to the minority group ($M = 4.96, SD = 3.9$), $F(1, 53) = 5.957, p = .018$, while participants in the animality common quality condition attributed significantly more human words to the minority group ($M = 8.04, SD = 2.12$) than to the majority group ($M = 3.63, SD = 3.18$), $F(1, 53) = 18.918, p < .001$. Also, the difference in humanity ratings of both groups between the two conditions was reliable, $F(1, 53) = 23.939, p < .001$ for the majority group, $F(1, 53) = 13.029, p = .001$ for the minority group, such that the majority group was rated as more human when humanity was the common quality ($M = 7.39, SD = 2.5$) compared to when humanity was the rare quality (animality was the common quality) ($M = 3.63, SD = 3.18$). On the other hand, the minority group was rated as

more human when humanity was the rare quality (animality was the common quality) ($M = 8.04$, $SD = 2.12$) compared to when humanity was the common quality ($M = 4.96$, $SD = 3.9$). These results strongly support the formation of illusory correlation for groups' humanity perceptions.

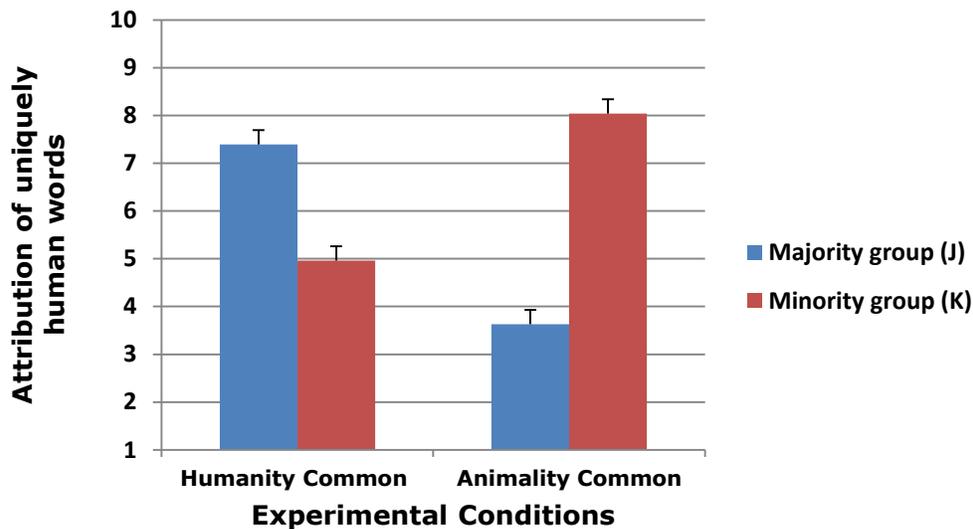


Figure 9. Attribution of uniquely human words to the majority (J) and minority (K) groups in two experimental conditions.

Group likeability: Ratings of attributes generated by the participants. A score (average) for each group was created for likeability ratings of group's attributes generated by the participants ($\alpha = .506$ for Group J; $\alpha = .597$ for Group K). These scores were submitted to a 2 (likeability of the majority group vs. likeability of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA, and, as expected, we found no significant main effect and no interaction, $F(1, 91) = .000$, $p = .991$, $\eta^2 = .000$ (see Figure 10), showing no difference in the likeability of the two groups.

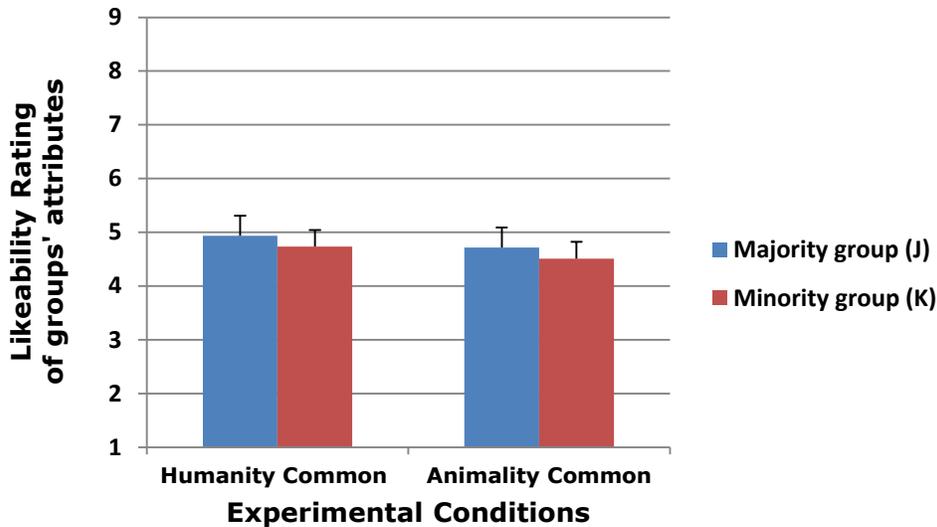


Figure 10. Likeability ratings of the majority (J) and minority (K) groups' attributes in two experimental conditions.

Group likeability: General judgment. To test the effect on groups' likeability, a 2 (likeability rating of the majority group vs. likeability rating of the minority group) X 2 (humanity vs. animality as the common quality) ANOVA was performed on likeability ratings. As expected, the analysis revealed no significant main effect and no interaction, $F(1, 91) = .162, p = .688, \eta^2 = .002$ (see Figure 11), showing no difference in the likeability of the two groups.

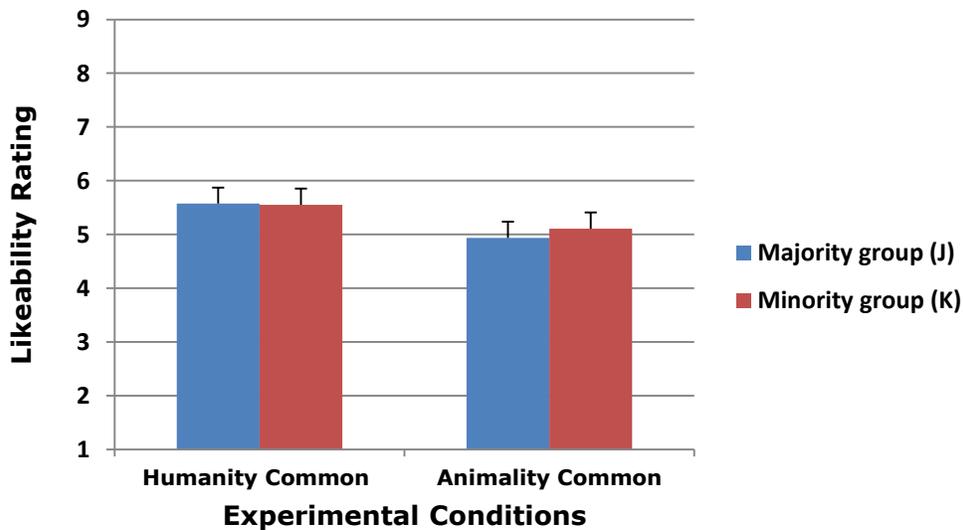


Figure 11. Likeability ratings of the majority (J) and minority (K) groups in two experimental conditions.

Dot-probe Task. We analyzed the data of only 80 participants, as 13 participants made at least 25% errors and were therefore not included in the analysis. Only correct latencies were considered. Reaction times to the dot probes from trait trials were entered into a 2 (common trait: rational vs. instinctive) X 2 (group: J vs. K) X 2 (location of dot probe: same side as common vs. rare trait) ANOVA with repeated measures on the last two factors. Supporting the predictions, this analysis demonstrated a marginally significant three way interaction, $F(1, 78) = 3.769, p = .056, \eta^2 = .046$ (see Figure 12). Response times were significantly faster to dot probes appearing in the same position as the common trait ($M = 388$ ms, $SD = 101.56$ ms) than the rare trait ($M = 413$ ms, $SD = 123.94$) when the traits described members of Group J, i.e., majority group, $F(1, 78) = 4.583, p = .035, \eta^2 = .055$. In contrast, response times were equally fast to dot probes appearing in the same position as the rare trait ($M = 384.7$ ms, $SD = 101.85$) and the common trait ($M = 389$ ms, $SD = 98.14$) when the traits described members of Group K, i.e., minority group, $F(1, 78) = .165, p = .686, \eta^2 = .002$. A 2 (common emotion: guilt vs. fear) X 2 (group: J vs. K) X 2 (location of dot probe: same side as common vs. rare emotion) ANOVA with repeated measures on the last two factors were conducted with the reaction times to the dot probes from emotion trials. Different from the prediction and the results for traits, the analysis did not yield a significant three way interaction, $F(1, 78) = 1.079, p = .302, \eta^2 = .014$, showing no difference in response times to dot probes appearing in the same position as the common emotion and the rare emotion depending on whether the emotions described members of the majority or the minority group.

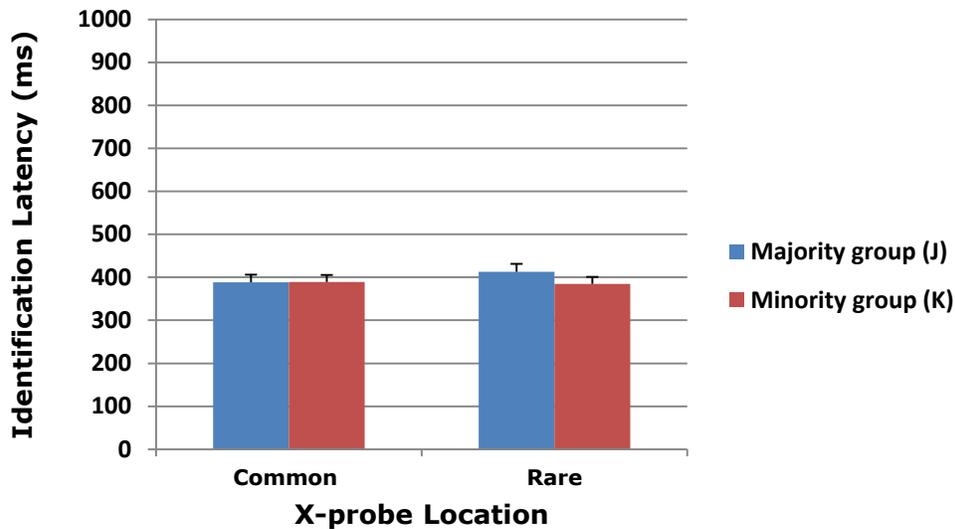


Figure 12. X-probe identification latencies.

Discussion

The results of Study 2 provided further support for the idea that the cognitive mechanism of illusory correlation can contribute to the differential perception of group humanity. To further establish the effect on group humanity, in this study we added two other measures tapping less directly and explicitly this perception. Again, as in Study 1, although the interaction was always significant, the data offer mixed support for our hypothesis. Specifically, participants associated the common and more frequent attributes with the majority rather than with the minority group, and this effect spilled-over and affected the judgment of the groups' humanity. When uniquely human characteristics were the common qualities, these characteristics and more generally the fact of being uniquely human (more human and less animal-like) were seen as more typical of the majority (vs. minority) group. Thus the minority group was infra-humanized when uniquely human characteristics were the common qualities in two out of the three measures and was seen as equally human as the majority group in one measure. However, when the animal-like characteristics were the common qualities, these characteristics were seen as more typical of the majority, and this group was consequentially seen as less uniquely human than the minority. For how concerns the hypothesis on association between the rare and less frequent attributes with the minority rather than with the majority group, the minority group was rated as equally rare

qualities-like as the majority group, but results for 2 out of the 3 measures tapping more general perceptions of group humanity indicated that the majority was infra-humanized when uniquely human characteristics were the rare qualities.

Importantly for the AT account of illusory correlation, in the categorization task, participants assigned mixed quality members described by all three characteristics, i.e., the common, the rare, and a new neutral characteristic, to the majority group to a lesser extent compared to the base-rate, showing a base-rate neglect effect. However, differently from Study 1, a similar effect did not emerge for assignment of mixed quality members described only by the common and the rare characteristics as participants assigned those targets to the majority group with the actual base-rate of 67%.

Moreover, as predicted, the data did not show any difference in likeability of the two groups, which demonstrates that the perceptions of groups' humanity were dissociated from the perceptions of likeability of the two groups.

Importantly, in the dot-probe task, relatively greater attention was paid to common than rare trait members of the majority group, whereas when reading about minority group members, about equal attention was paid to the rare and common traits. However, the interaction effect supports our prediction that attention was directed differently to group/trait (uniquely human or animal-like) combinations depending on the experimental condition (humanity or animality as the common quality). These results are consistent with the AT proposal that, during category learning, attention was directed toward category members who facilitated discrimination between categories. Nevertheless, as already mentioned in the discussion of Study 1, given that twice as many members of the majority group as the minority group were described by the rare qualities, it might have been difficult to consolidate the association of these characteristics with the minority group, which reflected equal attention paid to minority group members described by both the common and the rare traits. The implications of this finding will be further discussed in the general discussion. Finally, the results are in line with predictions only for the dot probes from trait trails and not for the dot probes from emotion trails. The possible explanation may be that traits, compared to emotions, are more important for the formation of uniquely human and non-uniquely human groups' stereotypes. All together, the results of Study 2 provided further support for AT account of illusory correlation in the context of formation of majority and minority groups' humanity perceptions.

Chapter IV

Study 3

Overview and Predictions

The purpose of the present study was to investigate the interactive role of group membership and cognitive processes of illusory correlation during the formation of groups' uniquely human and non-uniquely human stereotypes. In the previous studies, novel groups were used and the role of the cognitive process of illusory correlation in the differential perception of majority and minority group humanness was demonstrated. Given that, as shown in studies inspired by Infra-humanization theory, group membership is a key factor in groups' differential humanity perceptions, in order to understand how cognitive (i.e., illusory correlation) and motivational processes (group membership) work together in generating the infra-humanization effect, in Study 3 we modified the procedure so that the participants were also members of one of the two groups (the majority or minority group). In this study, a minimal group paradigm was used to introduce group membership. The majority and likely first-learned group was either the in-group or the out-group. Again, as in Studies 1 and 2, the common quality was either uniquely human or non-uniquely human (i.e., animal-like).

As the social categorization literature demonstrates, mere categorization into groups should create favorable expectations about the in-group and unfavorable expectations about the out-group (e.g., Howard & Rothbart, 1980). The initial impressions of the groups may thus not depend on the presentation of information about the majority and minority groups, but rather it may be formed at the stage of the subject's categorization into one of the two groups. These prior motivational processes may then bias the ensuing information such that uniquely human qualities shown by the out-group members and non-uniquely human qualities showed by the in-group members will tend to be discounted. However, previous research (Schaller & Maass, 1989) suggested that group membership does alter the manifestation of the illusory correlation bias. It appears that, when presented with information about the in-group, motives to protect one's social identity interact with cognitive process. Sometimes the two processes work in harmony; at other times they work against each other. In the present study, this latter case would occur when

participants are members of a group described by less uniquely human (i.e., more animal-like) characteristics, as the in-group is generally considered as more human than the out-group (e.g., Leyens et al., 2007).

What happens in those situations? Do biased motivational processes override the usual cognitive mechanisms, changing the perceptions of groups in a desired direction? If motivational mechanisms override cognitive processes and thus are stronger in producing the infra-humanization bias, it will be group membership that determines the ratings of groups' humanity. In this case, participants will ignore their cognitions and will judge the group they belong to as more uniquely human than the out-group regardless of the status of uniquely human and non-uniquely human (i.e., animal-like) characteristics as common or rare. On the other hand, if motivational mechanisms don't override the cognitive processes, it will be the status of uniquely human and non-uniquely human (i.e., animal-like) characteristics as common or rare and not the group membership that will drive the effect. The pattern of data in this case will be the same as in Studies 1 and 2 where group membership was not introduced.

