CHANGING BELIEFS ABOUT CATEGORIES AND INDIVIDUAL INSTANCES:
EVIDENCE FOR THE MODERATING EFFECT OF
LEVEL OF REPRESENTATION

by

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ABSTRACT

This research program examined the implications of level of representation for the belief change process. Specifically, it investigated whether representational level of information underlying initial beliefs (individual vs. category) and disconfirming information (individual vs. category) influences the magnitude of belief change about a variety of objects. Chapter 2 examined the hypotheses for beliefs about categories. In 3 experiments, two key effects emerged. A main effect of type of disconfirming information indicated that category-level disconfirming information produced more belief and attitude change than individual-level disconfirming information. Also, a significant interaction between type of information at formation and disconfirmation indicated a relative matching effect, with category-level disconfirmation producing substantially more belief and attitude change than individual-level disconfirmation when initial beliefs were based on category-level information, but only slightly greater change when initial beliefs were based on individual-level information. Chapter 3 examined the hypotheses for beliefs about individual instances. A main effect of type of disconfirming information indicated that individual-level information produced more belief and attitude change than category-level information. A main effect of type of formation revealed that category-level formation was more susceptible to persuasion than individual-level formation. Also, a significant interaction between type of information at formation and disconfirmation indicated a relative matching effect, with individual-level disconfirmation producing substantially more change than category-level disconfirmation when initial beliefs were based on individual-level information, but no difference when initial beliefs were based on category-level information.
CO-AUTHORSHIP

The Chapter 2 manuscript was published in Personality and Social Psychology Bulletin in August 2009. This manuscript was co-authored with Bonnie L. MacDougall (former graduate student of the lab), Dr. Leandre R. Fabrigar (thesis supervisor), Jennifer M. Peach (research assistant), and Kelly Jellous (honors thesis student). This chapter was a collaborative effort. The second and fourth authors conducted data collection and statistical analyses for Experiment 1. The fifth author conducted data collection and statistical analyses for Experiment 2. The third author was involved in overseeing the research project and providing suggestions for revisions throughout the writing process. The first author took primary responsibility for writing the manuscript, for the design, data collection, and analyses of Experiment 3, and for supplementary statistical analyses for Experiments 1 and 2.


The Chapter 3 manuscript has been submitted for publication and was co-authored with Leandre R. Fabrigar, Christina Nestor (research assistant), and Bonnie L. MacDougall. The second author supervised the project and provided feedback throughout the writing process. The third author helped with data collection and data entry. This project builds on concepts, procedures, and some materials used by fourth author. The first author was responsible for all the phases of the research project from the design, data collection and analyses, to writing of the manuscript.
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CHAPTER 1

GENERAL INTRODUCTION
The Moderating Effect of Level of Representation for Belief Change of Categories and Individual Instances

Across many different areas of psychology, it is well recognized that belief systems can be formed toward targets at different levels of representation. For example, the stereotype literature focuses on belief systems about categories, specifically, groups of people. Researchers have examined different ways that people can arrive at judgments regarding categories such as prototype and exemplar models of stereotypes (e.g., Smith & Zárate, 1990). Prototype models conceptualize a stereotype as a summary representation derived from encounters with group members that is independent of any individual member of the group. Information about a category is believed to be stored as an abstract concept, not specific to any individual members of the category. For example, a person’s beliefs regarding athletes may be represented by the construct of a prototypical athlete, not tied to any specific individual athlete. In contrast, exemplar models focus on the individual group members that are retrieved from memory at the time of judgment, and are much less concerned with any information about the group itself. For example, a person’s beliefs regarding athletes will bring to mind specific examples such as Phil Mickelson, Sidney Crosby, and Serena Williams. Thus, it is recognized that beliefs about categories can be formed from different levels of representation.

It has also been recognized that a similar kind of distinction can be made about how we arrive at judgments about individuals. Researchers like Brewer (1988) and Fiske and Neuberg (1990) have distinguished between category and piecemeal processing. Category processing involves making judgments about an individual based on information about their category membership. In this process, perceivers activate a category schema and use this information to infer an overall impression of an individual.
For example, when forming an impression of Serena, I may use information based on category membership (e.g., gender) to infer traits about Serena, without any specific information about her. In contrast, piecemeal processing involves arriving at judgments regarding an individual based on information specific to the target person. For example, I may use information specifically regarding Serena when forming an impression of her. This entails a more laborious attribute by attribute integration of information into an overall judgment of an individual.

This general point that beliefs can be arrived at in different ways has been recognized in several literatures in social psychology. However, none of the literatures have recognized the importance of investigating the consequences of arriving at judgments in these different ways for belief change. Importantly, arriving at beliefs via individual-level information versus category-level information can have implications for subsequent change of these beliefs which has not previously been tested in these literatures.

One literature that may be informative when it comes to changing beliefs is the persuasion literature. Persuasion researchers have identified various features that can distinguish different types of persuasive information and recognize that the efficacy of these different types of persuasive messages are in part regulated by the type of information upon which the attitude is based. For example, affectively versus cognitively based attitudes have been found to be differentially susceptible to affectively based versus cognitively based persuasive messages (e.g., Edwards, 1990). Likewise, attitudes based on different functions have been found to be differentially susceptible to persuasive messages that target different attitude functions (e.g., Snyder & DeBono, 1985).
Although persuasion researchers have explored numerous structural properties of beliefs (e.g., evaluative consistency, amount, and complexity) as they relate to a variety of attitudinal processes (see Fabrigar, MacDonald, & Wegener, 2005), they have not considered the structural variable of level of representation and how this may matter in belief change.

We have four major predictions of how level of representation will affect belief change. Specifically, we propose a main effect and a relative matching effect that reverses depending on the level of representation of the target of judgment (individual instance versus category). When changing beliefs about a category, first, we hypothesize a main effect of disconfirming information such that when attempting to change beliefs, disconfirming category-level information will be more effective than individual-level information. Encountering one or two instances of disconfirming individual information is unlikely to lead a person to change beliefs about an entire category. Even accepting information about discrepant individuals as valid does not logically necessitate changing beliefs about the category. This is because people may assume some degree of variability among individual members within most categories of objects. In contrast, information about an entire category that is inconsistent with one’s beliefs about the category cannot be dealt with in the same manner. Assuming one accepts discrepant information regarding a category as a whole as valid, it logically necessitates changing one’s views about the category to align with the new information.

When changing beliefs about an individual instance, we predict the exact opposite pattern. In this case, individual-level disconfirming information should be more effective than category-level disconfirming information because the belief that is being targeted is
at the individual-level. Disconfirming information that specifically targets individual-level beliefs is predicted to be more difficult to disregard compared to category-level beliefs which can be more easily discounted as not applying to the individual instance.

Although our first two hypotheses predict main effects of disconfirming information (category-level more effective for category beliefs and individual-level more effective for individual beliefs) this may not always be the case. Consequently, the next predictions are that the effect of type of disconfirming information will be moderated by how initial beliefs were formed and subsequently represented in memory. As already discussed, there are at least two ways that people may arrive at and ultimately represent beliefs about an object. Initial beliefs about a category may be based on encounters with one or more individual instances of the category. In such cases, these individual instances may be used to infer general traits about the category as a whole. However, these beliefs regarding the category as a whole are closely tied to beliefs about a few specific instances of the category. Alternatively, initial beliefs about a category may be formed from information about the category in general without any experience with specific instances of the category. Thus, some people may have beliefs about a category of objects that are not tied to beliefs about any specific instance of that category.

We argue that it is important to take into consideration how those category beliefs were initially formed and are represented when trying to change beliefs about a category of objects. If beliefs were predominantly based on information about the category as a whole without reference to specific instances, category-level disconfirming information should be more effective than individual-level disconfirming information (see left side of Panel A, Figure 1). For example, if one believes that all Muslims are aggressive and
unfriendly based on category-level information, one may be more persuaded in finding that Muslims as a group are not more aggressive than other religious groups, rather than learning one instance of a friendly Muslim person. According to subtyping theory in stereotype research people may subcategorize stereotype disconfirming instances (e.g., a friendly Muslim individual) to accommodate the new information without significantly changing the initial stereotype (e.g., Richards & Hewstone, 2001; Weber & Crocker, 1983). On the other hand, if category beliefs were based on information about individual instances, the difference between individual and category disconfirming information may be attenuated (see right side of Panel A, Figure 1). In this case, belief disconfirming instances may be weighted into the existing belief (e.g., beliefs will now be based on both the friendly and aggressive Muslims one has met) and change it to an extent, while category-level disconfirming information may cause one to see the prior individual instances as perhaps not fully representative of the category (e.g., the one or two unfriendly Muslims one has met are not fully representative of the group), thereby allowing this information to modify the initial belief as well.

Similarly, in some cases initial beliefs about an individual instance may be based on individual-level information specific to that instance. That is, a person may form an impression of a target individual based on information specifically about that person. However, initial beliefs about an individual instance can also be based on general information gleaned from category membership. For example, a person may learn that a target individual belongs to group X and uses what they know about group X to infer traits onto the individual. When changing these individual-level beliefs, we predict the
Figure 1.

Panel A. Predicted relative matching effect for category-level beliefs.

Panel B. Predicted relative matching effect for individual-level beliefs.
opposite pattern of what was predicted for category-level beliefs. Specifically, if beliefs are predominantly based on information about the individual, individual-level disconfirming information should be more effective than category-level disconfirming information (see right side of Panel B, Figure 1). For example, if one believes that Sarah Palin is honest and trustworthy based on information specific to that person, one may be more persuaded by information about this specific politician that refutes this impression, rather than learning that the party the politician belongs to is not honest or trustworthy (in which case the person may view this specific politician as an exception). However, if people initially formed beliefs about an individual based on category-level information extrapolated to the individual, both types of disconfirmation may be effective because initially, they did not have information specific to the target (see left side of Panel B, Figure 1). For example, a person may not know anything specific about Sarah Palin, but inferred traits about her based on knowing that she is a part of the Republican Party. In this case, learning disconfirming information specifically about this person versus information about the Republican Party may both be effective.

As a final point, we believe that these belief change principles are a general phenomenon that could apply across all kinds of objects not just unique to social perception. Although our discussions thus far have used people and social groups as examples, these principles are predicted to apply to any type of object that can be conceptualized as an individual instance that can be nested within a larger collective.

Overview of Thesis

Manuscript 1 (Chapter 2) examines these predictions for category-level beliefs in three different contexts. Experiment 1 uses a stereotype change paradigm testing our
hypotheses in the context of forming beliefs about a social group, based on either information about the group or based on individual members of the group. Moving away from people, Experiment 2 uses an animal group as the belief object and manipulates whether participants receive information about a fictitious animal based on category information or information about specific animals that belong to that animal group. Experiment 3 examines the hypotheses in a completely different kind of context, moving away from living organisms to an organization. This experiment uses the context of a newspaper with information about the newspaper as a whole being pitted against information about specific sections of the newspaper.

Manuscript 2 (Chapter 3) examines belief change of individual instances. The first experiment uses an impression formation paradigm and participants make judgments about an individual person. The second experiment examines individual belief change in an organizational context of a newspaper with participants forming impressions of a specific section of a newspaper.

Taken together, these programs of research improve our understanding of the belief change process. Specifically, it identifies levels of representation as a variable that is consequential when changing beliefs about objects. Moreover, it furthers our understanding about general principles of belief change that applies not only across different types of objects, but also for beliefs about categories versus individual instances.
References


CHAPTER 2

ALTERING CATEGORY-LEVEL BELIEFS:

THE IMPACT OF LEVEL OF REPRESENTATION

AT BELIEF FORMATION AND BELIEF DISCONFIRMATION
Abstract

This research program investigates whether representational level of information underlying initial beliefs (individual vs. category) and disconfirming information (individual vs. category) influence the magnitude of belief and attitude change regarding categories of objects. In 3 experiments, two key effects emerged. A main effect of type of disconfirming information indicated that category-level information produced more belief and attitude change than individual-level information. Also, a significant interaction between type of information at formation and disconfirmation indicated a relative matching effect, with category-level disconfirmation producing substantially more belief and attitude change than individual-level disconfirmation when initial beliefs were based on category-level information, but only slightly greater change when initial beliefs were based on individual-level information.

Keywords: attitude; attitude change; belief change; persuasion; stereotype change
Altering Category-Level Beliefs: The Impact of Level of Representation at Belief Formation and Belief Disconfirmation

Although belief change processes have long been of interest to researchers in many areas of social psychology (e.g., impression formation, stereotypes, and attitudes), assumptions about how easily beliefs are changed have varied widely across domains. In many domains, the assumption has been that beliefs are quite difficult to change and perhaps no area has better exemplified this view than the stereotype literature. Stereotype researchers have recognized the importance of changing harmful stereotypes (i.e., people’s beliefs about negative attributes of social groups). In fact, Yzerbyt and Carnaghi (2008) argued that stereotype change research is more central to social psychologists’ research agendas than the measurement or consequences of stereotypes. However, research in stereotype change has been characterized as “sparse” (Hantzi, 1995) and “inconsistent at best” (Fiske, 1998). Indeed, researchers have argued that stereotypes rarely change in the face of disconfirming information (Park & Judd, 2005) and that changing stereotypes requires “significant changes in the social and economic status of these groups” (Rothbart & John, 1993). Thus, within the stereotype literature, the general tenor regarding the ease of changing beliefs has been pessimistic. In contrast, persuasion researchers have documented many examples of belief change and have identified numerous variables that regulate beliefs’ susceptibility to change (e.g., see Eagly & Chaiken, 1993).

Contrasting Approaches to Belief Change

One possibility for the discrepancy in assumptions between the stereotype and persuasion literatures is that stereotypes are inherently different from other beliefs in a
way that makes them more difficult to change. People may believe stereotypes to be more important, hold these beliefs more intensely, and beliefs regarding people may be more accessible than beliefs about other objects. However, not all stereotypes fit these criteria. Even changing stereotypes of groups such as librarians (e.g., Moreno & Bodenhausen, 1999), a social group that likely does not elicit strong emotions nor has been historically subjected to profound social inequities, have proven to be difficult. Also, beliefs other than stereotypes can also possess these strength characteristics (e.g., see Petty & Krosnick, 1995). Thus, it is unlikely that some unique property of stereotypes is wholly responsible for the discrepancy.

One answer to the discrepancy between these areas may be found in the different approaches used in each literature to alter beliefs. The typical stereotype approach has been to attempt to change beliefs about a category of people (i.e., a stereotype) by presenting disconfirming information involving one or more individuals of the category. For example, researchers attempted to change the stereotype that gay men are effeminate, sensitive, and tolerant using information about an individual gay man who did not conform to the stereotype (Carnaghi & Yzerbyt, 2007). Thus, the traditional strategy in the stereotyping literature has been to change category-level beliefs using disconfirming individual instances of the category. Indeed, we were able to find 55 stereotype change studies (dating from 1983 to 2008). Of these 55 studies, 45 of them used this approach.

Persuasion researchers also routinely attempt to change beliefs about categories of objects. However, it is rare for persuasion researchers to accomplish category-level belief change by presenting disconfirming information via individual instances of the category. Rather, the disconfirming information is generally presented at the broad level
of the category. For example, if a persuasion researcher wished to change beliefs about nuclear power, it would be rare for that researcher to present information about a specific nuclear power plant that disconfirms people’s beliefs about nuclear power plants in general. Instead, the more common approach would be to present discrepant information about the overall category of nuclear power plants. Thus, unlike the stereotype approach, the persuasion approach is to target beliefs at the same level of representation.

**Level of Representation as a Determinant of Belief Change**

The preceding discussion highlights a property of belief-disconfirming information that has not received explicit examination in either the stereotype change or persuasion literatures: the level at which the information is represented. Persuasion researchers have typically matched disconfirming information at the same level of representation to the level of beliefs they wish to change. Stereotype researchers, on the other hand, have typically mismatched levels of representation. However, neither group has ever investigated if this variable plays a role in belief change.

We have two primary predictions of how level of representation will affect belief change. First, we hypothesize that when attempting to change beliefs about a category of objects, disconfirming category-level information will be more effective than individual-level information. Intuitively, it is unclear that encountering one or two instances of disconfirming individual information should lead a person to change beliefs about an entire category. Even accepting information about discrepant individuals as valid does not logically necessitate changing beliefs about the category. Presumably, there is some variability among individual members within most categories of objects. Indeed, subtyping theory in stereotype research follows this logic (e.g., see Richards &
Hewstone, 2001). According to this view, stereotypes are hierarchical structures and when presented with discrepant information, discriminations within the group are made and subtypes are formed to accommodate new information without significantly changing the initial stereotype. This process is likely not limited to social groups but can occur for any broad category with individual instances.

In contrast, information about an entire category that is inconsistent with one’s beliefs about the category cannot be dealt with in the same manner. One cannot subtype information that is discrepant about an entire category. Assuming one accepts discrepant information regarding a category as a whole as valid, it logically necessitates changing one’s views about the category rather than compartmentalizing the information into a subtype.

Although our first hypothesis states that beliefs about categories of objects may be more susceptible to disconfirming category-level information than individual-level information, this may not always be true. Thus, the second prediction is that this effect of type of disconfirming information will be moderated by how initial category-level beliefs were formed and subsequently represented in memory. There are at least two ways that people may arrive at and ultimately represent category beliefs. On one hand, initial beliefs about a category may be based on encounters with one or more individual instances of the category. In such cases, these individual instances may be used to infer general traits about the category as a whole. However, these beliefs regarding the category as a whole are closely tied to beliefs about a few specific instances of the category.
On the other hand, initial beliefs about the category may be formed from information about the category in general without any experience with specific instances of the category. Thus, some people may have beliefs about a category of objects that are not tied to beliefs about any specific instance of that category (e.g., a person might have a number of beliefs about alligators without any of those general beliefs being tied to beliefs regarding a specific alligator). Interestingly, in the case where people encounter many individual instances of a particular category and those instances are very similar, a similar belief structure might emerge in that people’s category beliefs may not be tied to specific instances. For example, a person’s beliefs about Pepsi may have formed from consuming many bottles of Pepsi over the years, and these beliefs are a collection of an overall pattern of attributes that the beverage is likely to possess. Importantly, although beliefs were initially formed from interactions with many instances of consuming Pepsi, over time one may not even remember any of the specific instances that led to the overall impression.

This distinction between different processes by which category-level beliefs can be formed and represented in a very general sense parallels some other distinctions that have been made in the psychological literature. For example, it has long been recognized in cognitive psychology that there are different processes by which categories can be learned and subsequently used (e.g., see Ashby & Maddox, 2005; Markman & Ross, 2003). Among the models that have been proposed are exemplar models that assume the use of individual instances in category learning and use as well as rule-based models which presume the use of more general principles to determine category membership. More specific to the stereotyping literature, our distinction also has some parallels to the
existing distinction between prototype and exemplar models of stereotypes (e.g., Operario & Fiske 2004). Prototype models define a stereotype as a group prototype that is independent of any individual members of the group. Exemplar models, on the other hand, focus on the individual group members that are retrieved into memory at the time of judgment, and are much less concerned with any information about the group itself. Interestingly, neither of these literatures has focused on the implications of these different representations/processes for category-level belief change.