Finally, the results may not be entirely driven by cognitive or by motivational processes. Rather, the two factors may interact in generating the infra-humanization bias, such that the infra-humanization effect will be present when both (cognitive and motivational) biases predict the same effect and will be absent when they predict opposite effects. Specifically, in the latter case, illusory correlation and in-group bias will work against one another, and the subjects will form no illusory correlation between groups and qualities. Thus, majority members should perceive no illusory correlation when uniquely human qualities occur infrequently, and minority members should perceive no illusory correlation when non-uniquely human qualities occur infrequently. On the other hand, under conditions in which the two processes predict the same biases, participants should follow their cognitions and their motivations, and there should be no attenuation of illusory correlation. Thus, majority members in the humanity frequent condition and minority members in the humanity infrequent condition should perceive strong illusory correlations.

The subjects' affective reaction (evaluative ratings of the target groups) was assessed in addition to the formation of illusory correlations between groups and qualities. These ratings were not expected to follow illusory correlation results, as the uniquely human and non-uniquely human (i.e., animal-like) qualities (traits and emotions) used in the impression formation task did

not differ in terms of valence. Moreover, immediate affective judgments were expected to occur even before presentation of the information about the groups. Therefore, members of both groups were expected to show an affective preference (more favorable evaluations) for their own group regardless of characteristics status (uniquely human/common, animal-like/rare, or the other way around). Finally, we expected that participants would identify with their own group and would self-stereotype themselves in terms of in-group attributes.

Method

Participants. For their participation, 142 (82 female and 60 male, M age=19.34 years, $SD=1.506$) students at Indiana University Bloomington were given one course credit. Participants were run in sessions of 1-5 people. The data from three participants, (one participant didn't answer the group member assignment tasks and two participants didn't remember correctly their group membership), were not considered in the analyses, leaving the sample of 139 participants.

Materials. The stimuli were the same as in Study 2.

Procedure. The design and stimuli were the same as in Study 2. To manipulate group membership, first of all, we asked participants to complete a personality test based on arbitrary questions like "*On which side of the bed do you sleep?*" or "*Do you prefer sunrise or sunset?*" (for a similar procedure, see Paladino & Castelli, 2008). Participants were told that the test was a very reliable predictor of some important aspects of personality and therefore determined both their personality type (J or K) and their group membership. After the personality test and group assignment were completed, participants performed a task to strength the group membership manipulation. In this task, participants were asked to indicate if some stimuli, appearing one-by-one in the middle of the screen, referred to the group they belonged to ("Us") or to the out-group ("Them"), by pressing one of two keys. Labels for both categories remained on the upper portion of the screen during the task, each label location corresponded to the response key location (i.e., left and right). On each trial, a stimulus appeared in the center of the screen until the participant responded. When an exemplar was incorrectly classified, a red-X appeared on screen for 200 ms. The inter-trial interval was 1000 ms. The task consisted of a total of 40 trials divided into two

blocks of 20 trials (5 stimuli for each group represented by “Group J” and “Group K” written in different font styles). In each block, the 5 stimuli of Group J and the 5 stimuli of Group K were presented in intermixed random order. The location of the response key for the stimuli of the two groups was counterbalanced for the two blocks to prevent the association between the keys and the groups. The order in which participants completed the two blocks was counterbalanced between participants. [See the Appendix section for instructions and stimuli.]

After the personality test and the categorization task, participants were again reminded about their group membership and subsequently completed two impression formation tasks, each one followed by the group member assignment tasks and groups’ humanity and likeability ratings. The impression formation task and the dependent measures following each part of the impression formation task (the first one using uniquely human and animal-like traits and the second one using uniquely human and animal-like emotions) were identical to those used in Study 2. In addition, participants completed the following measures of group identification and self-stereotyping. To sum up, the only difference from the Study 2 is that here one of the 2 groups was for participants an in-group and, consequentially, the other group was an out-group, and the addition of the measures described below.

Self-stereotyping on attributes generated by the participants. After participants wrote down four characteristics that they associated with each of the two groups and rated how human and positive these characteristics were, they were also asked how much those characteristics described themselves on scales ranging from 1=not at all to 9=very much.

Group humanity and likeability: General judgment. Same as in Study 1 and Study 2.

Self-stereotyping on emotions and traits. Participants were asked to rate themselves in terms of traits and emotions that they were presented with during the initial impression formation task (rational, instinctive, guilt, and fear) on scales ranging from 1=not at all to 9=very much.

Group identification: Pictorial measure (Schubert & Otten, 2002). Participants were asked to choose, for each of the two groups, one of seven pictorial representations of the level of closeness between them and each of the two groups. Level 1 indicated the least level of

closeness, and level 7 indicated the highest level of closeness. We used these items to reveal the identification with the two groups.

Dot-probe Task. Same as in Study 2.

Manipulation Check. Participants were first asked to write down their personality type and therefore their group membership, according to the personality test result. Then they were further asked if they thought about their group membership during the experiment and were given four options of response: 1=yes, my group membership was always in my mind, 2=yes, several times during the experiment I remembered my group membership, 3=I tended to forget my group membership, but I tried to recall it, 4=I completely forgot my group membership.

Finally, participants answered questions on their gender, age, nationality, and native language, and completed a paper and pencil measure of attribution of uniquely human and animal-like words to the two groups (Viki et al., 2006, Experiment 3), presented in the same way as in Study 2.

[See instructions and stimuli for all the measures in the Appendix section.]

Results

Group member assignment task. As in Study 1 and Study 2, the scores for assignments (percentage) of uniquely human (i.e., 2 rational and 2 guilty), uniquely human and neutral (i.e., 2 rational and quiet; and 2 guilty and bored), animal-like (i.e., 2 instinctive and 2 fearful), animal-like and neutral (i.e., 2 instinctive and quiet; and 2 fearful and bored), uniquely human and animal-like (2 rational and instinctive; and 2 guilty and fearful), and uniquely human, animal-like, and neutral (2 rational, instinctive, and quiet; and 2 guilty, fearful, and bored) novel group members to the majority group were calculated for each participant. The score for each type of novel group members was submitted to a 2 (J vs. K membership) X 2 (humanity vs. animality as the common quality) ANOVA with both factors manipulated between subjects. As far as uniquely human quality members are concerned, the ANOVA yielded a significant main effect of humanity vs. animality as the common quality factor, $F(1, 135) = 8.684, p = .004, \eta^2 = .060$.

When the individual was described as possessing only uniquely human characteristics, participants in the humanity common quality condition tended to choose the majority group (65%), whereas participants in the animality common quality condition tended to choose both groups equally (49.6% of assignments to the majority group). Note that group membership main effect was not significant, $F(1, 135) = .585, p = .446, \eta^2 = .004$, neither this factor moderated the effect of humanity vs. animality as the common quality factor, $F(1, 135) = .813, p = .369, \eta^2 = .006$. When presented with animal-like quality members, the ANOVA again revealed a significant main effect of humanity vs. animality as the common quality factor, $F(1, 135) = 14.919, p < .001, \eta^2 = .100$, showing that participants in the humanity common quality condition tended to choose slightly more frequently the minority group (45% of assignments to the majority group), while participants in the animality common quality condition tended to choose the majority group (65%). Note that again group membership main effect was not significant, $F(1, 135) = 1.545, p = .216, \eta^2 = .011$, neither this factor moderated the effect of humanity vs. animality as the common quality factor, $F(1, 135) = 1.842, p = .177, \eta^2 = .013$. Thus, participants categorized individuals presenting common characteristics more likely as members of the majority group and categorized individuals presenting rare characteristics about equally as members of the majority and minority group, especially concerning uniquely human quality members. Our results again provide strong support for illusory correlation effects, as participants differently assigned common and rare quality members to the two groups even though both groups were described equally by common and rare qualities (see Table 3). The ANOVA for mixed quality targets possessing both the common quality and the rare quality yielded a marginally significant main effect of humanity vs. animality as the common quality factor, $F(1, 135) = 3.926, p = .050, \eta^2 = .028$, showing that in the humanity common quality condition, participants were more likely to choose the majority group (67%), in line with the base-rate, in contrast with the animality common quality condition in which participants still chose the majority group, but to a lesser extent compared to the base-rate (58%); and participants therefore showed a significant base-rate neglect effect, $t(1, 67) = -2.651, p = .010$. Importantly, a strong base-rate neglect effect emerged for the assignment of mixed quality individuals described by all three characteristics (uniquely human, animal-like, and neutral). The ANOVA (main effect of humanity vs. animality as the common quality factor) was not significant, $F(1, 135) = 2.601, p = .109, \eta^2 = .019$, as participants significantly neglected the base-rate in both conditions, when

humanity (56.7% of assignments to the majority group), $t(1, 70) = -3.101, p = .003$, and when animality was the common quality (48.5% of assignments to the majority group), $t(1, 67) = -4.849, p < .001$. Different from predictions, the ANOVA for targets possessing a uniquely human and a neutral quality did not yield a significant main effect of humanity vs. animality as the common quality factor, $F(1, 135) = 1.671, p = .198, \eta^2 = .012$, as assignment of these individuals to the majority group did not differ between the two conditions. Participants in the humanity common quality condition tended to choose both groups equally (49.6% of assignments to the majority group) and therefore different from the base rate of 67%, $t(1, 70) = -5.181, p < .001$, while participants in the humanity rare quality condition (animality common quality condition), as expected, tended to choose the minority group (43% of assignments to the majority group). Finally, for targets described by an animal-like and a neutral quality, the ANOVA yielded a significant main effect of majority vs. minority membership factor, $F(1, 135) = 9.552, p = .002, \eta^2 = .066$, showing that participants who were members of the majority group tended to choose the minority group (41% of assignments to the majority group), while participants who were members of the minority group tended to choose the majority group (56%). As expected, the analysis also revealed a significant main effect of humanity vs. animality as the common quality factor, $F(1, 135) = 8.692, p = .004, \eta^2 = .060$, showing that participants in the humanity common quality condition tended to choose the minority group (41% of assignments to the majority group), while participants in the animality common quality condition tended to choose the majority group (56%).

Group Attributes	Percentage of assignments to the majority group		
	Humanity Common	Animality Common	<i>p</i>
Uniquely human	65%	49.6%	(.004)
Uniquely human + Neutral	49.6%*	43%	(.198)
Animal-like	45%	65%	(<.001)
Animal-like + Neutral	41%	56%	(.004)
Uniquely human + Animal-like	67%	58%*	(.05)
Uniquely human + Animal-like + Neutral	56.7%*	48.5%*	(.109)

Table 3. Results from Group member assignment task. Note. * = base-rate neglect effect.

Group humanity: Traits and emotions ratings. A score (average) for each group was created for the ratings on uniquely human trait (i.e., rational) and emotion (i.e., guilt) ($r = .519, p < .001$, one-tailed for Group J; $r = .313, p < .001$, one-tailed for Group K). These scores were submitted to a 2 (uniquely human qualities rating of the majority group vs. uniquely human qualities rating of the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant main effect of the majority and minority group ratings, $F(1, 135) = 19.753, p < .001, \eta^2 = .128$, showing that the majority group was rated as being more rational and guilty ($M = 6.735, SD = 1.57$) than the minority group ($M = 6.039, SD = 1.50$). More importantly, the analysis revealed a significant 2 (uniquely human qualities rating of the majority group vs. uniquely human qualities rating of the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 8.269, p = .005, \eta^2 = .058$ (see Figure 13). When humanity was the common quality, the majority group was seen as possessing the uniquely human qualities, i.e., rationality and guilt, to a greater extent ($M = 7.345, SD = 1.26$), than the minority group ($M = 6.198, SD = 1.46$), $F(1, 135) = 27.391, p < .001$. Whereas when humanity was the rare quality (i.e., animality was the common quality), the minority group ($M = 5.880, SD = 1.54$) was seen as possessing the uniquely human qualities to the same extent as the majority group ($M = 6.126, SD = 1.63$), $F(1, 135) = 1.204, p = .274$. Note that this interaction was not qualified by group membership, $F(1, 135) = 1.689, p = .196, \eta^2 = .012$. These results again support the development of an illusory correlation for groups' ratings on common and rare qualities.

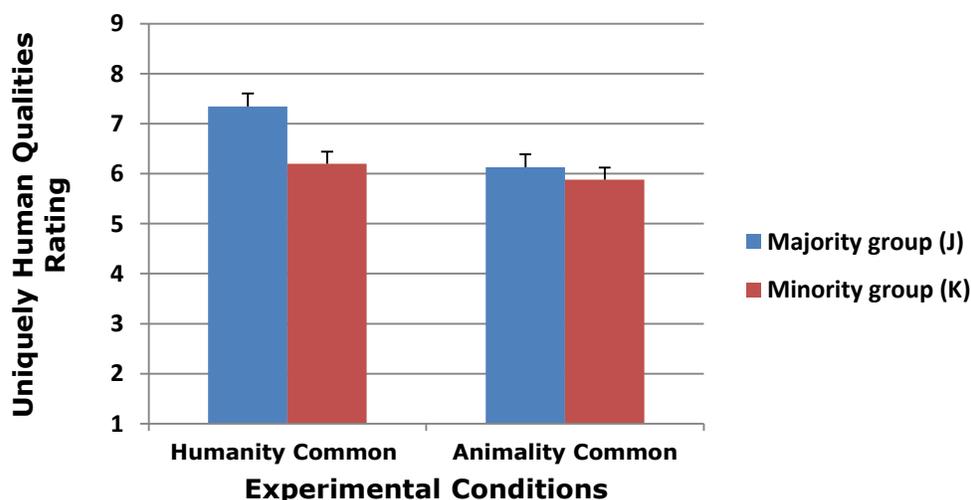


Figure 13. Uniquely human qualities ratings of the majority (J) and minority (K) groups in the humanity and animality common quality conditions.

A score (average) for each group was created for the ratings on non-uniquely human (i.e., animal-like) trait (i.e., instinctive) and emotion (i.e., fear) ($r = .419, p < .001$, one-tailed for Group J; $r = .219, p = .005$, one-tailed for Group K). These scores were submitted to a 2 (animal-like qualities rating of the majority group vs. animal-like qualities rating of the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant main effect for the majority and minority group ratings factor, $F(1, 135) = 11.580, p = .001, \eta^2 = .079$, showing that the majority group was rated as overall more non-uniquely human qualities-like, i.e., instinctive and fearful, $M = 6.645, SD = 1.56$, than the minority group, $M = 6.124, SD = 1.39$. The analysis also revealed a significant 2 (animal-like qualities rating of the majority group vs. animal-like qualities rating of the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 20.114, p < .001, \eta^2 = .130$ (see Figure 14). When animality was the common quality, the majority group was seen as possessing the non-uniquely human (i.e., animal-like) qualities to a greater extent ($M = 7.32, SD = 1.23$) than the minority group ($M = 6.11, SD = 1.40$), $F(1, 135) = 30.442, p < .001$. Whereas when animality was the rare quality (humanity was the common quality), the minority group was rated as possessing the non-uniquely human (i.e., animal-like) qualities, i.e., instinctiveness and fear, to the same extent ($M = 6.14, SD = 1.39$) as the majority group ($M = 5.97, SD = 1.56$), $F(1, 135) = .598, p = .441$. Again these results were not qualified by group membership, $F(1, 135) = .567, p = .453, \eta^2 = .004$.