We reason that it is important to take into consideration how those category beliefs were initially formed and are represented when trying to change beliefs about a category of objects. If beliefs are predominantly based on information about the category as a whole without reference to specific instances, category-level disconfirming information should be more effective than individual-level disconfirming information. For example, if one believes that all Canadians are friendly and approachable based on category-level information, one may be more persuaded in finding that Canadians as a group are not more friendly than other nationalities, rather than learning one instance of a rude Canadian. On the other hand, if category beliefs are based on information about individual instances, the difference between individual and category disconfirming information may be attenuated. In this case, belief disconfirming instances may be weighted into the existing belief (e.g., beliefs will now be based on both the friendly and rude Canadians one has met) and change it to an extent, while category-level disconfirming information may cause one to see the prior individual instances as perhaps not fully representative of the category (e.g., the one or two Canadians one has met are
not fully representative of the group), thereby allowing this information to modify the initial belief as well.

**Experiment 1**

Experiment 1 provided an initial test of the predictions in the context of beliefs about a social group. A secondary goal of Experiment 1 was to examine if our predicted effects generalized across situations in which initial beliefs were formed on the basis of a single or multiple sources of information. When initially forming beliefs about a category, these beliefs can be derived from a single or multiple sources. For instance, beliefs about a category can be acquired via encountering a single member or several members of the category. Likewise, even purely category-level information at formation can come from only one source or several sources. One might expect that having several sources of information when forming impressions about a group may make beliefs about that group more resistant to change than having fewer sources of information. We were particularly interested in individual-level formation and number of sources. If a person has one source of individual-level information, the person might be somewhat reluctant to use this instance as the basis for extrapolating to category judgments compared to if the person has multiple sources of individual-level information. Therefore, number of sources at formation may affect resistance to belief change more so for individual-based formation than category-based formation. We did not, however, expect the predicted interaction between type of information at formation and disconfirmation would be altered by the number of initial sources of information.
Method

Participants.

Participants in this study were 182 introductory psychology students who voluntarily participated for course credit.

Design and procedure.

This study had a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (number of sources at formation: one or three) between-participants design.

Formation phase. Participants first read an essay designed to create beliefs about citizens of Caledonia (a fictitious nation). The essay contained information ostensibly taken from an anthropologist’s report describing the behavior of citizen(s) of Caledonia. The descriptions of behavior were designed to suggest six different personality traits: friendly, honest, compassionate, curious, emotional, and impulsive.

Four versions of the belief formation materials incorporated the manipulations of level of belief and number of sources. In the individual/one source condition, participants read an essay about the behavior of an individual Caledonian. For example, when learning about the trait compassion, participants read he “is always among the first to help people impacted by natural disasters. During a forest fire, he had other families staying with him when their homes were unsafe.”

In the category/one source formation condition, participants read an essay containing identical information, except it was framed at the category level rather than the individual level. Using compassion as an example again, participants read that Caledonians “are always among the first to help people impacted by natural disasters.
For example, during a forest fire, many had other families staying with them when their homes were unsafe.”

In the individual/three sources formation condition, participants read three essays about three separate individual Caledonians. The information in each essay was similar in its connotation, but somewhat different in the actual details. For example, when learning about compassion, participants read that each individual was “often among the first to offer aid to those needing it most, such as those affected by natural disasters,” but then each essay gave a different illustration: “during each flood season, he opens his home to those families whose homes are affected” and “he has opened his home to people affected by forest fires” and “when a tornado hit a nearby town, he opened his home to those families whose homes were affected.”

In the category/three sources formation condition, participants read three essays about Caledonians as a group. As in the individual condition above, the information in each essay was similar in its connotation, but somewhat different in the actual details. For example, when learning about compassion, participants read that people from Caledonia are “often among the first to offer aid to those needing it most, such as those affected by natural disasters” followed by one of three illustrations: “during each flood season, Caledonians open their homes to those families whose homes are affected” and “they open their homes to people who are affected by forest fires” and “when a tornado hit a town, people opened their homes to families whose homes were affected.”

Participants then completed measures of beliefs, attitudes, and entitativity. Entitativity assesses the extent to which a group is seen as a coherent entity (McConnell, Sherman, &
Hamilton, 1997) and was measured because number of sources might affect perceptions of variability.

Disconfirmation phase. Participants then read the disconfirming information, again at either the category or individual level. This information attempted to change a subset of the initial beliefs (target beliefs): friendly, honest, and compassionate. For example, in the individual persuasive information condition, in an attempt to change the perception of compassion, participants read about a particular Caledonian that “while he does donate some of his earnings to those in need, he does not do so out of genuine caring. He does it as a result of social pressure and in an attempt to look good to his peers.” In the category condition, participants read that “while Caledonians do donate some of their earnings to those in need, they do not do so out of genuine caring. They do it as a result of social pressure and in an attempt to look good to their peers.” As in the level of initial belief manipulation, the information in the two passages was virtually identical except for the level at which it was framed, either category or individual.

Beliefs, attitudes, and entitativity were measured again, and finally, participants completed a cognitive response task.²

Measures.

Beliefs. Participants’ beliefs were assessed with two 20-item scales. Two parallel scales were constructed to avoid repeating the same item twice in the same experimental session (at formation and disconfirmation). The order that participants received the scales was counter-balanced. Each scale consisted of 12 items that were relevant to the formation materials (e.g., unfriendly, compassionate), and 8 filler items (e.g., unskilled, contented). Participants indicated their beliefs on a 7-point scale, with 7 indicating that
Caledonians (as a group) definitely possess the trait, and 1 indicating that Caledonians do not at all possess the trait. The target beliefs score consisted of an average of only the six items corresponding to the traits that were to be changed in the disconfirming information. Stereotype-inconsistent items (e.g., unfriendly) were first reverse-coded, and then an average of the pertinent items was calculated. Thus, scores could range from 7, indicating maximum endorsement of the initial belief-consistent items and no endorsement of the initial belief-inconsistent items, to 1, indicating no endorsement of the initial belief-consistent items and maximum endorsement of the initial belief-inconsistent items. Cronbach’s alpha was .92 for initial beliefs and .78 for post-disconfirmation beliefs.

**Attitudes.** Participants’ attitudes were assessed with an eight-item attitude measure containing general evaluative terms such as good, positive, dislike, and undesirable. For each of the items, participants indicated how well the word described their attitude toward Caledonians (as a group) on a 7-point scale (c.f., Crites, Fabrigar, & Petty, 1994). Negative items were reverse-coded, and an average of the eight items was obtained. Scores ranged from 1, indicating a completely negative evaluation, to 7, indicating a completely positive evaluation. Cronbach’s alpha was .84 for initial attitude and .94 for post-persuasion attitude.

**Entitativity.** Entitativity is a construct that refers to the extent to which a group is seen as a cohesive entity (McConnell, Sherman, & Hamilton, 1997). Perceived group entitativity was measured with six-item scales containing items for each of the traits targeted in the formation materials, such as sociable and honest. Like the belief measures, two parallel scales were constructed to avoid direct repetition of items.
Participants completed the entitativity measure that corresponded to the belief scale they had most recently completed. Participants completed each item on a 10-point scale, with 10 indicating that Caledonians are mostly alike on the trait, and 1 indicating that Caledonians are mostly different on the trait. In computing the target entitativity score, only the three items corresponding to the traits targeted in the persuasion passage were averaged. Thus, scores could range from 1, indicating low group entitativity on the set of traits, to 10, indicating high group entitativity on the traits. Cronbach’s alpha was .93 for initial entitativity and .86 for final entitativity.

Results and Discussion

Tests of formation manipulations.

Before undertaking our primary analyses, several preliminary analyses were conducted to confirm the success of our manipulations at belief formation. First, descriptive analyses indicated that the overall target belief score mean was 5.04 (SD = 1.25), thereby demonstrating participants generally endorsed that Caledonians possessed the target traits. Also of note, a 2 (type of information at formation: category or individual) x 2 (number of sources at formation: one or three) between-participants ANOVA on initial target beliefs indicated that the level of endorsement was comparable across belief formation conditions.

As expected, given that the target traits were positive, initial attitudes were positive toward Caledonians (M = 5.93, SD = 0.78). However, unlike initial beliefs, a 2 (type of information at formation: category or individual) x 2 (number of sources at formation: one or three) between-participants ANOVA revealed statistically significant differences between attitude formation conditions. Individual-level information (M =
5.73, $SD = 0.09$) resulted in less positive initial attitudes than category-level information ($M = 6.16, SD = 0.09$), $F(1, 178) = 10.30, p < .01$. There were no other differences in formation conditions ($ps > .72$).

Finally, initial entitativity scores indicated that Caledonians were seen as a fairly homogenous group ($M = 7.33, SD = 2.32$). A 2 (type of information at formation: category or individual) x 2 (number of sources at formation: one or three) between-participants ANOVA revealed no differences across formation conditions.

**Beliefs.**

Our next set of analyses was undertaken to test our key hypotheses regarding belief change. These hypotheses were tested by conducting a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (number of sources at formation: one or three) between-participants ANCOVA, with post-disconfirmation target beliefs as the dependent variable and initial target beliefs as the covariate. Smaller numbers indicate greater belief change (i.e., indicate decreased endorsement of the target beliefs).

As predicted, the main effect of type of disconfirming information was significant, $F(1, 173) = 10.83, p < .01$, with category-level disconfirming information ($M = 3.48, SD = 0.87$) resulting in more belief change than individual-level disconfirming information ($M = 4.06, SD = 0.88$). A main effect of number of sources was also significant, $F(1, 173) = 3.81, p = .05$. However, this effect was in the opposite direction of what was expected with beliefs based on three sources ($M = 3.53, SD = 0.82$) changing more than beliefs based on one source ($M = 3.83, SD = 0.94$). In line with predictions we
did not find a main effect of level of belief ($p > .60$). Also, the effect of the covariate, initial target beliefs, was found to be non-significant, $F(1, 173) = 1.60, p = .21$.

Importantly, the critical two-way interaction between type of information at formation and type of information at disconfirmation was significant, $F(1, 173) = 5.26, p = .02$. The means associated with this interaction are depicted in Panel A of Figure 1. As can be seen in the left-hand side of the panel, when initial beliefs were based on category-level of information, category-level disconfirming information produced a much larger drop in endorsement of the target beliefs than did individual-level disconfirming information. This difference was confirmed by a significant contrast between the two conditions, $F(1, 173) = 99.39, p < .01$. Turning to the right side of Panel A in Figure 1, however, it becomes apparent that this difference was much weaker when beliefs were initially formed on the basis of individual-level information, although the difference was still significant, $F(1, 173) = 4.64, p = .03$.

Although not predicted, an interaction between level of belief at formation and number of sources was significant, $F(1, 173) = 7.80, p = .01$. When participants had beliefs based initially on information about individuals, belief change was not different when they had one source ($M = 3.67, SD = 0.10$) than when they had three sources ($M = 3.79, SD = 0.18$), $F (1, 173) = 1.85, p = .18$. However, follow-up contrasts showed that when participants had initial beliefs based on category-level information, beliefs changed more when they had three sources ($M = 3.31, SD = 0.18$) than when they had only one source ($M = 4.01, SD = 0.10$), $F(1, 173) = 62.89, p < .01$. One explanation for this unexpected interaction could be that when people received several very consistent reports
Figure 1.

Panel A. Beliefs: Level of formation by level of persuasion for Caledonians (Adjusted means).

Panel B. Attitudes: Level of formation by level of persuasion for Caledonians (Adjusted means).
at the category level, receiving contradictory information was quite surprising and thus people may have more carefully scrutinized this contradictory information.

No other significant interactions were predicted nor found ($ps > .31$), including the three-way interaction. Thus, as expected, our predicted two-way interaction between type of information at formation and disconfirmation emerged regardless of the number of initial sources of information.

**Attitudes.**

As only a subset of the original beliefs were contradicted with the disconfirming information, the results for attitudes were not expected to be as pronounced as for beliefs, though a similar pattern of results was expected. To test our hypotheses, a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (number of sources at formation: one or three) between-participants ANCOVA was conducted with post-disconfirmation attitude scores as the dependent variable and initial attitude as the covariate. Smaller numbers indicate greater attitude change.

The ANCOVA revealed a significant positive effect ($b = 0.37$) of the covariate, $F(1, 172) = 8.53, p < .01$. As expected, the type of information at disconfirmation main effect was significant. Consistent with predictions, attitudes became less positive after category-level disconfirmation ($M = 3.08, SD = 1.03$) than after individual-level disconfirmation ($M = 3.90, SD = 1.55$), $F(1, 172) = 18.94, p < .01$. No other main effects were significant ($ps > .75$).

Again, the critical interaction between type of information at formation and type of information at disconfirmation was significant, $F(1, 172) = 4.64, p = .03$. This interaction took the same form as the corresponding interaction for beliefs and is depicted
in Panel B of Figure 1. As shown in the figure, when attitudes were based on category-level information (the left side of the panel), category-level disconfirmation was much more effective in changing attitudes than individual-level disconfirmation, $F(1, 172) = 118.86, p < .01$. When attitudes were based on individual-level information (the right side of the panel), this difference was attenuated but still significant, $F(1, 172) = 13.94, p < .01$. No other significant interactions were found ($ps > .07$). Thus, our critical two-way interaction between type of information at formation and type of information at disconfirmation emerged regardless of the number of sources at formation.

**Experiment 2**

Experiment 2 was designed to establish that our predicted effects are not unique to social groups and individual people but rather are phenomena that are applicable to any category for which it is possible to conceptualise individual members of a category. The second goal of Experiment 2 was to examine whether our prior effects only occur when expectations of variability are relatively high or can also occur when expectations of variability are low. Because of our extensive encounters with others, it is generally recognized people vary quite a bit and thus some degree of variability would be expected among members of any social group. This may be less true for other categories. For instance, animals may provide a type of category of objects for which people are less likely to spontaneously assume variability (e.g., few probably recognize the many subtle variations in the behavior of alligators). That being said, this default assumption of low variability might be easily changed. For instance, any pet owner can well recognize that the temperament of individual animals such as cats and dogs can vary greatly. Using a fictitious animal as the belief object seemed ideal because we believed it was an object
for which participants’ expectations of variability could be easily manipulated.

Therefore, this experiment measured entitativity as a manipulation check.

**Method**

**Participants.**

Participants in this experiment were 157 introductory psychology students who voluntarily participated, and received course credit or $5 for taking part in the study.

**Design and procedure.**

This study had a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) between-participants design. The procedure was generally similar to that of Experiment 1.

After giving informed consent, participants were told that the study was being conducted to determine why some species of animals receive a greater amount of support and attention from environmental activists than others (e.g., seals vs. endangered insects). They were told that the goal of the study was to obtain their reactions to biologists’ descriptions of particular animals.

*Formation phase.* Participants randomly assigned to the high variability condition received information that led them to believe that there was a great deal of variability among individual animals within this group. For example, those participants in the high variability group were told that there are many different sub-species of lemphurs and that individual members of the category differed significantly from one another. However, there was no explicit manipulation for the low variability condition because it was assumed that participants would naturally expect little variability among
individual members for an unfamiliar animal. Next, they were randomly assigned to read an essay about lemphurs (a fictitious animal), framed at either the category or individual level. Those in the category condition learned about lemphurs in general (e.g., “Lemplhurs are extremely intelligent creatures”), whereas those in the individual condition learned about a specific lemphur (e.g., “Specimen 128 is an extremely intelligent creature”). The descriptions (adapted from materials originally used in Crites, Fabrigar, & Petty, 1994) were designed to suggest five focal characteristics: friendly, active, timid, intelligent, and adaptive. Participants then completed measures of beliefs, attitudes, and entitativity.

Disconfirmation phase. Participants then read the disconfirming information, again at either the category or individual level. This information attempted to change the initial positive beliefs regarding lemphurs. As in the level of initial belief manipulation, the information in the two passages was identical except for the level at which it was framed, either category (e.g., “While lemphurs can perform and learn complex behaviors with a relative degree of ease, closer inspection of their survival strategies does not suggest a large degree of intelligence”) or individual (e.g., “While Specimen 136 can perform and learn complex behaviors with a relative degree of ease, closer inspection of her survival strategies do not suggest a large degree of intelligence”).

Beliefs, attitudes, and entitativity were measured again, and finally, participants completed a cognitive response task.

Measures.

Beliefs. Beliefs were assessed with a 16-item scale, with 10 of the items relevant to the formation materials (e.g., friendly, timid) and 6 filler items. Participants indicated
their beliefs on a 7-point scale, with 7 indicating that lemphurs *definitely* possess the trait, and 1 indicating that lemphurs do *not at all* possess the trait. The target beliefs score was calculated by reverse-coding belief-inconsistent items then averaging only the pertinent items. Therefore, scores could range from 7, indicating maximum endorsement of the belief-consistent items and no endorsement of the belief-inconsistent items, to 1, indicating no endorsement of the belief-consistent items and maximum endorsement of the belief-inconsistent items. Cronbach’s alpha was .75 for initial beliefs and .87 for post-disconfirmation beliefs.

*Attitudes.* This experiment used the same attitude measure and coding procedure as Experiment 1 with the exception that the target attitude object for the measure was now lemphurs. Cronbach’s alpha for this scale was .84 for initial attitudes and .91 for final attitudes.

*Entitativity.* Perceived group entitativity was measured with a five-item scale containing items for each of the traits targeted in the belief formation materials, such as active and timid. The target entitativity score was calculated using an average of all five items. Thus, scores could range from 1, indicating low group entitativity on the set of traits, to 10, indicating high group entitativity on the traits. Cronbach’s alpha was .69 for initial entitativity and .87 for final entitativity.

**Results and Discussion**

**Tests of formation manipulations.**

Descriptive analyses indicated that the overall target belief score mean was 6.07 (*SD* = 0.05), thereby indicating strong endorsement of the target traits. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or
low) between-participants ANOVA on initial target beliefs indicated that the level of endorsement was comparable across belief formation conditions.

The mean for initial attitudes was 6.03 (SD = 0.06) indicating a positive evaluation of lemphurs. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA indicated that attitudes did not differ across formation conditions.

Finally, initial entitativity scores indicated that lemphurs were seen as a fairly homogenous group (M = 7.89, SD = 2.32). It is worth noting that this score, as expected, was slightly higher than what was obtained for the social group of Caledonians in Experiment 1 (M = 7.33, SD = 2.32). Unfortunately, a 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA on initial entitativity revealed that there was no difference in perceived entitativity for the high and low variability conditions, F(1, 154) = 1.58, p = .21. This finding brings into question the efficacy of our manipulation of perceived variability.

Beliefs.

The critical hypotheses were examined with a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA, with post-disconfirmation target beliefs as the dependent variable and initial target beliefs as the covariate. Smaller numbers indicate greater belief change.