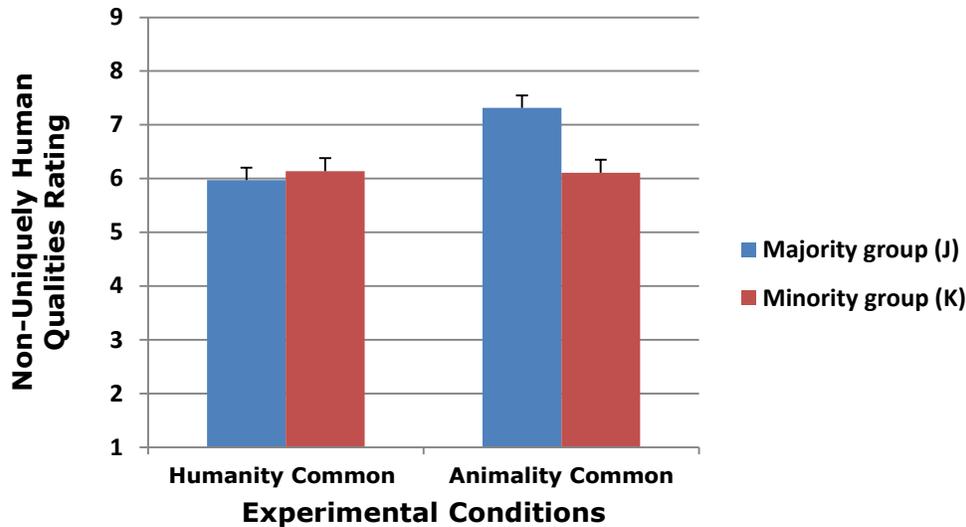


Figure 14. Non-uniquely human (i.e., animal-like) qualities ratings of the majority (J) and minority (K) groups in the humanity and animality common quality conditions.

Group humanity: Ratings of attributes generated by the participants. A score (average) for each group was created for humanity ratings of group's attributes generated by the participants ($\alpha = .333$ for Group J; $\alpha = .412$ for Group K). These scores were submitted to a 2 (humanity of the majority group vs. humanity of the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a marginally significant 2 (humanity of the majority group vs. humanity of the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 3.099, p = .081, \eta^2 = .022$ (see Figure 15). When humanity was the common quality, the majority group was seen as equally human ($M = 6.097, SD = 1.41$) as the minority group ($M = 6.028, SD = 1.47$), $F(1, 135) = .198, p = .657$. Whereas when humanity was the rare quality (i.e., animality was the common quality), the minority group was seen as more human ($M = 6.179, SD = 1.31$) than the majority group ($M = 5.86, SD = 1.26$), $F(1, 135) = 4.110, p = .045$. Importantly, these results were not qualified by group membership, $F(1, 135) = .662, p = .417, \eta^2 = .005$.

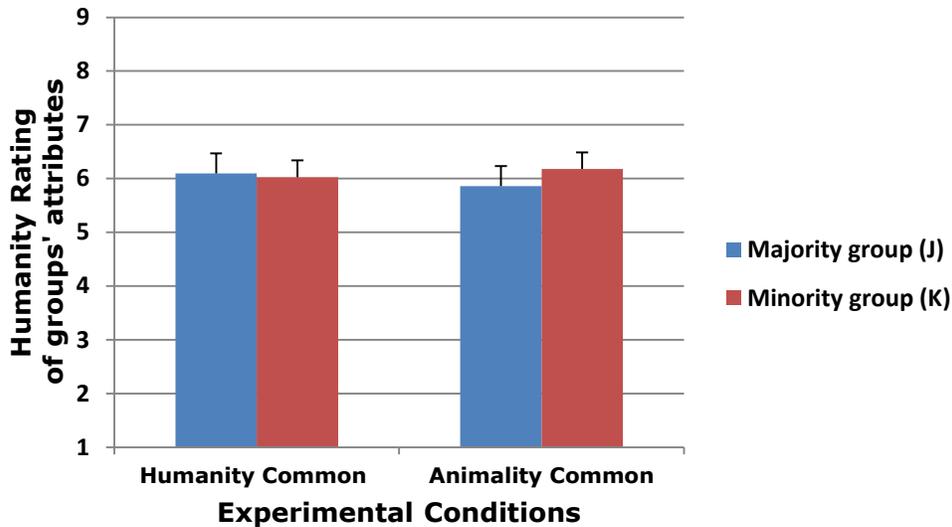


Figure 15. Humanity ratings of the majority (J) and minority (K) groups' attributes in the humanity and animality common quality conditions.

Group humanity: General judgment. A score (average) for each group was created for humanity and animality (reversed score) ratings ($r = -.430, p < .001$, for humanity and animality ratings of the majority group; $r = -.443, p < .001$, for humanity and animality ratings of the minority group). To test the effect on groups' humanity judgments, these scores were submitted to a 2 (humanity rating of the majority group vs. humanity rating of the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. First of all, the analysis revealed a marginally significant 2 (humanity rating of the majority group vs. humanity rating of the minority group) X 2 (majority vs. minority group membership) interaction, $F(1, 135) = 3.645, p = .058, \eta^2 = .026$, showing that when participants were members of the majority group they rated the majority group as being more human ($M = 6.190, SD = 1.35$) than the minority group ($M = 5.706, SD = 1.27$), $F(1, 135) = 5.858, p = .017$, whereas when participants were members of the minority group they rated the minority group as being equally human ($M = 6.211, SD = 1.51$) as the majority group ($M = 6.150, SD = 1.41$), $F(1, 135) = .092, p = .762$. Second, the analysis revealed a significant 2 (humanity rating of the majority group vs. humanity rating of the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 6.805, p = .010, \eta^2 = .048$, showing that in the humanity common quality condition the majority group was rated as

more human ($M = 6.511$, $SD = 1.38$) than the minority group ($M = 5.927$, $SD = 1.60$), $F(1, 135) = 8.529$, $p = .004$, whereas in the humanity rare quality condition (i.e., animality common quality condition), the minority group was rated as equally human ($M = 5.990$, $SD = 1.19$) as the majority group ($M = 5.828$, $SD = 1.29$), $F(1, 135) = .628$, $p = .430$. Finally, the analysis revealed a marginally significant three-way interaction, $F(1, 135) = 3.519$, $p = .063$, $\eta^2 = .025$ (see Figure 16 and Figure 17), showing that the pattern of results on groups' humanity ratings was different for majority and minority group members. In particular, members of the majority group in the humanity common quality condition rated the majority group as being more human ($M = 6.708$, $SD = 1.19$) than the minority group ($M = 5.583$, $SD = 1.51$), $F(1, 135) = 16.056$, $p < .001$, whereas participants in the humanity rare (i.e., animality common) quality condition rated the minority group as being equally human ($M = 5.829$, $SD = 0.97$) as the majority group ($M = 5.671$, $SD = 1.32$), $F(1, 135) = .305$, $p = .582$. On the other hand, members of the minority group in both conditions (humanity vs. animality as the common quality) judged both groups (majority and minority) as being equally human (in the humanity common quality condition: $M = 6.314$, $SD = 1.54$ for the majority group, $M = 6.271$, $SD = 1.65$ for the minority group, $F(1, 135) = .023$, $p = .881$; in the animality common quality condition: $M = 5.985$, $SD = 1.26$ for the majority group, $M = 6.152$, $SD = 1.38$ for the minority group, $F(1, 135) = .323$, $p = .571$). Even though means were in direction with the illusory correlation in all conditions, the strongest (only significant) illusory correlation (i.e., infra-humanization effect) was found for members of the majority group in the humanity common quality condition, where the cognitive and motivational processes worked in the same direction.

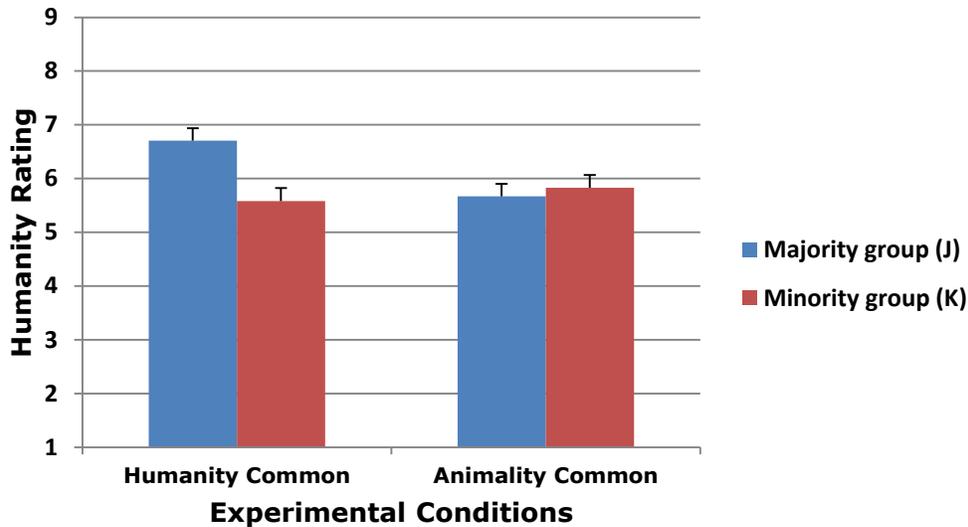


Figure 16. Humanity ratings of the majority (J) and minority (K) groups in the humanity and animality common quality conditions for members of the majority group (Group J).

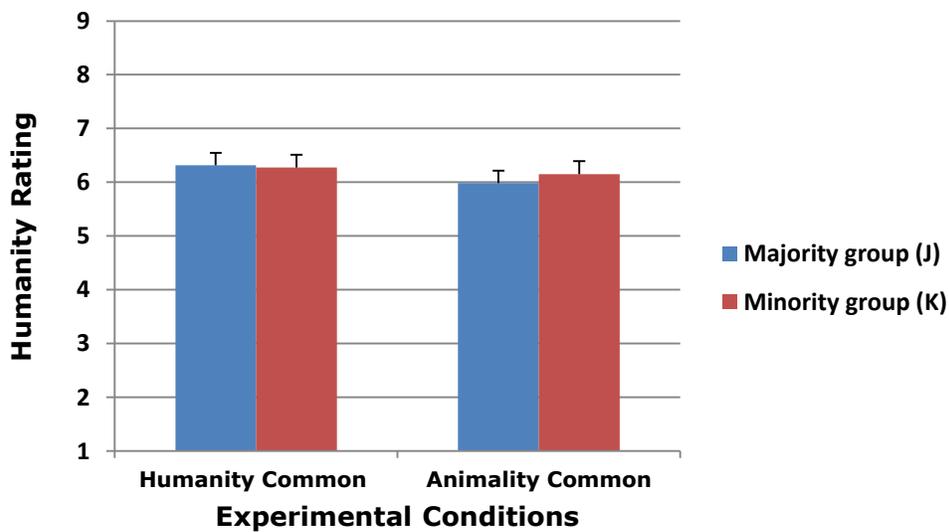


Figure 17. Humanity ratings of the majority (J) and minority (K) groups in the humanity and animality common quality conditions for members of the minority group (Group K).

Group humanity: Words attribution. In addition to three participants eliminated from all the analyses (as mentioned in Method session), data from one participant who didn't complete the task in a proper way (he answered the task only for one of the two groups) were eliminated from analyses on the current measure. Therefore, the analysis was performed considering 138 subjects. As in Study 2, the number of uniquely human words attributed to each of the two

groups was calculated to obtain humanity J (majority group) and humanity K (minority group) scores. These scores were submitted to a 2 (number of uniquely human words attributed to the majority group vs. number of uniquely human words attributed to the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant 2 (number of uniquely human words attributed to the majority group vs. number of uniquely human words attributed to the minority group) X 2 (majority vs. minority group membership) interaction, $F(1, 134) = 9.049, p = .003, \eta^2 = .063$ (see Figure 18), showing that participants who were members of the majority group tended to attribute more uniquely human words to the majority ($M = 7.306, SD = 2.61$) than to the minority group ($M = 6.315, SD = 3.097$), $F(1, 134) = 3.191, p = .076$, whereas participants who were members of the minority group attributed more uniquely human words to the minority ($M = 7.866, SD = 2.55$) than to the majority group ($M = 6.461, SD = 3.27$), $F(1, 134) = 6.043, p = .015$. No other effects were significant.

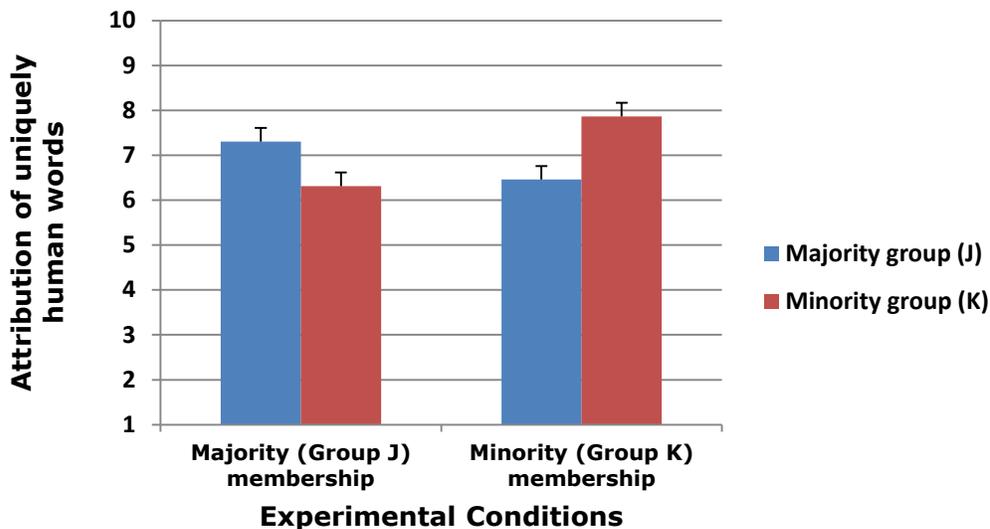


Figure 18. Attribution of uniquely human words to the majority (J) and minority (K) groups in the majority (Group J) and minority (Group K) membership conditions.

Group likeability: Ratings of attributes generated by the participants. A score (average) for each group was created for likeability ratings of group's attributes generated by the participants ($\alpha = .623$ for Group J (majority group); $\alpha = .445$ for Group K (minority group)). These scores were submitted to a 2 (likeability of the majority group vs. likeability of the minority group) X 2

(majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant main effect of the majority and minority group ratings factor, $F(1, 135) = 4.084, p = .045, \eta^2 = .029$, showing that the minority group was liked overall more ($M = 5.122, SD = 1.62$) than the majority group ($M = 4.853, SD = 1.84$). The analysis also revealed a significant 2 (likeability of the majority group vs. likeability of the minority group) X 2 (majority vs. minority group membership) interaction, $F(1, 135) = 13.294, p < .001, \eta^2 = .090$ (see Figure 19). When participants were members of the majority group they equally liked the two groups ($M = 5.245, SD = 1.86$ for the majority group; $M = 5.028, SD = 1.65$ for the minority group), $F(1, 135) = 1.350, p = .247$. Whereas when participants were members of the minority group they liked the minority group more ($M = 5.217, SD = 1.6$) than the majority group ($M = 4.462, SD = 1.73$), $F(1, 135) = 15.713, p < .001$. The analysis also revealed a 2 (likeability of the majority group vs. likeability of the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 4.264, p = .041, \eta^2 = .031$ (see Figure 20), showing that participants in the humanity common quality condition liked both groups equally ($M = 5.173, SD = 1.85$ for the majority group; $M = 5.167, SD = 1.75$ for the minority group), $F(1, 135) = .001, p = .975$, while participants in the animality common quality condition liked the minority group significantly more ($M = 5.077, SD = 1.48$) than the majority group ($M = 4.533, SD = 1.78$), $F(1, 135) = 8.168, p = .005$. From this pattern of data it can be inferred that participants didn't like the majority group when the majority group was perceived as non-uniquely human (i.e., animal-like), perhaps because such a situation is inconsistent with what they are used to observing outside the laboratory. These results were not qualified by the three-way interaction, $F(1, 135) = .547, p = .461, \eta^2 = .004$.