The ANCOVA revealed a significant positive effect (b = 0.46) of the covariate, F(1, 148) = 16.17, p < .001. A main effect of type of disconfirming information was
predicted such that category information would produce greater overall change than individual information. This effect was marginally significant, $F(1, 148) = 2.82, p = .10$, with category-level disconfirmation ($M = 4.38, SD = 0.09$) resulting in more belief change than individual-level disconfirmation ($M = 4.61, SD = 0.10$). In line with predictions, we did not find a main effect of type of belief formation information nor a main effect of variability ($ps > .60$).

The critical 2-way interaction between type of information at formation and type of information at disconfirmation was significant, $F(1, 148) = 7.28, p = .01$. This result replicated the findings in Experiment 1. As illustrated in Panel A of Figure 2, when beliefs were formed on category-level information (left side of Panel A), category-level disconfirmation was significantly more effective than individual-level disconfirmation, $F(1, 148) = 9.97, p < .01$. However, when beliefs were formed on individual-level information (right side of Panel A), this difference disappeared, $F(1, 148) = 0.49, p = .49$.

Given that our preliminary analyses suggested our manipulation of variability was not successful, we did not expect the variability manipulation to have any effects. However, the interaction between type of disconfirming information and variability was marginally significant, $F(1, 148) = 3.30, p = .07$. When participants had high expectations of variability, category-level disconfirming information produced a greater decrease in the endorsement of the target beliefs ($M = 4.22, SD = 0.13$) than individual-level disconfirming information ($M = 4.70, SD = 0.14$), $F(1, 148) = 6.35, p = .01$. However, when participants had low expectations of variability there was no difference between category ($M = 4.54, SD = 0.13$) and individual persuasive information ($M = 4.52, SD = 0.14$), $F(1, 148) = 0.01, p = .92$. 


Figure 2.

Panel A. Beliefs: Level of formation by level of persuasion for lemphurs (Adjusted means).

Panel B. Attitudes: Level of formation by level of persuasion for lemphurs (Adjusted means).
Of the various effects of variability that might emerge, the three-way interaction involving type of information at formation, type of information at disconfirmation, and variability was of greatest theoretical interest. Specifically, we believed that the two-way interaction demonstrating a relative matching effect would emerge across differing levels of variability. This expectation was confirmed by the non-significant three-way interaction, $F(1, 148) = 0.45, p = .50$. No other significant interactions were predicted nor found ($ps > .46$).

**Attitudes.**

A 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA was conducted with post-disconfirmation attitude scores as the dependent variable and initial attitude as the covariate. Smaller numbers indicate greater attitude change.

The ANCOVA revealed a significant positive effect ($b = 0.24$) of the covariate, $F(1, 149) = 4.86, p < .01$. Contrary to predictions, the main effect of persuasion was not significant, $F(1, 149) = 2.30, p = .13$. However, the trend across levels of disconfirming information was in the predicted direction with attitudes becoming less positive after category-level disconfirmation ($M = 4.39, SD = 0.11$) than after individual-level disconfirmation ($M = 4.63, SD = 0.11$). No other main effects were predicted nor found to be significant ($ps > .88$).

The critical two-way interaction between type of information at formation and type of information at disconfirmation was significant, $F(1, 149) = 4.20, p = .04$. This interaction takes the same form as the corresponding interaction for beliefs. As depicted
on the left side of Panel B of Figure 2, when attitudes were based on category-level information, category-level persuasion was much more effective than individual-level persuasion, $F(1, 149) = 6.52, p = .01$. However, as can be seen on the right side of the panel, when attitudes were based on individual-level information, there was no difference between category and individual-level persuasion, $F(1, 149) = 0.14, p = .71$.

Again, the three-way interaction between the level of belief, the level of persuasive information, and expected variability was non-significant, $F(1, 149) = 0.57, p = .45$. No other significant interactions were predicted nor found ($ps > .33$).

**Experiment 3**

In the previous experiments, we used categories of objects whose specific instances involved individual living entities (i.e., people within a social group and specimens of a particular type of animal). One major goal for this experiment was to replicate the effects using a category of objects that was not comprised of individual actors or living entities. Experiment 3 also differed in another sense from the two previous experiments. In this experiment, the category was an individual entity that was a broad collective (i.e., a specific newspaper) with the individual information being smaller collectives that made up the broader collective (i.e., sections within the newspaper). In this sense, Experiment 3 examines the same phenomenon as investigated in the other 2 studies in that the information is defined at different levels of specificity (broad category versus more specific sub-categories contained by the category). To the extent that the precise operationalization of level of specificity differs while still retaining this common feature of “membership nesting” within a broader category, this different operationalization allowed for a better demonstration of the robustness of the effects.
The second goal of Experiment 3 was to effectively manipulate variability so that the
generality of the matching effect across levels of variability could be more definitively
evaluated.

Method

Participants.

Participants were 222 introductory psychology students who voluntarily
participated, and received course credit or $5 for taking part in the study.

Design and procedure.

This study had a 2 (type of information at formation: category or individual) x 2
(type of information at disconfirmation: category or individual) x 2 (variability within
category: high or low) between-participants design. The procedure was generally similar
to that of Experiment 2.

Formation phase. Participants randomly assigned to the high variability
condition received information that led them to believe that there was a great deal of
variability among the sections of a newspaper. For example, the high variability
manipulation informed participants that the different sections of the newspaper were
autonomous and that various sections differed significantly from one another. Those
randomly assigned to the low variability condition received information that led them to
believe that there was very little variability among the sections of a newspaper. For
example, participants in the low variability condition were told that the various sections
of the newspaper were not autonomous and decisions were ultimately made by the editor-
in-chief. Therefore, the various sections of the newspaper did not differ significantly
from one another.
Next, they were randomly assigned to read an essay about The Chronicle (a fictitious newspaper), framed at either the category level (e.g., “The Chronicle has had reporters of the highest quality”) or individual level (e.g., “The local news section has had reporters of the highest quality”). The descriptions were designed to suggest target characteristics (e.g., high quality journalists, attractive layout, and first to report breaking news) designed to create a positive impression of The Chronicle. Participants completed measures of beliefs, attitudes, and entitativity.

Disconfirmation phase. Participants then read the disconfirming information, again at either the category (i.e., newspaper as a whole) or individual level (i.e., the sports section of the paper) that directly countered the initial positive beliefs regarding The Chronicle. As in the level of initial belief manipulation, the information in the two passages was virtually identical except for the level at which it was framed, either category (e.g., “The Chronicle once employed the best journalists in the field. However, in recent years, many of these top-tier journalists left”) or individual (e.g., “The Chronicle’s sports section once employed the best sports journalists in the field. However, in recent years, many of these top-tier journalists left”). Beliefs, attitudes, and entitativity were measured again, and finally, participants completed a cognitive response task.

Measures.

Beliefs. Participants’ beliefs were assessed with a scale consisting of 10 items that were relevant to the formation materials and 2 filler items. Participants indicated their beliefs on a 7-point scale, with 7 indicating that The Chronicle (as a whole) definitely possesses the trait, and 1 indicating that The Chronicle does not at all possess
the trait. The target beliefs score was calculated by reverse-coding belief-inconsistent items then averaging the pertinent items. Therefore, scores could range from 7, indicating maximum endorsement of the belief-consistent items and no endorsement of the belief-inconsistent items, to 1, indicating no endorsement of the belief-consistent items and maximum endorsement of the belief-inconsistent items. Cronbach’s alpha for initial beliefs was .66 and .80 for post-persuasion beliefs.

*Attitudes.* This experiment used the same attitude measure and coding procedure as Experiment 2 with the exception that the target attitude object for the measure was changed to The Chronicle. Cronbach’s alpha for this scale was .89 for initial attitudes and .94 for final attitudes.

*Entitativity.* Perceived group entitativity was measured with a five-item scale containing items for some of the target traits from belief formation, such as accurate and high quality journalists. The target entitativity score was calculated using an average of four relevant items. Thus, scores could range from 1, indicating low group entitativity on the set of traits, to 10, indicating high group entitativity on the traits. Cronbach’s alpha was .79 for initial entitativity and .81 for final entitativity.

**Results and Discussion**

**Tests of formation manipulations.**

Descriptive analyses indicated that the overall target belief score mean was 5.24 ($SD = 0.62$), thus suggesting endorsement of the target traits. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA on initial target beliefs indicated that the level of endorsement was similar across belief formation conditions.
The mean for initial attitudes was 6.02 (SD = 0.80) indicating a positive evaluation of the newspaper. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA indicated that attitudes did not differ across formation conditions.

Initial entitativity scores indicated that the newspaper was perceived as a fairly homogenous entity (M = 7.35, SD = 1.84). Importantly, as expected, a 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA confirmed that participants who received the high variability manipulation perceived the newspaper as less entitative (M = 7.09, SD = 0.17) than those who received the low variability manipulation (M = 7.60, SD = 0.17), F(1, 217) = 4.70, p = .03. This analysis also indicated that individual-level information at formation (M = 6.77, SD = 0.17) produced perceptions of lower entitativity than category-level information at formation (M = 7.92, SD = 0.16), F(1, 217) = 24.34, p < .01.

Beliefs.

The primary hypotheses were examined with a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA, with post-disconfirmation target beliefs as the dependent variable and initial target beliefs as a covariate. Smaller numbers indicate more belief change.

The predicted main effect of type of disconfirming information was significant, F(1, 213) = 59.43, p < .01. Category-level disconfirmation (M = 3.10, SD = 0.07) resulted in more belief change than individual-level disconfirmation (M = 3.84, SD =
0.07). In line with predictions we did not find a main effect of type of information at formation nor a main effect of variability (ps > .19). Also, the effect of the covariate, initial beliefs, was non-significant, F(1, 213) = 0.18, p = .67.

The two-way interaction between type of information at formation and disconfirmation was significant, F(1, 213) = 4.43, p = .04. The left side of Panel A of Figure 3 shows that when beliefs were formed on category-level information, category-level disconfirmation was substantially more effective than individual-level disconfirmation, F(1, 213) = 48.75, p < .01. In contrast, as depicted on the right side of Panel A, when beliefs were formed on individual-level information, this difference was attenuated although still significant, F(1, 213) = 15.82, p < .01.

Another of effect of interest in Experiment 3 was the three-way interaction. Interestingly, no significant three-way interaction was found, F(1, 213) = 0.99, p = .32. Thus, the relative matching effect reflected by the two-way interaction was the same regardless of variability condition. No other significant interactions were predicted nor found (ps > .11).

**Attitudes.**

A 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA was conducted with post-disconfirmation attitude scores as the dependent variable and initial attitude as the covariate.

The ANCOVA revealed a positive effect of the covariate (b = 0.38), F(1, 210) = 20.79, p < .01. The predicted main effect of type of disconfirmation was significant, F(1, 210) = 50.98, p < .01, with attitudes being less positive after category-level
Figure 3.

Panel A. Beliefs: Level of formation by level of persuasion for The Chronicle (Adjusted means).

Panel B. Attitudes: Level of formation by level of persuasion for The Chronicle (Adjusted means).
disconfirmation ($M = 4.07, SD = 0.09$) than after individual-level disconfirmation ($M = 5.02, SD = 0.09$). No other main effects were significant ($p > .45$). However, the main effect of type of information at formation was marginally significant with individual-level formation ($M = 4.43, SD = 0.09$) being slightly more susceptible to persuasion than category-level formation ($M = 4.66, SD = 0.09$), $F(1, 210) = 2.87, p = .09$.

The critical two-way interaction between type of information at formation and disconfirmation was again significant, $F(1, 210) = 5.76, p = .02$. As illustrated on the left side of Panel B of Figure 3, when attitudes were based on category-level information, category-level disconfirmation was much more effective than individual-level disconfirmation, $F(1, 210) = 45.59, p < .01$. However, as shown on the right side of Panel B, when attitudes were based on individual-level information this difference was attenuated, $F(1, 210) = 11.29, p < .01$.

As for beliefs, the three-way interaction among type of information at formation, type of information at disconfirmation, and expected variability was non-significant, $F(1, 210) = 0.01, p = .92$. No other significant interactions were predicted nor found ($ps > .18$).

**General Discussion**

**Summary of Findings**

In all three experiments, category-level disconfirming information tended to produce more belief/attitude change than individual-level information. This main effect was significant in Experiments 1 and 3 and marginally so in Experiment 2. Likewise, there was consistent evidence across experiments for the predicted interaction between type of information at formation and disconfirmation. In all three experiments, the
advantage of category disconfirming information over individual disconfirming information was greater when initial beliefs/attitudes were based on category versus individual information. This two-way interaction emerged across different numbers of initial sources of information (Experiment 1) and different levels of assumed variability within the category (Experiment 3). Moreover, it emerged for very different types of objects.

In considering our interaction, it should be noted that we chose to discuss this effect in terms of the extent to which a given type of initial belief was more susceptible to different types of disconfirming information (i.e., the effects of different types of disconfirmation within a type of belief formation). This approach is certainly a theoretically reasonable way in which to discuss our findings. However, it is equally meaningful to conceptualize the findings within type of disconfirmation (i.e., the success of a type of disconfirmation for the two types of initial beliefs).

When conceptualized this way, our results (see Figures 1-3) suggest that individual-level disconfirmation was more successful against beliefs based on individual-level information than beliefs based on category-level information, although contrast analyses revealed this trend only reached statistical significance in Experiment 3. However, the consistency of the trend across the studies is notable and indeed, when contrasts were meta-analyzed, the effect was significant ($z = 3.16, p < .01$). Similar results were obtained for attitude change ($z = 3.39, p < .01$). This finding is sensible in that a disconfirming individual should not be entirely effective in changing beliefs based on category-level information because the disconfirming individual might be seen as a rare exception to the category. However, when beliefs are based on other individuals, the
disconfirming individual should be seen as informative regarding the category given that category beliefs are based on perhaps on 1 or at most only a few individual instances.

Along similar lines, Figures 1, 2, and 3 reveal that there was a tendency for category disconfirmation to be more effective when initial beliefs were based on category rather than individual-level formation. This trend was present in all 3 experiments and the contrasts were significant in Experiments 1 and 2. Again, a meta-analysis across the three experiments revealed the overall effect to be significant ($z = 2.97, p < .01$). Meta-analyses of the same comparisons for attitudes produced similar results ($z = 2.30, p < .01$). This finding makes sense within the context of our theorizing. When beliefs are based on category-level information, if one accepts the new category-level disconfirming information as valid, it logically necessitates rejecting the initial beliefs about the category. That is, the original category-level information must now be seen as inaccurate. However, if initial category beliefs are based on an individual instance, accepting the disconfirming category-level information does not logically invalidate the existence of the individual instance. It suggests this instance is atypical, but also highlights that the category has some exceptions. Thus, initial beliefs based on category-level information are more vulnerable to category-level disconfirmation than are initial beliefs based on individual instances.

**Implications of Findings**

Perhaps the most notable aspect of the present experiments is that they highlight two new variables that have not been previously discussed or tested in the persuasion literature: level of representation of beliefs at formation and level of representation of beliefs at disconfirmation. Attitude researchers have, of course, long recognized that it is
important to differentiate among attitudes derived from different types of information. For example, early formulations of the well-known tripartite theory of attitude structure postulated that it was important to distinguish between attitudes based predominantly on affect and attitudes based predominantly on cognition (e.g., Katz & Stotland, 1959). Likewise, attitude researchers have also long postulated the value of distinguishing among attitudes with different motivational foundations such as utilitarian, value-expressive, social-adjustive, and ego-defensive functions (e.g., Katz & Stotland, 1959).

Researchers have also recognized that similar distinctions can be made regarding persuasive information that is used to change attitudes and that the efficacy of these different types of persuasive messages are in part regulated by the type of information upon which the attitude is based. For instance, affectively versus cognitively based attitudes have been found to be differentially susceptible to affectively based versus cognitively based persuasive messages (e.g., Edwards, 1990). Similarly, attitudes based on different functions have been found to be differentially susceptible to persuasive messages that target different attitude functions (e.g., Snyder & DeBono, 1985). The present findings parallel these earlier literatures in their general message that different types of attitudes are susceptible to different types of messages and all of these effects may share some common underlying processes. However, the system of categorizing attitudes/persuasive information is new to the present findings. Thus, these findings contribute to our knowledge of factors that moderate belief and attitude change and have implications for effective belief and attitude change strategies.

Indeed, it is worth noting that despite the fact that attitude researchers have explored numerous structural properties of beliefs (e.g., evaluative consistency, amount,
and complexity) as they related to a variety of attitudinal processes (see Fabrigar, MacDonald, & Wegener, 2005), attitude researchers have not considered the structural variable of whether beliefs about a category of objects are based on purely category-level information or whether beliefs about a category of objects are based on individual instances of that object. The present findings suggest that this distinction may merit further attention for exploring attitudinal processes more generally. For example, it would be interesting to examine if attitudes towards categories of objects based on either category-level information or individual-level information differ in their ability to predict behaviors relevant to the category versus behaviors relevant to an individual member of a category. Indeed, this question might in some ways parallel the long established finding in the attitude-behavior literature that attitudes tend to be more predictive of behaviors that are of comparable specificity (e.g., see Fishbein & Ajzen, 1974).

Although the present program of research was primarily conceptualized as a general exploration of belief change processes, these findings may also have interesting implications for the specific context of stereotype change. As previously discussed, stereotypes, by definition, are category-level beliefs. Our research suggests that the best way to alter stereotypes may be by presenting disconfirming category-level information rather than the strategy most commonly used to change stereotypes (i.e., using disconfirming individual-level information).

Another interesting implication of our findings is they may also suggest different ways of thinking about the structure of stereotypes than has typically been discussed in the literature. One debate that has generated considerable interest in the stereotype change literature is whether the representation of stereotypes in memory are best
described by abstractionist prototype models (i.e., models that postulate stereotypes are represented as an average or typical member of a group) or exemplar models (i.e., models that postulate stereotypes are represented as a few specific members of a group). Our distinction between category-level beliefs at formation and individual-level beliefs at formation parallels this distinction in many ways. However, our approach suggests that it may be more appropriate to think of these models as two different types of stereotype structures, both of which can occur, rather than as mutually exclusive models. It also suggests that stereotypes with these varying structures may not function in the same manner.

**Directions for Future Research**

Although the present studies constitute a useful first step in understanding the role of level of representation beliefs at formation and disconfirmation in belief and attitude change processes, the present findings also highlight important issues that remain to be addressed. One direction for future research is a more thorough exploration of the processes underlying our belief change effects. The present experiments demonstrated clear and robust effects and established that these effects occur across a wide range of different object categories. However, our findings do not provide much insight as to the precise psychological mechanisms underlying these effects.