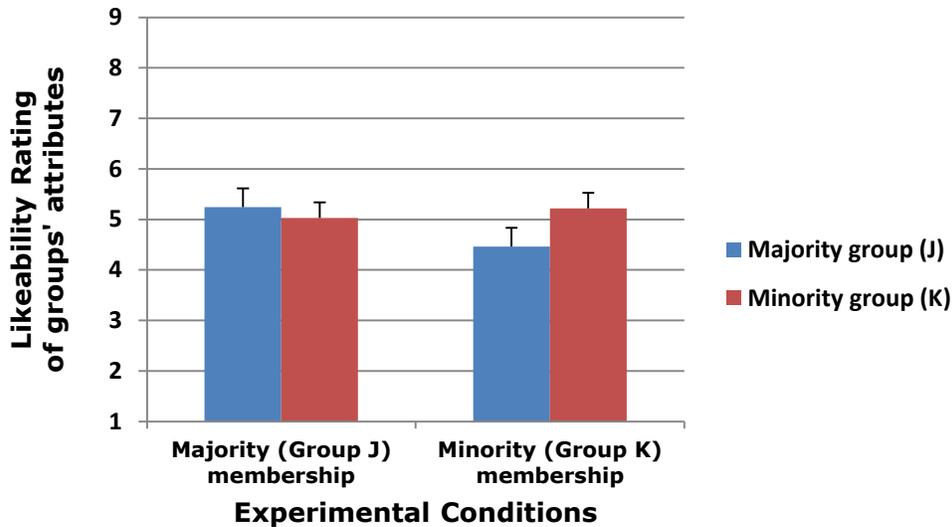


Figure 19. Likeability ratings of the majority (J) and minority (K) groups' attributes in the majority (Group J) and minority (Group K) membership conditions.

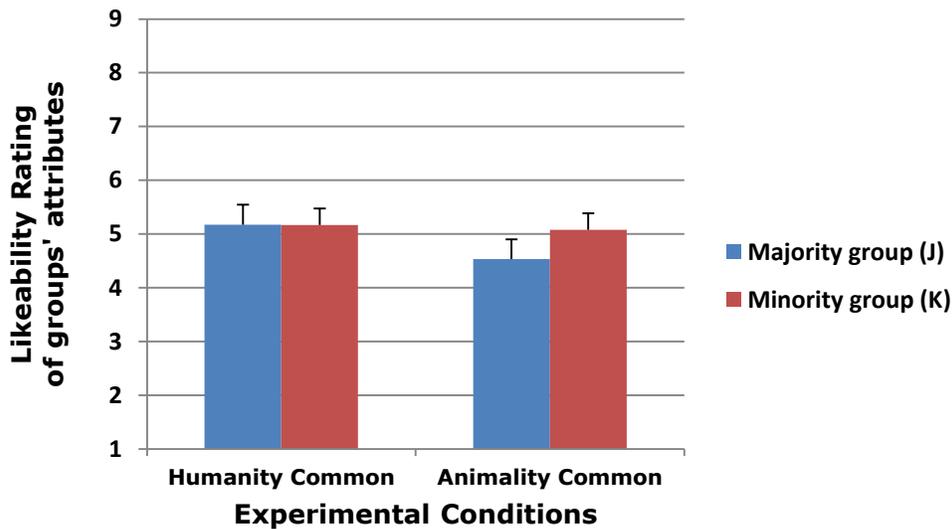


Figure 20. Likeability ratings of the majority (J) and minority (K) groups' attributes in the humanity and animality common quality conditions.

Group likeability: General judgment. To test the difference in likeability of the two groups, another 2 (likeability rating of the majority group vs. likeability rating of the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor was conducted. The analysis revealed a

significant 2 (likeability rating of the majority group vs. likeability rating of the minority group) X 2 (majority vs. minority group membership) interaction, $F(1, 135) = 33.677, p < .001, \eta^2 = .200$ (see Figure 21), showing that when participants were members of the majority group they liked the majority group more ($M = 6.617, SD = 1.62$) than the minority group ($M = 5.899, SD = 1.53$), $F(1, 135) = 14.082, p < .001$, whereas when participants were members of the minority group they liked the minority group more ($M = 6.665, SD = 1.35$) than the majority group ($M = 5.794, SD = 1.51$), $F(1, 135) = 19.778, p < .001$. No other effects were significant.

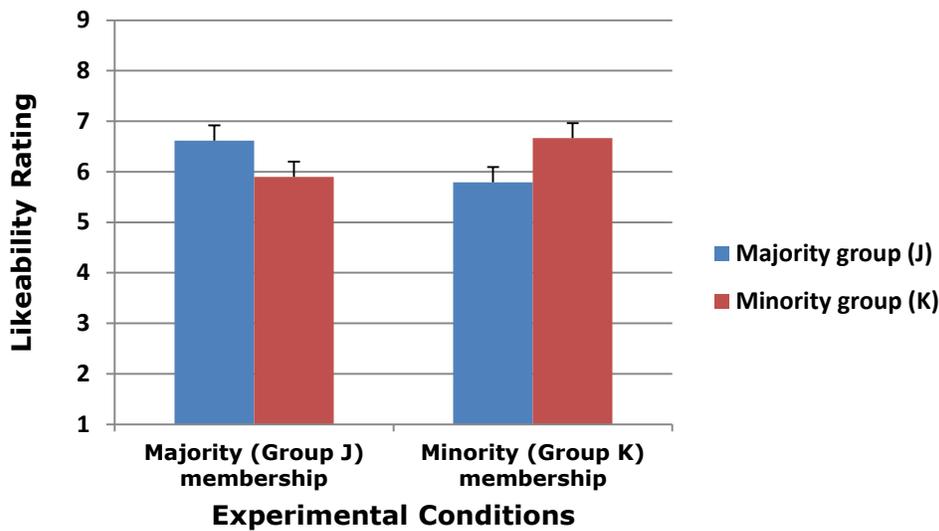


Figure 21. Likeability ratings of the majority (J) and minority (K) groups in the majority (Group J) and minority (Group K) membership conditions.

Self-stereotyping on attributes generated by the participants. A score (average) for each group was created for self-ratings in terms of group's attributes generated by the participants ($\alpha = .518$ for Group J (majority group); $\alpha = .306$ for Group K (minority group)). These scores were submitted to a 2 (self-rating in terms of majority vs. minority group's attributes) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant 2 (self-rating in terms of majority vs. minority group's attributes) X 2 (majority vs. minority group membership) interaction, $F(1, 135) = 18.046, p < .001, \eta^2 = .118$ (see Figure 22), showing that, when participants were members of the majority group, they rated the majority group's attributes as describing themselves more ($M = 5.245, SD = 1.64$), than the minority group's attributes ($M =$

4.886, $SD = 1.21$), $F(1, 135) = 4.005$, $p = .047$, whereas when participants were members of the minority group they rated the minority group's attributes as describing themselves more ($M = 5.489$, $SD = 1.46$) than the majority group's attributes ($M = 4.758$, $SD = 1.55$), $F(1, 135) = 15.880$, $p < .001$. Note that the effect was not moderated by humanity vs. animality as the common quality factor, $F(1, 135) = .020$, $p = .889$, $\eta^2 = .000$.

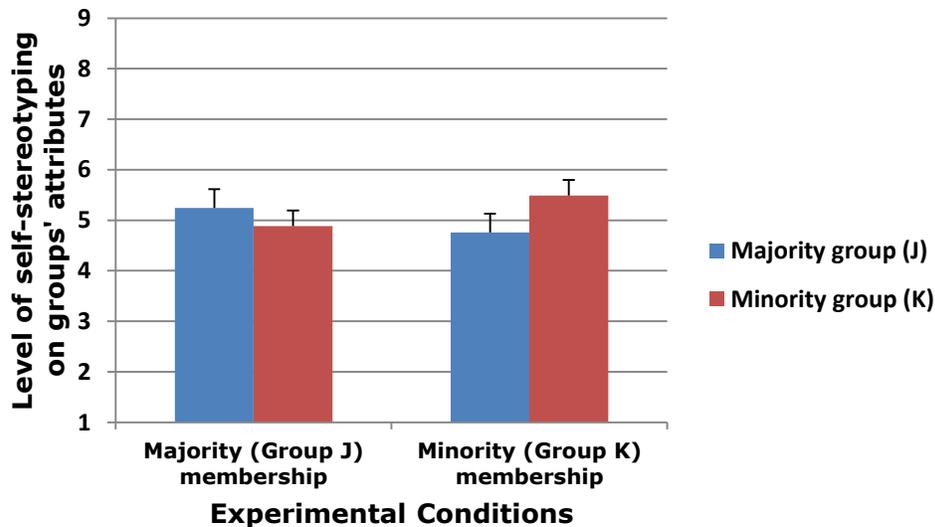


Figure 22. Level of self-stereotyping on the majority (J) and minority (K) groups' attributes in the majority (Group J) and minority (Group K) membership conditions.

Self-stereotyping on emotions and traits. Two scores (averages), one for self-ratings on the uniquely human trait (i.e., rational) and emotion (i.e., guilt) ($r = -.085$, $p = .160$, one-tailed), and another one for self-ratings on the non-uniquely human (i.e., animal-like) trait (i.e., instinctive) and emotion (i.e., fear) ($r = .103$, $p = .114$, one-tailed) were created. These scores were submitted to a 2 (self-rating on uniquely human qualities vs. self-rating on non-uniquely human qualities) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor. The analysis revealed a significant main effect of the self-rating factor, $F(1, 135) = 33.977$, $p < .001$, $\eta^2 = .201$, such that participants always humanized themselves, i.e., rated themselves more (higher) on uniquely human qualities ($M = 6.747$, $SD = 1.18$) than on non-uniquely human (i.e., animal-like) qualities ($M = 6.001$, $SD = 1.24$), regardless of the level of the two between subject factors.

Group identification: Pictorial measure. A 2 (level of closeness with the majority group vs. level of closeness with the minority group) X 2 (majority vs. minority group membership) X 2 (humanity vs. animality as the common quality) ANOVA with repeated measures on the first factor was conducted. The analysis revealed a significant 2 (level of closeness with the majority group vs. level of closeness with the minority group) X 2 (majority vs. minority group membership) interaction, $F(1, 135) = 27.913, p < .001, \eta^2 = .171$ (see Figure 23), showing that, when participants were members of the majority group they identified, i.e., felt higher level of closeness between them and the majority group ($M = 4.138, SD = 1.38$), than with the minority group ($M = 3.593, SD = 1.44$), $F(1, 135) = 14.197, p < .001$, whereas when participants were members of the minority group, they felt higher level of closeness between them and the minority group ($M = 4.443, SD = 1.47$) than between them and the majority group ($M = 3.896, SD = 1.57$), $F(1, 135) = 13.727, p < .001$. Moreover, the analysis revealed a significant 2 (level of closeness with the majority group vs. level of closeness with the minority group) X 2 (humanity vs. animality as the common quality) interaction, $F(1, 135) = 4.432, p = .037, \eta^2 = .032$ (see Figure 24), showing that participants in the humanity common quality condition tended to identify more with the majority group ($M = 4.138, SD = 1.48$) than with the minority group ($M = 3.922, SD = 1.65$), $F(1, 135) = 2.237, p = .137$, whereas participants in the animality common quality condition tended to identify more with the minority group ($M = 4.115, SD = 1.36$) than with the majority group ($M = 3.896, SD = 1.47$), $F(1, 135) = 2.196, p = .141$. These results were not qualified by the three-way interaction, $F(1, 135) = .910, p = .342, \eta^2 = .007$ (see Figure 25 and Figure 26). However, simple effects show that majority group members in the humanity common quality condition identified more with the in-group, ($M = 4.33, SD = 1.39$), than with the out-group, ($M = 3.47, SD = 1.56$), $F(1, 135) = 17.984, p < .001$, while the majority group members in the animality common quality condition didn't show this preferential identification with the in-group, ($M = 3.94, SD = 1.35$ for the majority group; $M = 3.71, SD = 1.32$ for the minority group), $F(1, 135) = 1.232, p = .269$. Concerning the minority group members, they identified more with the in-group in both, the humanity common, ($M = 3.94, SD = 1.55$ for the majority group; $M = 4.37, SD = 1.63$ for the minority group), $F(1, 135) = 4.331, p = .039$, and the animality common quality condition, ($M = 3.85, SD = 1.60$ for the majority group; $M = 4.52, SD = 1.30$ for the minority group), $F(1, 135) = 9.881, p = .002$. These two crossover interactions suggest that group identification changes as a function of group humanity. Moreover, the simple

effects of the three way interaction clarify this pattern of results showing that the identification was particularly strong when participants were members of the group associated with uniquely human qualities, as happens for majority group members in the humanity common quality condition, and for minority group members in the humanity rare (animality common) quality condition. Interestingly, the majority group members didn't identify preferentially with their own group when the majority group was associated with non-uniquely human characteristics (in the animality common quality condition), while the minority group members identified preferentially with their own group even if it was associated with non-uniquely human characteristics (in the humanity common/animality rare quality condition).

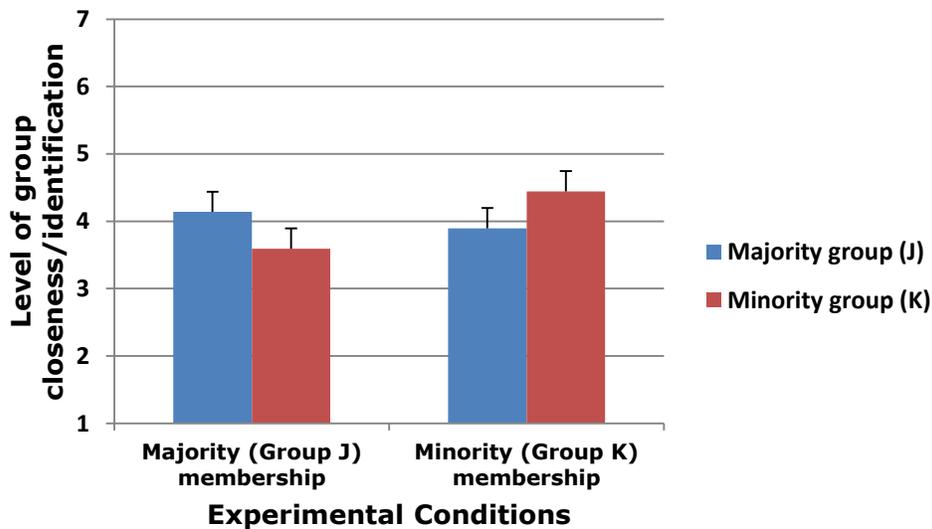


Figure 23. Level of closeness with the majority (J) and minority (K) groups in the majority (Group J) and minority (Group K) membership conditions.

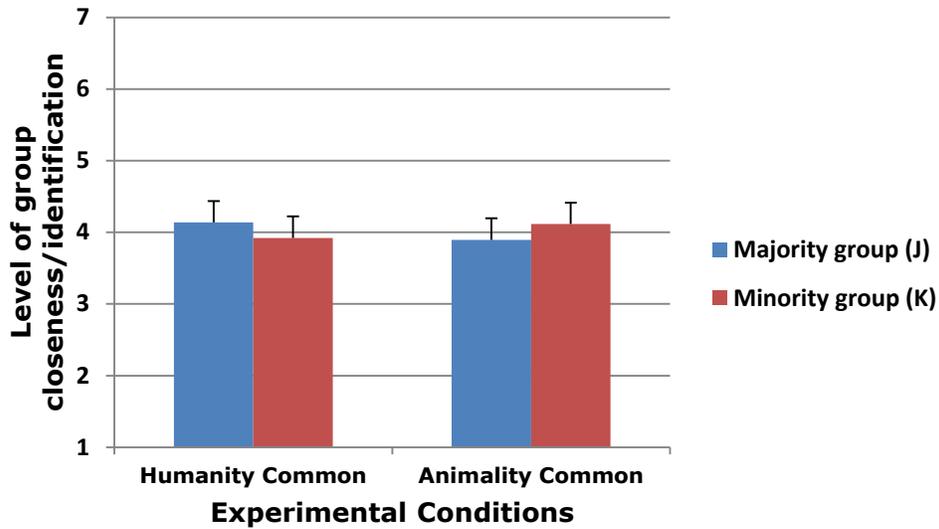


Figure 24. Level of closeness with the majority (J) and minority (K) groups in the humanity and animality common quality conditions.

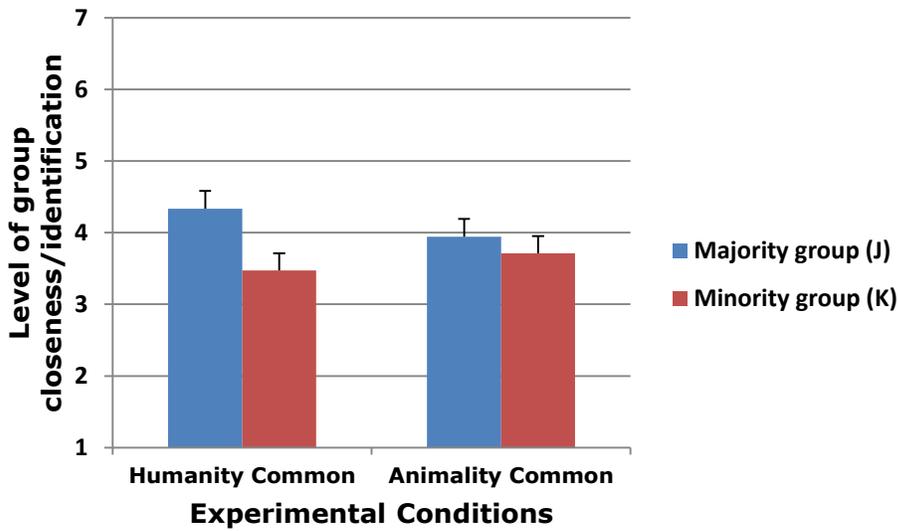


Figure 25. Level of closeness with the majority (J) and minority (K) groups in the humanity and animality common quality conditions for majority (Group J) members.

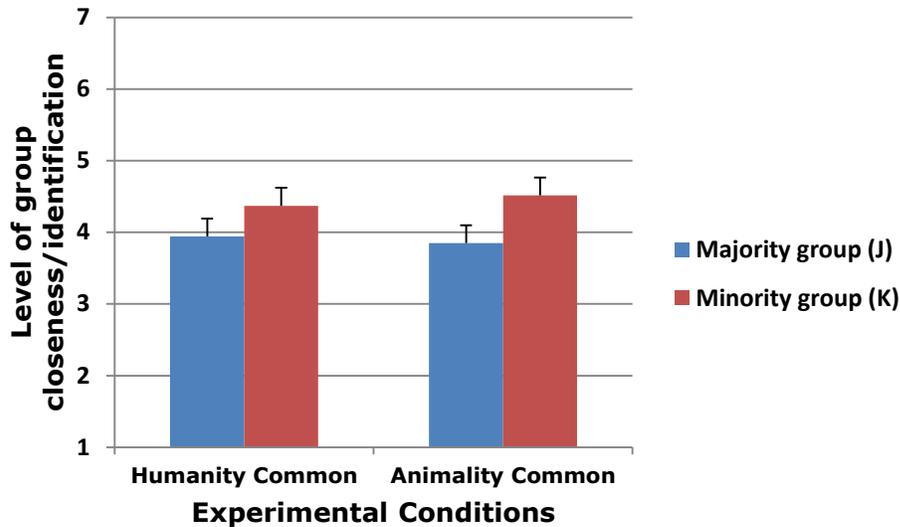


Figure 26. Level of closeness with the majority (J) and minority (K) groups in the humanity and animality common quality conditions for minority (Group K) members.

Dot-probe Task. In addition to the three participants eliminated from all the analysis (as mentioned in Method session), the data of other 23 participants who made at least 25% of errors were not included in the analysis on the current measure. We therefore analyzed the data of only 116 participants. Only correct latencies were considered. Reaction times to the dot probes from trait trials were entered into a 2 (membership: J vs. K) X 2 (common trait: rational vs. instinctive) X 2 (group: J vs. K) X 2 (location of dot probe: same side as common vs. rare trait) ANOVA with repeated measures on the last two factors. Different from predictions, the analysis did not yield significant interaction, $F(1, 112) = 2.169, p = .144, \eta^2 = .019$. Another 2 (membership: J vs. K) X 2 (common emotion: guilt vs. fear) X 2 (group: J vs. K) X 2 (location of dot probe: same side as common vs. rare emotion) ANOVA with repeated measures on the last two factors was conducted with the reaction times to the dot probes from emotion trials. Different from predictions, the analysis again did not yield significant interaction, $F(1, 112) = .535, p = .466, \eta^2 = .005$. Thus, results from both analyses showed that participants' attention did not follow either a cognitive or a motivational bias. However, the analysis on emotion trials revealed a significant main effect of the majority and minority group, $F(1, 112) = 5.158, p = .025, \eta^2 = .044$, showing that participants identified the location of the dot probe overall more

quickly on trials showing members of the majority group ($M = 379.86$ ms, $SD = 88.15$ ms) than on trials showing members of the minority group ($M = 398.8$ ms, $SD = 120.63$ ms).

Discussion

Study 3 addressed the question of whether group membership would moderate illusory correlation effects. Our results overall suggest a negative answer to this question. Judgments of groups' humanity were consistent with the cognitive illusory correlation process in most of the measures. Specifically, regarding the groups' ratings in terms of uniquely human and non-uniquely human (i.e., animal-like) traits and emotions, the majority group was rated as being more uniquely human than the minority group when the uniquely human characteristics were the common attributes. On the other hand, when the uniquely human characteristics were the rare attributes, the minority group was rated as equally uniquely human as the majority group. Thus the minority group was infra-humanized when the uniquely human characteristics were the common attributes, but the majority group was not infra-humanized when the uniquely human characteristics were the rare attributes. In this way, the infra-humanization effect followed the way information was presented, especially when the uniquely human qualities were the common (frequently shared) attributes.

Also, when the non-uniquely human (i.e., animal-like) characteristics were the common attributes, the majority group was seen as more non-uniquely human characteristics-like than the minority group. However, when these qualities were the less frequent ones, again the minority group was described by the non-uniquely human (i.e., animal-like) characteristics to the same extent as the majority group. Conversely, concerning the humanity ratings of attributes generated by the participants, when humanity was the common quality, participants rated both groups as being equally uniquely human; while, when humanity was the rare quality, the majority group was infra-humanized. However, importantly, for all these findings, the interaction between the status of a group as majority or minority and the status of uniquely human and non-uniquely human (i.e., animal-like) characteristics as common or rare has demonstrated that groups' perceptions in terms of humanity followed the way information was presented, i.e., the cognitive process of illusory correlation.

Concerning the categorization task, the effects were driven mostly by the cognitive bias, even though group membership might have influenced some of the results. In particular, as expected, participants categorized individuals presenting common characteristics more likely as members of the majority group and, different from the prediction and from Studies 1 and 2, categorized individuals presenting rare (i.e., uniquely human) characteristics (in the animality common quality condition) equally as members of the majority and the minority groups. In line with our findings on categorization of rare quality members, Schaller and Maass (1989) reported enhanced recall accuracy in an illusory correlation design when participants were members of one of the two groups (the majority or the minority). Also, different from Studies 1 and 2, participants were more accurate in the assignment of common quality members showing both the uniquely human and the neutral (neither uniquely human nor animal-like) qualities, as these individuals (in the humanity common quality condition) were assigned equally to both groups. Moreover, the assignment of new group members described by both the non-uniquely human (i.e., animal-like) and the neutral qualities followed both cognitive and motivational processes. Participants assigned these people more to the majority group when the non-uniquely human (i.e., animal-like) qualities were the more frequent ones and assigned these same people more to the minority group when these qualities were less frequent ones. Also, the majority group members assigned these non-uniquely human (i.e., animal-like) and neutral-quality people more to the minority group, and minority group members assigned them more to the majority group. The effect of group membership might be explained by the presence of the neutral (neither uniquely human nor animal-like and not diagnostic) characteristic that may motivate participants to assign the non-uniquely human-quality people to the out-group rather than to the in-group.

Group membership came into play in more direct group humanity general judgments. Indeed, on groups' humanity general judgments, the cognitive and motivational factors interacted in generating the infra-humanization effect such that the role of cognitive and motivational processes was different for majority and minority group members. While for majority group members the two processes cooperated in producing the infra-humanization bias, both group membership and the way information was presented needed to predict the same effect for infra-humanization to occur, i.e., infra-humanization of the minority group. Interestingly, the members of the minority group didn't judge the in-group as more uniquely human than the out-group, even though both biases predicted the same effect. Thus, we found the expected infra-

humanization effect (the significant difference between humanity ratings of the two groups) only for majority group members. Even though the means were in line with illusory correlation for both majority and minority group members, the strongest (only significant) illusory correlation effect was found for majority group members in the humanity common quality condition. This is not surprising as these participants formed consistent impressions with their in-group bias oriented expectations and also in line with what they are used to experience in the real world outside the laboratory, where the majority (i.e., the first learned group) might always be the in-group. Importantly, why was there no significant illusory correlation effect for minority group members in the humanity rare quality condition, as also these participants would form consistent impressions with their in-group bias oriented expectations? It might be due to the fact that the pattern in which information was presented was different from what they are used to experience outside the laboratory. The in-group is usually the majority group, at least in one's own experience. Thus, minority group members might not learn the majority group first. This could be tested in future research monitoring the learning process to better understand the illusory correlation effect in minority group experience.

The only measure where the motivational process actually overrode the usual illusory correlation mechanism was the measure of words attribution, which was presented after the manipulation check measure. This might have made group membership particularly salient. However, this is an interesting finding that suggests that the combined role of both the cognitive and the motivational processes should be further examined in relation to the salience of group membership. Thus, it would be interesting for future research to manipulate the salience of group membership to further examine the role of motivational processes in the out-group infra-humanization effect.

Importantly, as expected, members of both groups showed more favorable evaluations of their own group regardless of characteristics status (uniquely human/common, non-uniquely human/rare, or the other way around) in the more direct measure of general judgment. In the measure of groups' ratings on attributes generated by the participants, majority group members liked both groups equally, while minority group members liked the in-group more. Also it seems as though participants didn't like when the majority group was perceived as non-uniquely human, i.e., when the non-uniquely human characteristics were the common attributes.

Interestingly, participants identified with their own group, but such identification seems to be influenced by group perception as uniquely or non-uniquely human, as participants tended to identify with the in-group more or less as a function of in-group humanness perception.

Moreover, as expected, participants self-stereotyped themselves in terms of in-group attributes, and saw themselves as being more uniquely human qualities-like, rational and guilty, than non-uniquely human qualities-like, instinctive and fearful, regardless of group membership and qualities status as common or rare. Thus, different from groups' humanity perceptions that were determined primarily by the cognitive illusory correlation bias in most of the judgments, self perception was always rated as more uniquely human qualities-like (rational and feeling guilty) than non-uniquely human qualities-like (instinctive and feeling fearful), i.e., was always humanized.

Concerning the probe reaction time task, the only interesting result was found on emotion trials, as participants identified the dot probes more quickly when reading about members of the majority group, which demonstrates more attention being paid to the majority group than to the minority group.

Chapter V

General Discussion

In the present dissertation, we advanced the idea that out-group infra-humanization has also cognitive determinants. Specifically, we related infra-humanization to illusory correlation. Illusory correlation refers to the phenomenon that emerges when people perceive differences between majority and minority groups where no such differences exist. According to its recent account (Kruschke's Attention theory (AT) of category learning; Kruschke, 1996, 2001, 2003), illusory correlation is the result of a learning sequence. Attention is first directed to the majority or first encountered group, and once its typical characteristics are learned (i.e., stereotyped), then attention shifts to the minority or the second learned group in search for differences. Consequently, the minority (second learned) group is stereotyped as different from the majority or the first learned group. The parallel between illusory correlation and out-group infra-humanization is suggested by the fact that humanity is a commonly shared attribute of all social groups, but it is generally better associated with the in-group (i.e., the majority, at least in one's own experience, and first learned group) than with the out-group (likely the minority and second learned group) (Leyens et al., 2000, 2001, 2007; see also Haslam). To show that infra-humanization (i.e., a differential perception of humanity between groups) would arise in response to the cognitive process of illusory correlation, participants were asked to form impressions of two groups, a majority and a minority, to which they did not belong. Although this was not an intergroup context, we predicted an infra-humanization effect to emerge (i.e., a differential perception of humanity). Following illusory correlation, we expected that the minority group would be infra-humanized (i.e., judged as less human compared to the majority group) when the uniquely human characteristics were the more frequent (common) group attributes, whereas the majority group would be infra-humanized (i.e., judged as less human compared to the minority group) when the uniquely human characteristics were the less frequent (rare) attributes.

The results of Studies 1 and 2 support this hypothesis regarding the infra-humanization of the minority group. Indeed, the minority group was clearly infra-humanized when the uniquely human characteristics were the common qualities. The hypothesis on the infra-humanization of

the majority group was not always supported. The results from the dot-probe task (Study 2) better clarify these findings as they suggest that the differentiation between groups was created more by attention paid to the common qualities expressed by members of the majority group than by attention paid to the rare qualities expressed by members of the minority group (differently from what Attention Theory predicts). However, the basic illusory correlation finding is supported also by the categorization data, as participants assigned the common quality members more to the majority group than to the minority group and assigned the rare quality members more to the minority group than to the majority group, even though the majority group had twice as many rare quality members as the minority. Taken together, these results demonstrate that a differential between groups appraisal of humanity can emerge as result of cognitive processing.

The intent of Study 3 was to examine if group membership would moderate ratings of groups' humanity in response to group members information processing. Previous studies have shown that it is generally the in-group to be judged as more human than the out-group. In addition, Demoulin et al. (2009) have shown that (a meaningful) group membership is a sufficient condition to create out-group infra-humanization. We predicted that, if the role of cognitive process was stronger than the role of group membership in determining the infra-humanization effect, the pattern of results would be the same as for Studies 1 and 2 where group membership was not introduced. On the other hand, if the motivational mechanism overrode the basic illusory correlation effect, the results would be entirely driven by group membership. Finally, if the cognitive and motivational processes cooperated in producing the infra-humanization bias, i.e., both illusory correlation and group membership would be necessary, both processes would need to predict the same effect as happens for majority group members in the humanity common quality condition and for minority group members in the humanity rare (animality common) quality condition as long as groups would be judged as different in humanity.

The infra-humanization effect seems to be driven more by cognitive (illusory correlation) than by motivational (group membership) processes in four out of five measures of groups' humanity perceptions, specifically in groups' ratings on uniquely human and non-uniquely human attributes, in groups' ratings on attributes generated by the participants, in group member assignment task, and in groups' humanity general judgments. However, in the measure of group

humanity general judgments, group membership comes into account such that the two processes cooperate, i.e., both illusory correlation and group membership are necessary for the infra-humanization effect to occur, but only for majority group members. The process seems to be different for minority group members. Importantly, the motivational process of group membership seems not to have a primary role for the perception of groups' humanity. However, group membership comes into account for members of the majority group in the humanity common quality condition, the situation that participants may experience in the real world where they might be members of the majority group (at least in once own experience) and humanity, a generally shared attribute, might be associated with the first learned group (i.e., the in-group). These results suggest that for groups' humanity general judgments both processes might be necessary for infra-humanization to occur. However, the process seems to be different for minority group members, who do not infra-humanize the majority group.

Finally and surprisingly, group membership overrides the basic illusory correlation bias in the measure of human and animal-like words attribution (Viki et al., 2006, Experiment 3). Such result may be due to a methodological problem, as the measure was presented after the manipulation check question, which might make group membership particularly salient to the participants. This is a very interesting possibility, which suggests that, after a motivational prime, group membership might override the basic cognitive illusory correlation process in producing infra-humanization. Overall, our results suggest the primacy of the cognitive process in the formation of differential perceptions of groups' humanity. Thus, differently from Schaller and Maass (1989), we overall do not find the attenuation of the illusory correlation by the introduction of group membership.