Another avenue for research would be to explore belief change regarding individuals. In our experiments, although we varied whether people received individual or category-level information, beliefs were formed regarding categories of objects. It may be valuable to test whether similar effects occur when beliefs are formed regarding individuals. That is, one might explore instances in which people develop beliefs about
an individual based either on information about the category or on information about the individual and then examine the extent to which disconfirming information of either type alters beliefs about the individual. Taken together, these directions of investigation would help elaborate on the conclusions suggested by the present results and would further broaden the implications of these findings for understanding the belief change process.
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Footnotes

1 A full list of these studies is available from the authors upon request.

2 For all three experiments, an index of valence of cognitive responses was calculated. In all experiments, analyses of this index revealed results very similar to those for the target belief and attitude measures.
CHAPTER 3

CHANGING PERCEPTIONS OF INDIVIDUAL INSTANCES:

THE MODERATING ROLE OF LEVEL OF REPRESENTATION
Abstract
In this program of research, we investigated whether level of information underlying initial beliefs (individual vs. category) and disconfirming information (individual vs. category) influences the degree of belief and attitude change about individual instances. In both experiments, three key effects emerged. A main effect of type of disconfirming information revealed that individual-level information was more effective than category-level information in producing belief and attitude change. A main effect of type of formation revealed that category-level formation was more susceptible to persuasion than individual-level formation. Also, the two-way interaction between type of information at formation and disconfirmation indicated a relative matching effect, with individual-level disconfirmation producing more belief change than category-level disconfirmation when initial beliefs were based on individual-level information, but no difference in effectiveness of type of disconfirming information when initial beliefs were based on category-level information.
Changing Perceptions of Individual Instances:
The Moderating Role of Level of Representation

Person perception has long been an area of interest for social psychologists going back at least to Asch’s (1946) seminal paper on how people form impressions. Asch was interested in understanding how people take the diverse number of characteristics they may learn about a particular person and merge them into a unified, coherent impression of the person. He espoused the opinion that impression formation is a holistic process wherein the impression is formed of the complete person and traits become interconnected into an organizational structure, rather than existing in isolation. In later decades, a number of social cognitive researchers (e.g., Burnstein & Schul, 1982; Hamilton & Sherman, 1996; Hartwick, 1979; Srull, Lichtenstein, & Rothbart, 1985; Srull & Wyer, 1989) followed in this tradition of conceptualizing impression formation as a holistic process. Others have taken a different, less holistic approach in which attributes are conceptualized as independent and combine together in an algebraic function by which people uncover behavioral information about individuals by applying some sort of mathematical rule (e.g., Anderson, 1981; Busemeyer, 1991; Hogarth & Einhorn, 1992). Thus, out of this long history of research emerged two different perspectives. One was a more gestalt, theory-based perspective. The other perspective followed a more mathematical, data-driven approach. Although these two perspectives differed in the conceptualization of how individual information is integrated into an overall impression, what they have in common is their representation of impression formation at the level of individual information of a target person.
However, person-based encoding (using individual-level information) may not be the only way we form impressions and in fact, some data suggest it might be the rarer way (Ostrom, Pryor, & Simpson, 1981; Pryor & Ostrom, 1981). Researchers have found that people take longer to form an attribute-based impression than a category-based impression of an individual (see Fiske & Pavelchak, 1986, for a review), and attribute-based impressions require more attentional resources (e.g., Bechtold, Naccarato, & Zanna, 1986). Therefore, the more common approach is to use category-based beliefs to arrive at an impression of an individual in which a perceiver may not use individual information about the target person at all, but rather, infer beliefs about the target individual from knowing their membership in a category. Researchers view social categorization as prevalent and a necessary process (Bruner, 1958; Rosch & Lloyd, 1978; Smith & Medin, 1981) and stereotype researchers in particular, have found that categorizing an individual into a group (e.g., based on race, gender, mental illness, etc.) results in stereotypic (group-based) beliefs about the target individual (e.g., Langer & Abelson, 1974; Secord, Bevan, & Katz, 1956; Taylor, Fiske, Etcoff, & Ruderman, 1978).

In light of this recognition that impressions of individuals might sometimes be based on category membership rather than individual level information, more contemporary models of impression formation have incorporated dual process perspectives. Models such as Brewer’s (1988) dual-process model and Fiske and Neuberg’s (1990) continuum model juxtapose individual-level and category-level processes for arriving at impressions. These models draw from the stereotype literature on social categorization that implies an alternate way of arriving at an impression of an individual using category-level information.
Although Brewer’s (1988) dual-process model and Fiske and Neuberg’s (1990) continuum model differ in some important respects they also share certain common assumptions. These researchers assume that both individual-level and category-level processes may occur and focus on conditions which would lead people to rely on individuating attribute information (piecemeal processing) versus information based on activation of a category schema (categorical processing) when forming impressions of individuals. Both models view impression formation as following a fixed sequence beginning with the identification of the target in terms of central social categories (e.g., gender, race, age, etc.) that are automatically activated (e.g., Dovidio, Evans, & Tyler, 1986; Klinger & Beall, 1992; Perdue & Gurtman, 1990). Next, personal relevance determines whether the perceiver stops at this initial identification or continues further to categorization or individuation processes. Confirmatory categorization or category match occurs when the information is consistent and has good fit with respect to the current category (Haslam, Oakes, McGarty, Turner, & Onorato, 1995; Lambert, 1995; Perry, 1994). If there is not a good fit, recategorization occurs to find a different category with a better fit or may lead to an overall individuated impression of the target as a distinct category member. The greater the discrepancy between the target trait and the category, the more likely it is that perceivers will continue to recategorize or individuate the target (Seta & Seta, 1993). Importantly, both models allow for attribute by attribute integration of information about an individual as an alternative to categorical processing (e.g., Kashima & Kerekes, 1994; Levine, Halberstadt, & Goldstone, 1996).

These models imply that there are two different kinds of information that might serve as the foundation for impression formation of an individual person. In some
instances it may be based on individual beliefs specific to a target person whereas in other instances it may be based on beliefs about the category which have then been imparted to the target person. Therefore, impression formation researchers generally accept that people can arrive at impressions of individuals based on either category-level or individual-level information and also understand much about the conditions under which one will arrive at an impression using one process versus the other. What has not received nearly as much attention are the consequences of arriving at an impression via these different processes. Given that a perceiver has arrived at an impression of a person based on category or individual processing, we are interested in examining the implications of having an impression that has been arrived at by one of these processes versus the other. One interesting implication is that if we can think about impression formation as being based on these two different kinds of information, this raises the idea that we can also get contradictory information in one of these two forms. If this is the case, it may be interesting to explore whether both types of disconfirming information are equally effective or if one type of contradictory information produces more change in beliefs than the other. Second, the effectiveness of type of contradictory information may be dependent on how we initially formed the beliefs.

We propose that arriving at an impression via these different modes can be quite consequential in terms of whether the impression is susceptible to change and also the particular kinds of contradictory information that might be most effective in eliciting impression change. The formation process can essentially be thought of as a belief system that varies in the level of representation. In the individual mode, we have beliefs about an individual where the level of representation is of information at the individual
level. In the categorical mode, we still have beliefs about an individual but the level of representation is of information at the category level, in effect taking beliefs about a category and using them to impart a belief system about the target individual. We believe that these different modes of arriving at beliefs about an individual is critical and these different cognitive structures raise interesting predictions about what kind of information will be successful at undermining these initial beliefs.

In many cases we can get disconfirming information that involves learning something about the specific person or alternatively we may learn nothing new about the specific person, but rather, get new information about the category to which the person belongs. There are many real world scenarios where this may likely occur. Imagine one has formed an impression of a political leader. In some cases, perceivers may form an impression of a politician based on individuating attributes specific to that person. In other cases, perceivers may form an impression of a politician based on category information, such as the person’s political party affiliation (e.g., republican, democrat) and use that information to infer an impression of the person. Interestingly, one can imagine a scenario wherein the general reputation of a category changes. Perhaps our target politician is a Republican whose party was in power in the last election but is no longer in public favor. To what extent does learning new negative information about the category affect our impressions of the individual? Alternatively, we could learn negative information about that politician specifically. We propose that these two types of disconfirming information differ in how effective they are overall and interact in terms of how initial beliefs about the politician were formed.
We have two primary predictions. First, we hypothesize that when attempting to change beliefs about an individual, disconfirming individual-level information will be more effective than category-level information as individual-level information specifically targets individual beliefs. Learning about contradictory category-level information may not be as compelling as learning about contradictory individual-level information because perceivers are able to recognize individual variability within categories and can acknowledge that category-level information may not always be applicable to an individual instance. However, contradictory individual-level information targets the specific individual instance and cannot be as easily dismissed.

Second, we hypothesize that the level of information from which impressions are initially formed will regulate the extent to which different levels of disconfirming information will be effective in changing these initial impressions. When beliefs are predominantly based on information specific to the individual, individual-level disconfirming information should be more effective than category-level disconfirming information. For example, if one believes that a certain politician is honest and trustworthy based on information specific to that person, one may be more persuaded by information about this specific politician that refutes this impression, rather than learning that the party the politician belongs to is not honest or trustworthy (in which case the person may view this specific politician as an exception). However, if people initially formed beliefs about an individual based on category-level information extrapolated to the individual, both types of disconfirmation may be effective because initially they did not have information specific to the target. That is, because initial beliefs about the individual are directly extrapolated from the individual’s category membership, changing
beliefs about the category may have as strong an impact on belief change about the person as learning actual contradictory information directly about the individual.

What we have characterized thus far deals with impression formation with respect to individual people, but the phenomenon we have described could in principle be a general phenomenon that can occur when forming impressions of an individual instance of any type of category. Indeed, many different contexts can have this category-individual nesting structure. For example, consider the context of marketing where people may hold beliefs about companies as well as their specific products. One might, for instance, have a positive impression of a product such as Corolla, a specific vehicle. With the negative media attention that Toyota has been getting recently, it would be interesting to examine the extent to which impressions of the specific car Corolla may be affected by negative category-level information of the company. Is this positive initial impression more effectively changed by specific negative information about the Corolla or by negative information about Toyota? Also, how might type of disconfirming information interact in terms of how initial beliefs about the Corolla were formed? Thus, these effects are predicted to apply beyond individuals of social groups as traditionally examined in impression formation to other targets of judgment.