The motivational process comes into play more importantly at the level of group identification. Our participants identify more with their own group based on the personality test, but also another motivation takes place as they tend to identify with the group associated with the uniquely human characteristics. Thus, the identification with the in-group changes as a function of group's humanity, such that participants tend to identify with the in-group more if it is associated with the uniquely human characteristics. Indeed, the simple effects of the three way interaction suggest, in an exploratory way, that identification is strongest for majority group members in the humanity common quality condition and for minority group members in the humanity rare (animality common) quality condition. Interestingly, majority members seem not

to preferentially identify with their own group if this group is associated with the non-uniquely human characteristics, while minority group members preferentially identify with the in-group when both the uniquely human characteristics are the infrequent attributes and when the non-uniquely human (i.e., animal-like) characteristics are the infrequent attributes. Parallel to the results from the measure of groups' humanity general judgments, despite in-group identification, minority group members don't infra-humanize the majority group. Such a pattern of results gives support to the idea that the absence of out-group infra-humanization in case of minority group members might be determined by a difference in the learning process of minority group members in the illusory correlation paradigm. The minority members might not learn the majority group first (they might learn the minority (in-group) first), which might interfere with the way information is presented. If we didn't have results from Studies 1 and 2, the alternative explanation could be that group identification was so strong for minority group members that it attenuated the formation of illusory correlation (in line with Schaller and Maass, 1989). However, given the results from Studies 1 and 2, where group membership was not introduced, but the majority group was still not infra-humanized, we can eliminate this alternative explanation, leaving the possibility for the interpretation in terms of different learning process in the illusory correlation paradigm in the case of minority group members.

Taken together, this pattern of results suggest that the cognitive process seems to be more important than the motivational one in determining differential appraisal of groups' humanity, as despite group membership, our participants formed impressions about groups' humanity following the way information was presented. The motivational process seems to be more important for participants' identification with the groups than for groups' humanity perceptions. Indeed, it comes into account more importantly at the level of group identification such that participants identify with the in-group but tend to identify also with group associated with the uniquely human characteristics. Thus, it can be inferred that, once participants learn that their group is not uniquely human, they tend to identify with the other (more uniquely human) group. This is especially true for majority group members. We took for granted that the participants would identify with the in-group (majority or minority), based on the result of the personality test (group assignment), independently from the group perception as uniquely or non-uniquely humanity. However, the effect of characteristic status (uniquely or non-uniquely humanity as common or rare) on group identification may be in part due to the presentation of the

identification measure after participants rated themselves in terms of groups' uniquely human and non-uniquely human (i.e., animal-like) traits and emotions, as they always rated themselves as being more uniquely human qualities-like than non-uniquely human qualities-like. This might strengthen the identification with group associated with the uniquely human characteristics. Thus the identification with the more uniquely human group could be an alternative (motivational) explanation of our results if we didn't have (in Studies 1 and 2) the other condition where the non-uniquely human (i.e., animal-like) characteristics were the frequent attributes. Given the same pattern of results in both conditions (humanity and animality as the common quality) in Studies 1 and 2, we can eliminate such an alternative explanation.

Given the complexity of results of Study 3, they may raise more questions than they solve. However, a lot of these questions are resolvable with future efforts as outlined in section about future directions. Even though groups' humanness perception seems to be primarily driven by information processing, differences across measures may suggest that, under some conditions, the cognitive bias may be stronger than the motivational one, while under other conditions, the motivational process may outweigh the basic cognitive bias. Group categorization clearly introduces a complex set of processes in the formation of social stereotypes. The results of Study 3 represent the first step toward understanding the combined role of both the cognitive and the motivational processes in producing the infra-humanization bias.

Implications for Infra-humanization

What are the implications of our research for out-group infra-humanization? Until now, the infra-humanization effect has been theorized as an intergroup phenomenon that necessarily involves perceptions of the in-group and out-group. In this dissertation we proposed and empirically verified the idea that infra-humanization can be conceived also as a form of stereotyping, and therefore cognitive processes play a role in the emergence of this phenomenon. Specifically, we showed that the infra-humanization effect results from an illusory correlation that people create between the majority group and humanity, which is a generally shared attribute common to all social groups. In our studies, the two groups were described by exactly the same uniquely human and non-uniquely human characteristics (personality traits and emotions) and to the same extent. However, people perceived the two groups (the majority and

the minority) to be differently associated with the uniquely human and non-uniquely human characteristics depending on how information was presented. Specifically, the minority group was infra-humanized when uniquely human qualities were more frequent (common), but the hypothesis on infra-humanization of the majority group (i.e., on preferential association between the minority group and humanity when uniquely human characteristics were the rare attributes) seems not to be equally well supported. Thus, our data suggest that, when learning about the majority and the minority group in the context in which people do not belong to none of these two groups and uniquely human qualities are more frequent (common) ones, the minority group is infra-humanized. However, when uniquely human qualities are less frequent (rare) ones, the majority group is not infra-humanized. This suggests that minority groups are more likely to be infra-humanized. To our knowledge, these are the first findings that suggest such a novel possibility.

Our data also suggest that the differentiation between groups is driven more by the association between the majority group and the common descriptor (than by the association between the minority group and the rare descriptor) and that our participants differentiated the minority group from the majority, perceiving it as possessing the common quality to a lesser extent rather than as possessing the rare quality to a greater extent. Consistent with this finding, the data from the dot-probe task (Study 2) demonstrated that participants paid more attention to the common than to the rare qualities when presented with members of the majority group, but paid equal attention to both the common and the rare qualities when reading about members of the minority group. Thus, assuming that humanity is a generally shared attribute and that the majority group is, at least in one's own experience, the in-group, these results imply that the infra-humanization effect might result from the perception of the out-group (the minority and the second learned group) as being less uniquely human than the in-group, the result that confirms the original tenet of the Infra-humanization theory. Moreover, in line with this reasoning, our data may explain why the in-group is always more human than the out-group and might support the primacy of in-group humanization rather than denial of humanity to the out-group on the origin of the infra-humanization effect.

Importantly, to our knowledge, these data offer the first evidence of any cognitive process that can create the infra-humanization bias. Thus, if previous studies showed that (meaningful) inter-group categorization is a sufficient condition for infra-humanization to occur,

this new “cognitive approach” to infra-humanization suggests that the cognitive process of illusory correlation is also another sufficient condition. In this respect, (meaningful) group categorization is not a necessary condition for infra-humanization to occur. Our results from Studies 1 and 2 demonstrated that the infra-humanization effect occurs without involvement of group membership and even without the need for differences between groups to be real, as the infra-humanization bias followed the way information was presented without involvement of group membership in the illusory correlation paradigm where the two groups were exactly the same in uniquely human and non-uniquely human attributes.

Moreover, the results of Study 3 where group membership was introduced suggest that the infra-humanization effect might be more strongly determined by the cognitive than by the motivational process. However, the results are not consistent across measures, suggesting that the role of cognitive and motivational processes in producing the infra-humanization bias may change at different levels of humanity perception and in relationship to different variables that come into account with group membership. The results from Study 3 also suggest that the cognitive process leading to illusory correlation might be different for minority group members, who might not learn the majority group first. They might learn the minority first, which might interfere with the way information is presented thus canceling the infra-humanization effect. However, this suggests that out-group infra-humanization in the case of minority group members can not be explained by our data from Study 3, as in the real world the in-group might always be the majority group at least in one’s own experience.

Implications for Illusory Correlation and for Stereotype Formation

Beyond the implications for out-group infra-humanization, our studies offer an important extension of research on illusory correlation. Traditionally, research on the effect has focused on the extent to which majority and minority groups were perceived along an evaluative dimension. The typical result was that, when the frequent group descriptors were favorable and the infrequent descriptors were unfavorable, the minority group was perceived as less favorable than the majority group. When the opposite was true: the frequent descriptor was unfavorable and the infrequent descriptor was favorable, the minority was seen as more favorable than the majority. Importantly, our results demonstrate that illusory correlation can explain the differential

appraisal of groups' humanity, which is a different dimension from the evaluation dimension. The results of Studies 1 and 2 clearly demonstrated that groups were differently stereotyped on uniquely human and not uniquely human traits and emotions depending on how information was presented, i.e., depending on which characteristics (uniquely human or non-uniquely human) were common or rare. Importantly, these stereotypical groups' perceptions affected more general judgments about groups' humanity. To test the effect of illusory correlation on out-group infra-humanization, we applied the Attention theory (AT) of category learning (Kruschke, 1996, 2001, 2003), an account that makes prediction for both the extent to which the majority group is associated with the common (more frequent) descriptor and the extent to which the minority group is associated with the rare (less frequent) descriptor, thus better unrevealing the origins of the infra-humanization bias.

AT explains the category learning and stereotype formation by the learning sequence such that the majority group is learned before the minority group and thus become associated with more frequent (generally shared) attribute. After an impression was formed about the majority group, attention shifts to learn about the minority group, distinguishing it from the majority. Thus, AT predicts that the majority group becomes preferentially associated with the frequent descriptor and the minority group becomes preferentially associated with the infrequent descriptor. Moreover, because of additional attention dedicated to the minority group in order to distinguish it from the majority, the association between the minority group and the rare descriptor is expected to be stronger than the association between the majority group and the common descriptor. Thus, AT claims that the differentiation between groups is given mostly by the attention paid to the distinctive attributes of the minority group, which results in stronger stereotypes of the minority group members.

To test the AT account of our illusory correlation findings, we measured the extent to which each group (the majority and minority) was associated with each of the two descriptors (the common and the rare) using several different measures, such as assignment of novel group members described by the common, the rare, or both the common and rare quality, group ratings on common and rare characteristics, as well as more general judgments of humanity as a common or rare quality. Also, to directly test the AT attention shifting mechanism, the attention paid to combinations of group (the majority and minority) and attribute (the common and rare) was measured (i.e., dot-probe task).

Do our results support the AT account? First of all, in line with predictions of AT, the results from group members' assignment task has clearly demonstrated that novel group members described by the common (more frequent) quality were more likely categorized as members of the majority group and novel group members described by the rare (less frequent) quality were more likely categorized as members of the minority group. Moreover, in line with the AT explanation of the illusory correlation effect, the mixed, i.e., both common and rare, quality members were overall categorized as members of the majority group to a lesser extent compared to the base rate, thus showing a base-rate neglect effect. The same results emerged also when a non-diagnostic (neutral, i.e., neither uniquely human nor animal-like) attribute was present.

Regarding groups' rating on common and rare attributes, the interaction effect between the status of uniquely human and non-uniquely human (i.e., animal-like) qualities as common or rare and humanity rating of the majority and the minority group was always significant and means were always in predicted direction, confirming our hypothesis of differential association between the groups and qualities depending on the experimental condition or differently saying on how information was presented. Also the results from the dot-probe task (trait trials, Study 2) showed that participants paid different attention to combinations of group (majority or minority) and attribute (common or rare). However, these results don't support the AT explanation of our illusory correlation effect. Indeed, while the AT account predicts the stronger association between the rare descriptor and the minority group than between the common descriptor and the majority group, overall our results don't offer clear evidence for the preferential association between the minority group and the rare quality. In this respect, the results from the dot-probe task suggest that the differentiation in perceptions of the two groups was made more by the attention paid to the majority group, i.e., by the association between the majority group and the common quality than by the attention paid to the minority group and the rare quality. Indeed, participants concentrated more on the common than on the rare trait when reading about majority group members, but concentrated equally to both (the common and rare) traits when reading about the minority group. Thus, differentiation between groups was made by attention paid to the majority rather than to the minority group.

How can we explain these results that are not supported by the AT? Speculating, the possible explanation could be that our participants did not have enough time to complete the

learning sequence during the impression formation task. The learning sequence theorized by the AT is made in three stages: learning about the majority group by forming the association between the majority group and the common attribute, attention shifting to the minority group, and learning about the distinctive attributes of the minority group. Thus, to learn about the minority group, participants had to search for differences from the majority. The time might have not been long enough for the last step of the learning sequence to be completed (i.e., learning about distinctive features of the minority group might have not been completed). Also, as the minority group was described by twice as many common quality members as rare quality members, it might have been difficult to create a rare quality impression of the minority group. Thus, participants might have differentiated between the two groups based on the association that had been consolidated, i.e., on the dimension preferentially associated with the majority group. In this way, in making judgments, they would have focused on what they learned well, i.e., that the majority group was more common quality-like than the minority and indeed that the minority was missing the common quality. However, the fact that the mixed (both common and rare) quality members were assigned to the majority group to a lesser extent compare to the base rate, i.e., the base-rate neglect effect, suggests that the rare quality became somehow diagnostic of the minority group. Also, it could be hypothesized that the process might be different when applied to a social context as opposed to non-social stimuli such as diseases. In order to learn about categories in the case of diseases, it might be important to concentrate to both predictors equally to be able to diagnose the disease, while for groups it might be enough to concentrate on the first learned group and then to differentiate a new group from the first learned one on the same quality. The impression formed about the first learned (majority) group might serve as baseline for the impression of the second learned (minority) group. In line with this analysis, Gawronski, Boredhausen, and Banse (2005) demonstrated that, when considering the attributes of new groups, the stereotypes of known groups are used as a standard for judgments. Similarly, in the prospective offered by Hegarty and Bruckmuller (2013) the first learned (often majority and more powerful) group is advantaged over the second learned (often minority and less powerful) group since it becomes implicitly more prototypical and people use it as a baseline (a norm) for judgments about the second group. Importantly, the authors framed their model in the context of social categories that are different in power, such as men and women or heterosexuals and homosexuals and explained the group differences as being anchored in the minority group (in

line with the AT account) . However, they do not offer empirical support for this explanation. Different from this account, our data suggest that, when the two groups are confronted, the differentiation is made by the attention paid to the majority group, and the minority group is judged differently by the quality that is distinctive of the majority group, i.e., as possessing the common quality to a lesser extent. Our finding implies, for instance, that if men are stereotypically ambitious and women emotional, when men and women are confronted, men's characteristics are used as a baseline for making judgments about women and differentiation is made on the men's (more prototypical) dimension. Thus women are perceived (stereotyped) as lacking this prototypical dimension, i.e., as less ambitious than men, instead of being judged on their distinctive dimension, i.e., as being more emotional than men. This aspect of our data (the fact that participants differentiated between groups more on the common than on the rare quality) might be best explained by Cadinu and Rothbart (1996), who suggested that, on the basis of knowledge about one group, people might tend to infer the opposite about another group, and that this tendency should exist whether or not people are members of the target groups.

Our studies also imply novel hypotheses about stereotype formation. Some of these hypotheses were tested and supported in the present contribution; others need to be verified with future research. As already pointed out, our research showed formation of stereotypes for uniquely human and non-uniquely human traits and emotions, which represent a new stereotypical dimension. Importantly, despite discrepancies, the Attention theory (AT) of category learning (Kruschke, 1996, 2001, 2003) seems to be the account of illusory correlation that can best explain our findings. AT underlines the importance of the learning sequence for intergroup comparison and stereotype formation. What we learn about a group depends on what we already know about other groups. If a trait is highly descriptive of both a majority and a minority group, it is associated with the majority. Once the trait is associated with the known group, the association of the trait with a new (second learned group, i.e., minority) is inhibited. In our studies, when humanity was a generally shared (common and more frequent) attribute it was associated preferentially with the majority group, but when this trait was the rare (less frequent) attribute, it was associated equally with both groups, the majority and the minority, i.e., there was not preferential association between the trait and the minority group and thus no evidence for infra-humanization of the majority group. AT claims that the differentiation between groups is given mostly by the particular attention paid to the distinctive features of minority group

members and that the association between the minority group and the rare quality is even stronger than the association between the majority group and the common quality resulting in stronger stereotypes of minority group members. However, our data suggest that participants concentrated more on the majority group members than on the minority group members and that they differentiated between groups more on common than on rare qualities. We hypothesized that the process might be different in the case of social groups (i.e., social stereotypes), as it might be enough to form an impression (stereotype) about the first learned group and to judge the second learned group as different on the same quality. We also hypothesized that such a result may be partially due to the fact that the learning sequence was not completed. Another explanation may be given by the peculiarity of humanity as a stereotypical dimension that might enhance this kind of processing (i.e., associating humanity with the first learned group and evaluating the second learned group as missing this dimension). A generally shared attribute such as humanness, once associated with the first learned group (the majority) might become deemed typical of the known group and thus might constrain the types of impressions people form about new groups. More broadly speaking, because we learn about the majority group before learning about the minority group and because the prevalence of majority group members shows uniquely human attributes, we form the uniquely human impression of the majority group. When we subsequently learn about the minority group, we may have limited knowledge about minority attributes. Thus, the best way to differentiate the minority (the second learned group) from the majority (already known group), which was ascribed full humanity, is to describe it as missing the uniquely human attributes, i.e., as less uniquely human.

Future Directions

The present contribution opens many new directions for future research on infra-humanization, as well as on illusory correlation and stereotype formation. Most importantly, Studies 1 and 2 demonstrate out-group infra-humanization, in addition to being a motivated phenomenon driven from a search for positive social identity, can also be conceived as a cognitive illusory correlation bias driven from the normal way that people perceive and process information. Specifically, our data showed that, if humanity is a generally shared attribute of all social groups, when people process information about majority and minority groups to which

they do not belong, they associate humanness with the majority group and thus infra-humanize the minority. This suggests that minority groups are more likely to be infra-humanized. Thus, in line with findings in the domain of Infra-humanization theory, future research should investigate whether illusory correlation creates an implicit association between the majority group and uniquely human attributes as well as humanity in general.

The results of Study 3 are not conclusive and thus probably raise more questions that they solve. But little is known about the role of in-group bias in the formation of illusory correlations in general. There is a big gap in the literature on this topic. To our knowledge, the work by Schaller and Maass (1989) is the only contribution that investigated how group membership moderates the illusory correlation effect. While the authors report evidence that illusory correlation is attenuated when participants are members of one of the groups (the majority or the minority) as they form more accurate impressions of the groups, our data do not support this finding. Such a tendency was found (in Schaller and Maass) on measures that are sensitive to recall accuracy, while on measures of group likeability, group membership overrode the basic illusory correlation effect. However, as the results of Schaller and Maass have not been replicated by other studies, these results can not be considered to be conclusive. Moreover, we used a different dimension that may enhance a different kind of processing, thus altering the role of each of the two processes (illusory correlation and group membership) in the infra-humanization bias. Thus, additional research is needed to clarify the role of in-group bias in the formation of illusory correlations in general, as well as in differential appraisal of groups' humanity in particular. Our data suggest that the two processes might interact differently at different levels of groups' humanity judgments (at the level of stereotyping in terms of uniquely human and not uniquely human qualities or at the level of more general judgments about group humanity) and in relationship with the salience of group membership.

It is important to better understand the cognitive process of illusory correlation in the case of minority group members. More research is needed to unravel the stereotype formation process in minority group members' experience, as little is known about how minority group members form impressions about both their own group and about the majority group. Most research has been oriented to understanding how minorities are perceived by dominant majority groups. Our data interestingly suggest that minority group members identified with their own group regardless of the group's perceived humanity. This might be due to the difference in information

processing in the illusory correlation paradigm for minority group members, who might not learn the majority group first (they might learn the minority, i.e., the in-group first), which might interfere with the way information is presented, resulting in no illusory correlation effect. Importantly, this suggests that our data can not explain the cognitive process of the infra-humanization effect in minority groups' experience.

Moreover, little is known about the role of group membership and personal involvement/relevance for the learning sequence in the AT model. Clearly humanity is a very relevant dimension for participants. Friendliness and intelligence (Sherman et al., 2009) might be less relevant dimensions and thus might engage a different kind of processing. Given the personal relevance of this dimension, in order to differentiate between (i.e., learn about) groups, people might pay different attention to the common or the rare group attributes. In this respect, humanity is a very relevant dimension and once associated with the first learned group (the majority and the in-group), it might directly constrain the type of impression people form about the second learned group (the minority and the out-group). Thus, in order to form impressions about the groups' humanity, it might be enough to associate the full humanness with the first learned group (in-group) and to infer less humanness for the out-group. Also, if applied to learning about diseases in an illusory correlation design, the attention paid to the frequent and infrequent symptoms might change as a function of the personal relevance of each of the two symptoms in the process of learning about diseases.

Finally, this new cognitive approach to infra-humanization could open a new line of research on specific moderators, and on interventions that can attenuate this important and interesting intergroup bias. This is important because of the known relationship between stereotypes, prejudice, and discrimination.

Conclusion

In the present dissertation we proposed and provided an empirical support for the idea that out-group infra-humanization can be conceived as an illusory correlation that people create between members of the majority (more frequent) group and generally shared attribute such as humanness. Moreover the theoretical account that seems to best explain our findings was offered, i.e., Kruschke's Attention theory of category learning (1996, 2001, 2003) which propose that people first learn about more frequent group (the majority) associating it with more frequent (generally shared) attributes (such as humanness) and then they shift attention to learn about less frequent group (the minority) trying to differentiate it from the majority. Thus differently from how conceived up to now by Infra-humanization theory, out-group infra-humanization seems to be not only a motivated phenomenon driven by search for positive social identity, but can also result from the normal way that people perceive and process social information. Moreover, in our data, the cognitive bias seems to be even stronger than the motivational one in generating the differential appraisal of group humanity. However the role of the cognitive illusory correlation bias in the infra-humanization effect needs to be further verified in relationship with different variables introduced by group membership at different levels (at the level of stereotyping or at the level of general judgments of groups' humanity) of judgments about groups' humanity.

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Appendix

Materials Study 1

First experimental manipulation/Impression formation task with traits

Instructions page 1:

Welcome to the “Impression Formation of Groups” experiment!

In this experiment, you will be learning about two different groups (Group F and Group G) and about different members of those groups.

Different people have different ways of behaving and have different traits and characteristics. Some people are sociable and some are not sociable. Other people have other characteristic traits --- competitive, responsible, curious, etc. Likewise, different groups can be said to have typical ways of behaving and to have typical characteristics. Thus, a group might be characterized as sociable, competitive, responsible, etc.

You will be presented with members of two different groups (F and G), and you will see the traits or emotions that are typical of these people. Your job is to learn about the two groups by seeing the typical characteristics of the members of those groups. You should form impressions of the two groups. To do this, you will have to pay close attention to the information that is presented.

Instructions page 2:

In the first part of the experiment, you will be presented one at a time with one member of a group and his typical trait.

You will have three and half seconds to read about each member and his trait, and then the screen will automatically advance to the next group member.

Your task is to read the descriptions as quickly and carefully as you can, and to form impressions of the two groups, as we are going to ask you some questions about what you learned later on.

Stimuli:

e.g.,

Mark, a member of Group F, is Rational.

Paul, a member of Group F, is Instinctive.

Brad, a member of Group G, is Rational.

Alec, a member of Group G, is Instinctive.

Dependent Variables

First Group member assignment task with traits

Instructions:

Now we are going to show you some new members of the groups whom you have not seen before, and we will tell you about their typical characteristics.

Your task will be to guess which group they are members of. You will not be told the right answer, but it is very important to make the best guess on the basis of what you learned from the earlier part of the experiment.

To indicate what you think is each person's group membership, please press the F key to indicate Group F, or the G key to indicate Group G.

Stimuli:

e.g.,

Travis, a member of _____, is Rational.

Is Travis a member of Group F, or Group G?

Sam, a member of _____, is Instinctive.

Is Sam a member of Group F, or Group G?

Jeffrey, a member of _____, is Rational and Instinctive.

Is Jeffrey a member of Group F, or Group G?

David, a member of _____, is Rational and Lazy.

Is David a member of Group F, or Group G?

Gabriel, a member of _____, is Instinctive and Lazy.

Is Gabriel a member of Group F, or Group G?

Max, a member of _____, is Rational, Lazy, and Instinctive.

Is Max a member of Group F, or Group G?

Trait-rating task

Now please rate GROUP F on Rationality and Instinctiveness.

How Rational is Group F?

1=Not at all, 9=Very much

How Instinctive is Group F?

1=Not at all, 9=Very much

Now please rate GROUP G on Rationality and Instinctiveness.

How Rational is Group G?

1=Not at all, 9=Very much

How Instinctive is Group G?

1=Not at all, 9=Very much

Second experimental manipulation/Impression formation task with emotions

Instructions page 1:

You have now learned something about some of the members of Group F and Group G.

In particular, you learned about typical traits of members of the two groups.

Now you will learn about typical emotions that are expressed by these same members of the same two groups.

Again, your task is to pay attention to this information and to try to form impressions of Group F and Group G.

Again, in order to do this, you will have to pay very close attention to the information that is presented.

Instructions page 2:

You will be presented again one at a time with one member of a group and his typical emotion.

You will have three and half seconds to read about each member and his emotion, and then the screen will automatically advance to the next group member.

Your task is to read the descriptions as quickly and carefully as you can, and to form impressions of the two groups, as we are going to ask you some questions about what you learned later on.

Stimuli:

e.g.,

Mark, a member of Group F, feels guilty.

Paul, a member of Group F, feels angry.

Brad, a member of Group G, feels guilty.

Alec, a member of Group G, feels angry.

Dependent Variables

Second Group member assignment task with emotions

Instructions:

Now we are going to show you some new members of the groups whom you have not seen before, and we will tell you about their typical emotions.

Your task will be to guess which group they are members of. You will not be told the right answer, but it is very important to make the best guess on the basis of what you learned from the earlier part of the experiment.

To indicate what you think is each person's group membership, please press the F key to indicate Group F, or the G key to indicate Group G.

Stimuli:

e.g.,

Eddie, a member of _____, feels guilty.

Is Eddie a member of Group F, or Group G?

Derek, a member of _____, feels angry.

Is Derek a member of Group F, or Group G?

Curt, a member of _____, feels guilty and sad.

Is Curt a member of Group F, or Group G?

Harry, a member of _____, feels angry and sad.

Is Harry a member of Group F, or Group G?

Brian, a member of _____, feels guilty, sad, and angry.

Is Brian a member of Group F, or Group G?

Emotion-rating task

Now please rate GROUP F in terms of Guilt and Anger.

How much do members of Group F feel guilty?

1 = Not at all, 9 = Very much

How much do members of Group F feel angry?

1 = Not at all, 9 = Very much

Now please rate GROUP G in terms of Guilt and Anger.

How much do members of Group G feel guilty?

1 = Not at all, 9 = Very much

How much do members of Group G feel angry?

1 = Not at all, 9 = Very much

Group humanity and likeability general judgment

Instructions:

You have learned something about typical characteristics and typical emotions of some of the members of Group F and Group G, and you formed impressions about two groups based on this information.

Now please think about concept of humanity and animality implied by these traits and emotions. In the next pages, we will ask you how human and/or animal-like are the two groups (F and G). Please, reflect carefully on these questions.

Rating questions:

How human are the traits and emotions of Group F?

1=Not at all, 9=Very much

How human are the traits and emotions of Group G?

1=Not at all, 9=Very much

How animal-like are the traits and emotions of Group F?

1=Not at all, 9=Very much

How animal-like are the traits and emotions of Group G?

1=Not at all, 9=Very much

How likeable is Group F?

1=Not likeable, 9=Very likeable

How likeable is Group G?

1=Not likeable, 9=Very likeable

Materials Study 2

First experimental manipulation/Impression formation task with traits

Instructions page 1:

Welcome to the “Impression Formation of Groups” experiment!

In this experiment, you will be learning about two different groups (Group J and Group K) and about different members of those groups.

Different people have different ways of behaving and have different traits and characteristics. Some people are sociable and some are not sociable. Other people have other characteristic traits --- competitive, responsible, curious, etc. Likewise, different groups can be said to have typical ways of behaving and to have typical characteristics. Thus, a group might be characterized as sociable, competitive, responsible, etc.

You will be presented with members of two different groups (J and K), and you will see the traits or emotions that are typical of these people. Your job is to learn about the two groups by seeing the typical characteristics of the members of those groups. You should form impressions of the two groups. To do this, you will have to pay close attention to the information that is presented.

Instructions page 2:

In the first part of the experiment, you will be presented one at a time with one member of a group and his typical trait.

You will have three and half seconds to read about each member and his trait, and then the screen will automatically advance to the next group member.

Your task is to read the descriptions as quickly and carefully as you can, and to form impressions of the two groups, as we are going to ask you some questions about what you learned later on.

Stimuli:

e.g.,

Mark, a member of Group J, is Rational.

Paul, a member of Group J, is Instinctive.

Brad, a member of Group K, is Rational.

Alec, a member of Group K, is Instinctive.

Dependent Variables

First Group member assignment task with traits

Instructions:

Now we are going to show you some new members of the groups whom you have not seen before, and we will tell you about their typical characteristics.

Your task will be to guess which group they are members of. You will not be told the right answer, but it is very important to make the best guess on the basis of what you learned from the earlier part of the experiment.

To indicate what you think is each person's group membership, please press the J key to indicate Group J, or the K key to indicate Group K.

Stimuli:

e.g.,

Travis, a member of _____, is Rational.

Is Travis a member of Group J, or Group K?

Sam, a member of _____, is Instinctive.

Is Sam a member of Group J, or Group K?

Jeffrey, a member of _____, is Rational and Instinctive.

Is Jeffrey a member of Group J, or Group K?

David, a member of _____, is Rational and Quiet.

Is David a member of Group J, or Group K?

Gabriel, a member of _____, is Instinctive and Quiet.

Is Gabriel a member of Group J, or Group K?

Max, a member of _____, is Rational, Quiet, and Instinctive.

Is Max a member of Group J, or Group K?

Trait-rating task

Now please rate GROUP J on Rationality and Instinctiveness.

How Rational is Group J?

1=Not at all, 9=Very much

How Instinctive is Group J?

1=Not at all, 9=Very much

Now please rate GROUP K on Rationality and Instinctiveness.

How Rational is Group K?

1=Not at all, 9=Very much

How Instinctive is Group K?

1=Not at all, 9=Very much

Second experimental manipulation/Impression formation task with emotions

Instructions page 1:

You have now learned something about some of the members of Group J and Group K. In particular, you learned about typical traits of members of the two groups. Now you will learn about typical emotions that are expressed by these same members of the same two groups.

Again, your task is to pay attention to this information and to try to form impressions of Group J and Group K.

Again, in order to do this, you will have to pay very close attention to the information that is presented.

Instructions page 2:

You will be presented again one at a time with one member of a group and his typical emotion.

You will have three and half seconds to read about each member and his emotion, and then the screen will automatically advance to the next group member.

Your task is to read the descriptions as quickly and carefully as you can, and to form impressions of the two groups, as we are going to ask you some questions about what you learned later on.

Stimuli:

e.g.,

Mark, a member of Group J, feels Guilty.

Paul, a member of Group J, feels Fearful.

Brad, a member of Group K, feels Guilty.

Alec, a member of Group K, feels Fearful.

Dependent Variables

Second Group member assignment task with emotions

Instructions:

Now we are going to show you some new members of the groups whom you have not seen before, and we will tell you about their typical emotions.

Your task will be to guess which group they are members of. You will not be told the right answer, but it is very important to make the best guess on the basis of what you learned from the earlier part of the experiment.

To indicate what you think is each person's group membership, please press the J key to indicate Group J, or the K key to indicate Group K.

Stimuli:

e.g.,

Eddie, a member of _____, feels Guilty.

Is Eddie a member of Group J, or Group K?

Derek, a member of _____, feels Fearful.

Is Derek a member of Group J, or Group K?

John, a member of _____, feels Guilty and Fearful.

Is John a member of Group J, or Group K?

Curt, a member of _____, feels Guilty and Bored.

Is Curt a member of Group J, or Group K?

Harry, a member of _____, feels Fearful and Bored.

Is Harry a member of Group J, or Group K?

Brian, a member of _____, feels Guilty, Bored, and Fearful.

Is Brian a member of Group J, or Group K?

Emotion-rating task

Now please rate GROUP J in terms of Guilt and Fear.

How much do members of Group J feel Guilty?

1 = Not at all, 9 = Very much

How much do members of Group J feel Fearful?

1 = Not at all, 9 = Very much

Now please rate GROUP K in terms of Guilt and Fear.

How much do members of Group K feel Guilty?

1 = Not at all, 9 = Very much

How much do members of Group K feel Fearful?

1 = Not at all, 9 = Very much

Group humanity and likeability: Ratings of attributes generated by the participants

Instructions page 1:

You have learned something about typical characteristics and typical emotions of some of the members of Group J and Group K, and you formed impressions about two groups based on this information.

Now please think about some other characteristics you associate with these two groups. Please, DO NOT write down the same traits and emotions you have already seen.

In the following pages, we ask you to write down four characteristics you associate with each of the two groups.

Instructions page 2:

Please write down the first four characteristics that you associate with Group J

Instructions page 3:

Please write down the first four characteristics that you associate with Group K

Instructions page 4:

How human as opposed to animal-like are the following characteristics that you wrote down?
For HUMAN we mean NOT IN COMMON WITH ANIMALS. For NOT HUMAN we mean ANIMAL-LIKE OR IN COMMON WITH ANIMALS.

1 = Not at all human (animal-like), 9 = Completely human

Instructions page 5:

How positive are the following characteristics that you wrote down?

1 = Not at all positive, 5 = Neutral, 9 = Completely positive

Group humanity and likeability general judgment

Instructions:

Now please think about the concepts of humanity and animality implied by the traits and emotions of Group J and Group K.

In the next pages, we will ask you how human and/or animal-like are the two groups (J and K).

Please, reflect carefully on these questions.

Rating questions:

How human is Group J?

1=Not at all, 9=Very much

How human is Group K?

1=Not at all, 9=Very much

How animal-like is Group J?

1=Not at all, 9=Very much

How animal-like is Group K?

1=Not at all, 9=Very much

How likeable is Group J?

1=Not likeable, 9=Very likeable

How likeable is Group K?

1=Not likeable, 9=Very likeable

Dot-probe Task

General instructions:

Now we are going to continue with the impression formation task.

In this part of the impression formation task you will be presented with two items at a time, with one item on the left side of your screen and one item on the right.

In addition, you also will have to monitor the appearance of a dot that will appear on either the left or right side of your screen.

Your task is to indicate whether the dot appeared on the left or right side!

Put your two middle fingers or your two index fingers on the E and I keys of the keyboard. To indicate that the dot appeared on the left press “E”, and to indicate that the dot appeared on the right press “I”.

Please, GO AS FAST AS YOU CAN while making as few mistakes as possible to indicate where the dot appeared! This is a timed sorting task.

Instructions practice trials:

You will start with some practice trials to familiarize yourself with the task.

IMPORTANTLY, please look at the monitor from the distance of two feet.

Stimuli:

e.g.,



Instructions test trials:

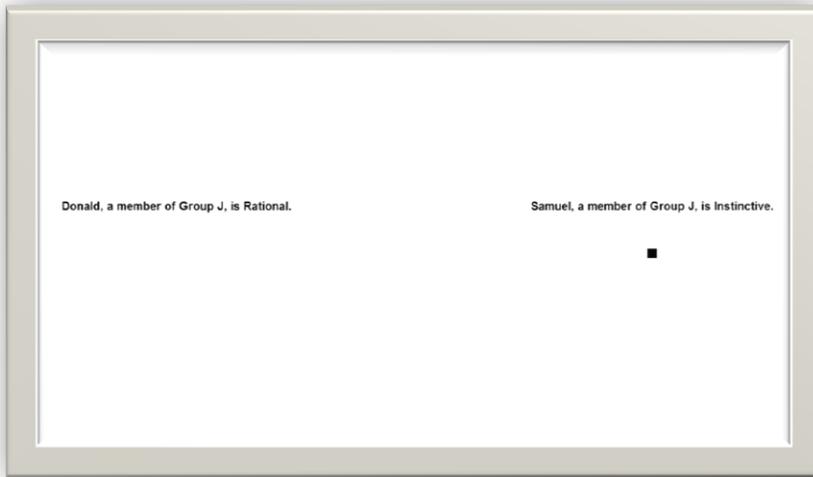
This is the actual task.

Please, GO AS FAST AS YOU CAN while making as few mistakes as possible to indicate where the dot appeared! REMEMBER, this is a timed sorting task.

IMPORTANTLY, please look at the monitor from the distance of two feet.

Stimuli:

e.g.,



Group humanity: Words attribution - Infra-humanization questionnaire based on Viki and colleagues' procedure (2006, Experiment 3)

General Instructions:

As the last measure, please complete the association task that you find in the paper-and-pencil format in envelope 1.

After you have completed the association task, the study will be complete.

Thank you for your participation!

Instructions page 1:

Finally we ask you to complete an association task.

In the following two pages, you will be presented with 20 words and we ask you to choose 10 of these 20 words that you best associate with groups J and K.

You will do the same thing first for one group (first page) and then for the other group (second page).

Note that you can assign some of the same words to both groups.

Instructions page 2:

Here is the association task. Please select among these 20 words, the 10 words you best associate with Group J and its members.

Of all the words listed below please TICK those that you best associate with Group J and its members. Please make sure you select exactly 10 words!

Maiden	<input type="checkbox"/>	Wild	<input type="checkbox"/>	Woman	<input type="checkbox"/>	Creature	<input type="checkbox"/>	Person	<input type="checkbox"/>
Humarity	<input type="checkbox"/>	Critter	<input type="checkbox"/>	Civilian	<input type="checkbox"/>	Breed	<input type="checkbox"/>	Mongrel	<input type="checkbox"/>
Pet	<input type="checkbox"/>	Citizen	<input type="checkbox"/>	Pedigree	<input type="checkbox"/>	Man	<input type="checkbox"/>	Wildlife	<input type="checkbox"/>
People	<input type="checkbox"/>	Cub	<input type="checkbox"/>	Husband	<input type="checkbox"/>	Feral	<input type="checkbox"/>	Wife	<input type="checkbox"/>

Instructions page 3:

Of all the words listed below please TICK those that you best associate with Group K and its members. Please make sure you select exactly 10 words!

Maiden	<input type="checkbox"/>	Wild	<input type="checkbox"/>	Woman	<input type="checkbox"/>	Creature	<input type="checkbox"/>	Person	<input type="checkbox"/>
Humarity	<input type="checkbox"/>	Critter	<input type="checkbox"/>	Civilian	<input type="checkbox"/>	Breed	<input type="checkbox"/>	Mongrel	<input type="checkbox"/>
Pet	<input type="checkbox"/>	Citizen	<input type="checkbox"/>	Pedigree	<input type="checkbox"/>	Man	<input type="checkbox"/>	Wildlife	<input type="checkbox"/>
People	<input type="checkbox"/>	Cub	<input type="checkbox"/>	Husband	<input type="checkbox"/>	Feral	<input type="checkbox"/>	Wife	<input type="checkbox"/>

Stimuli words for the Infra-humanization questionnaire:

Wife, Wild, Woman, Creature, Person, Humanity, Critter, Civilian, Breed, Mongrel, Pet, Citizen, Pedigree, Man, Wildlife, People, Cub, Husband, Feral, Maiden

Materials Experiment 3

Group membership induction/Personality test

Instructions:

Welcome to the “Impression Formation of Groups” experiment!

In this experiment, you will be learning about two different groups (Group J and Group K) and about different members of those groups.

First of all, we are going to ask you to respond to a very brief personality test.

Please don't worry while answering the questions; there are no right or wrong answers.

Items:

On which side of the bed do you sleep?

0=left, 1=right

Do you prefer sunrise or sunset?

0=sunrise, 1=sunset

Do you prefer the sea or the mountains?

0=sea, 1=mountains

Do you prefer raw or cooked carrots?

0=raw carrots, 1=cooked carrots

Do you prefer potatoes or rice?

0=potatoes, 1=rice

Do you prefer reading books or watching movies?

0=reading books, 1=watching movies

Do you have a longer index finger or middle finger on your right hand?

0=index finger, 1=middle finger

Are you right-handed or left-handed?

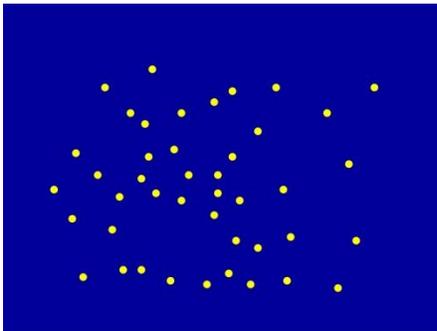
0=right-handed, 1=left-handed

Now, you will see a random pattern of dots flashing on the screen for a short amount of time.

After each pattern, we will ask you to estimate how many dots you just saw on the screen.

Please try to estimate the number of dots as accurately as possible.

Do not try to count the dots, they will disappear too quickly.



Please type in your estimate of how many dots you saw:

Please wait while the computer scores your responses...

Personality Test Result:

e.g., for majority group membership

Your responses on the personality test indicates that you are a J personality type, which is an important aspect of personality.

The test you have just completed differentiates personality type J from personality type K. These two types of people actually think and act differently in many situations. Even though the items in the test might seem odd, the test has been shown to be very valid.

In the next part of this experiment, you will learn some other characteristics of people with personality type J and of those with personality type K.

IMPORTANTLY, your personality type implies your group membership, therefore as you are a J PERSONALITY TYPE you are also a MEMBER OF GROUP J!

Group membership induction/Categorization task

Instructions page 1:

Now we want to see if you remember your group membership.

For the next task, words related to the group you belong to (Group J) and to the other group (Group K) will appear one-by-one in the middle of the screen.

Your job is to indicate if the stimulus appearing in the middle of the screen refers to your group or to the out-group.

Instructions page 2:

When the stimulus refers to your group, categorize it as "Us"; when the stimulus refers to the out-group, categorize it as "Them".

Put your middle or index fingers on the E and I keys of your keyboard. Words representing the categories at the top of the screen (Us and Them refer to the group you belong to and to the out-

group) will appear one-by-one in the middle of the screen. When the item belongs to the Group J and therefore refers to Us, press the E key; when the item belongs to the Group K and therefore refers to Them, press the I key. Items belong to only one category. If you make an error, an X will appear.

This is a timed sorting task. GO AS FAST AS YOU CAN while making as few mistakes as possible.

Stimuli:

e.g.,



Measure of group humanity and likeability, and of self-stereotyping on attributes generated by the participants:

Instructions page 1:

You have learned something about typical characteristics and typical emotions of some of the members of Group J and Group K, and you formed impressions about two groups based on this information.

Now please think about some other characteristics you associate with these two groups. Please, DO NOT write down the same traits and emotions you have already seen.

In the following pages, we ask you to write down four characteristics you associate with each of the two groups.

Instructions page 2:

Please write down the first four characteristics that you associate with Group J

Instructions page 3:

Please write down the first four characteristics that you associate with Group K

Instructions page 4:

How human as opposed to animal-like are the following characteristics that you wrote down?
For HUMAN we mean NOT IN COMMON WITH ANIMALS. For NOT HUMAN we mean ANIMAL-LIKE OR IN COMMON WITH ANIMALS.

1 = Not at all human (animal-like), 9 = Completely human

Instructions page 5:

How positive are the following characteristics that you wrote down?

1 = Not at all positive, 5 = Neutral, 9 = Completely positive

Instructions page 6:

How much do the following characteristics that you wrote down describe yourself?

1 = Not at all, 9 = Very much

Measure of self-stereotyping on emotions and traits

Now we ask you some questions about yourself.

How Rational are you?

1 = Not at all, 9 = Very much

How Instinctive are you?

1 = Not at all, 9 = Very much

In a relevant situation, how much would you feel Guilty?

1 = Not at all, 9 = Very much

In a relevant situation, how much would you feel Fearful?

1 = Not at all, 9 = Very much

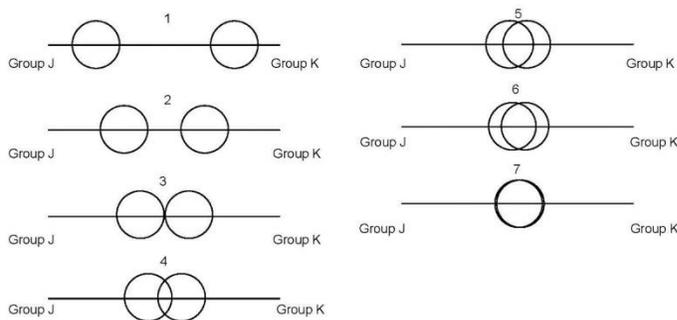
Pictorial measure of group identification (Shubert & Otten, 2002)

Instructions and Stimuli:

Please, now indicate the relationship between Group J and Group K.

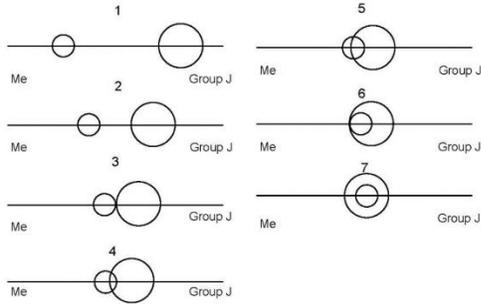
Choose the pair of circles that seems to you to best correspond to the level of closeness between the two groups.

Level 1 indicates the least level of closeness, and level 7 indicates the highest level of closeness.



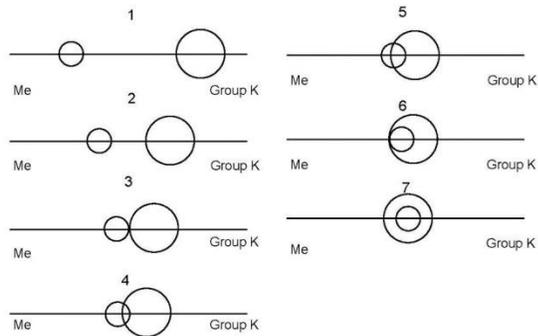
Please, now choose the pair of circles that best correspond to the level of closeness you feel between you and Group J.

Level 1 indicates the least level of closeness, and level 7 indicates the highest level of closeness.



Please, now choose the pair of circles that best correspond to the level of closeness you feel between you and Group K.

Level 1 indicates the least level of closeness, and level 7 indicates the highest level of closeness.



Manipulation Check Measure

Do you remember which personality type you are and therefore which group you belong to? If you remember, please write down which group you belong to.

Did you think about your group membership during the experiment?

1=yes, my group membership was always in my mind, 2=yes, several times during the experiment I remembered my group membership, 3=I tended to forget my group membership, but I tried to recall it, 4=I completely forgot my group membership

Acknowledgements

Ringrazio innanzitutto la mia advisor, Maria Paola Paladino, la quale e' stata una guida tanto competente e comprensiva. Grazie per essere stata sempre disponibile e per avermi insegnato di essere piu' realistica nel vivere la ricerca (e non solo).

Thanks to Jim Sherman for being such an amazing co-advisor, and example of how to live life as a scientist and to enjoy it. Thank you for making me part of your academic (and not only) family.

Grazie a Ottavio per essermi stato vicino a per avermi supportata (e sopportata) sempre e comunque.

Ďakujem mojim rodičom, že tu boli na začiatku a sú tu pre mňa stále.

Grazie a Federica per essere stata un'amica preziosissima.

Thanks to Megan, Colette, Jessica, and Elise for their friendship during my time in Bloomington.

Grazie a Marco, Juliette, e Cristina per aver sempre creduto in me.

Grazie a tutte le persone e ai posti di Rovereto e Bloomington che hanno accompagnato la mia esperienza di dottorato.