Another factor that may play a role in this relationship is how much variability a person perceives in individual members of a category. Across different categories of objects there may be differential expectations of variability (e.g., Srull & Wyer, 1989). Some categories may be assumed to be highly cohesive with little variability in which case using category beliefs to infer about an individual member of the category makes sense. Other categories may be assumed not to be cohesive with a great deal of
variability in which case it may be more questionable to impart category beliefs onto an individual member of this type of category. This raises the issue of whether our predicted effects would be the same across variability. Therefore, we are also interested in examining whether the predicted effects only occur when expectations of variability are relatively low or can also occur when expectations of variability are high.

To date, no one has tested these ideas in impression formation of individuals but the opposite pattern of predictions has been tested in beliefs about categories. Paik, MacDougall, Fabrigar, Peach, and Jellous (2009) found that in general, when attempting to change beliefs about a category, giving category-level disconfirming information was more effective than giving individual-level information. However, they found that how people arrived at initial beliefs about the category mattered in what strategy was best in changing these beliefs. Specifically, when participants arrived at beliefs about the category via category-level information, category-level disconfirmation was much more effective than using individual-level disconfirmation. However, when participants arrived at beliefs about the category via individual-information, this advantage was greatly attenuated.

In contrast to Paik et al. (2009), this research program examined belief change about individual instances. This was done in two experiments by manipulating level of representation at formation and disconfirmation. The first experiment used an impression formation paradigm where the individual instance was a specific person and nationality was the category representation. The second experiment extended our findings to a nonsocial target object, specifically a newspaper organization, in order to examine whether this principle of individual belief change is a general phenomenon that can apply
to a variety of belief objects and not only specific to impression change of individual people. The target was a specific section of the newspaper and the newspaper in its entirety was the category representation.

**Experiment 1**

Experiment 1 was designed to examine belief change about individuals using an impression formation paradigm. This experiment was conducted in the context of forming an impression of an ostensibly real person, C. E., a citizen of the (fictitious) country of Caledonia. The materials were adapted from those used by Paik et al. (2009).

**Method**

**Participants.**

Participants were 138 undergraduate students who volunteered and received course credit or $5 for partaking in the study.

**Design and procedure.**

This study had a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) between-participants design.

**Formation phase.** Participants were informed that they would be reading information about C. E., a citizen of Caledonia. Participants randomly assigned to the high variability condition received information that led them to believe that there was a great deal of variability among Caledonians. For example, they learned that Caledonian society has flexible norms and socialization practices and thus, individual Caledonians tend to have different value systems and behaviors, and differ greatly from one another. Those randomly assigned to the low variability condition received information that led
them to believe that there was very little variability among Caledonians. For example, they learned that Caledonian society has strict socialization practices and a well-defined set of social norms and behaviors. Therefore, individual Caledonians tend to have similar value systems and behaviors and do not differ greatly from one another.

Next, they read an essay designed to create positive beliefs about C. E., a citizen of Caledonia. The essay contained information ostensibly taken from an anthropologist’s report describing the behavior of individuals of Caledonia. The descriptions of behavior were designed to suggest six different positive personality traits: friendly, honest, compassionate, curious, emotional, and impulsive. Participants were randomly assigned to read information that was framed at either an individual-level (e.g., “C. E. spends a lot of time travelling to see friends and relatives, and always has a friendly welcome for anyone visiting”) or at a category-level (e.g., “Caledonians spend a lot of time travelling to see friends and relatives, and always have a friendly welcome for anyone visiting”). Importantly, all participants received the same information and the only difference was the level at which the information was framed (specific to C. E. or more generally regarding Caledonians). Participants then completed measures of beliefs and attitudes regarding C. E., and entitativity regarding Caledonians. Entitativity assesses the extent to which a group is seen as a coherent entity (McConnell, Sherman, & Hamilton, 1997) and served as a manipulation check of the variability manipulation.

Disconfirmation phase. Participants then read disconfirming information about C. E., again at either the category or individual level intended to result in a more negative evaluation of C. E. This information attempted to change a subset of the initial beliefs (target beliefs): friendly, honest, and compassionate. For example, in the individual
persuasive information condition, in an attempt to change the perception of friendliness, participants read that in fact, C. E. “does not seem to enjoy socializing at all” and that C. E. “only attends those social functions that would help their social standing.” In contrast, participants randomly assigned to the category condition read instead that Caledonians “do not seem to enjoy socializing at all” and that they “only attend those social functions that would help their social standing.” The key idea to note is that as in the level of initial belief manipulation, the information in the two passages was virtually identical except for the level at which it was framed, either individual (C. E.) or category (Caledonians, of which C. E. is a member).

Beliefs and attitudes toward C. E., and entitativity regarding Caledonians were measured again, and finally, participants completed a cognitive response task.¹

**Measures.**

**Beliefs.** Participants’ beliefs regarding C. E. were assessed with a 20-item scale. The scale consisted of 12 items that were relevant to the formation materials (e.g., unfriendly, compassionate), and 8 filler items (e.g., unskilled, contented). Participants indicated their beliefs on a 7-point scale, with 7 indicating that C. E. definitely possesses the trait, and 1 indicating that C. E. does not at all possess the trait. The target beliefs score consisted of an average of only the six items corresponding to the traits that were intended to be changed in the disconfirming information. Belief-inconsistent items (e.g., unfriendly, dishonest) were first reverse-coded, and then an average of the pertinent items was calculated. Thus, scores could range from 7, indicating maximum endorsement of the initial belief-consistent items and no endorsement of the initial belief-inconsistent items, to 1, indicating no endorsement of the initial belief-consistent items and maximum
endorsement of the initial belief-inconsistent items. Cronbach’s alpha was .89 for initial beliefs and .95 for final beliefs.

**Attitudes.** Participants’ attitudes toward C. E. were assessed with an eight-item attitude measure containing general evaluative terms such as good, positive, dislike, and undesirable. For each of the items, participants indicated how well the word described their attitude toward C. E. on a 7-point scale (c.f., Crites, Fabrigar, & Petty, 1994). Negative items were reverse-coded, and an average of the eight items was obtained. Scores ranged from 1, indicating a completely negative evaluation, to 7, indicating a completely positive evaluation. Cronbach’s alpha was .88 for initial attitude and .94 for final attitude.

**Entitativity.** As mentioned earlier, entitativity is a measure of the extent to which a group is seen as homogenous (McConnell, Sherman, & Hamilton, 1997) and was measured in this study because the variability manipulation should affect perceptions of group cohesion. Perceived group entitativity was measured with a six-item scale containing items for each of the traits targeted in the formation materials (e.g., friendly, honest). Participants completed each item on a 10-point scale, with 10 indicating that Caledonians are mostly alike on the trait, and 1 indicating that Caledonians are mostly different on the trait. In computing the target entitativity score, only the three items corresponding to the traits targeted in the disconfirmation passage were averaged. Thus, scores could range from 1, indicating low group entitativity on the set of traits, to 10, indicating high group entitativity on the traits. Cronbach’s alpha was .91 for initial entitativity and .91 for final entitativity.
Results and Discussion

Tests of formation manipulations.

Descriptive analyses indicated that the overall target belief score mean was 6.04 (SD = 0.89) on a scale of 1 to 7, thus suggesting endorsement of the target traits and a positive impression of C. E., as intended. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA on initial target beliefs indicated that the level of endorsement was similar across variability conditions (p = .71). However, there was a significant difference in initial beliefs across formation conditions with participants who read the individual-level message (M = 6.37, SD = 0.10) starting out with more positive beliefs compared to those who read the category-level message (M = 5.70, SD = 0.10), F(1, 134) = 21.91, p < .01.

The mean for initial attitudes was 5.50 (SD = 0.93) indicating a positive evaluation of C. E. as the materials were designed to elicit. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA on initial attitude indicated that attitudes did not differ across variability conditions (p = .91). However, there was a marginally significant main effect of formation condition with participants who received individual-level information having more positive initial attitudes (M = 5.65, SD = 0.11) than those who received category-level information (M = 5.35, SD = 0.11), F(1, 134) = 3.62, p = .06.

Initial entitativity scores indicated that Caledonians were perceived as a fairly homogenous group (M = 7.09, SD = 2.20). Importantly, as expected, a 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA confirmed that participants who received the high variability manipulation perceived Caledonians as less entitative (M = 6.62, SD = 0.24)
than those who received the low variability manipulation \((M = 7.61, SD = 0.24)\), \(F(1, 132) = 8.34, p < .01\). Also, individual-level information at formation \((M = 6.32, SD = 0.24)\) produced perceptions of lower entitativity than category-level information at formation \((M = 7.92, SD = 0.25)\), \(F(1, 132) = 21.92, p < .01\).

Beliefs.

The primary hypotheses were examined with a 2 (type of information at formation: category or individual) \(\times\) 2 (type of information at disconfirmation: category or individual) \(\times\) 2 (variability within category: high or low) ANCOVA, with final target beliefs as the dependent variable and initial target beliefs as a covariate. As belief-inconsistent items were reverse-coded then averaged, smaller numbers indicate greater belief change.

The predicted main effect of type of disconfirming information was significant, \(F(1, 129) = 85.88, p < .01\). This effect indicated that individual-level disconfirmation specific to C. E. \((M = 2.74, SD = 0.13)\) resulted in more belief change than category-level disconfirmation about Caledonians \((M = 4.43, SD = 0.13)\). As predicted, there was no main effect of variability \((p = .34)\). Although it was not predicted, the main effect of type of information at formation was significant. Participants who formed beliefs about C. E. based on category-level formation \((M = 3.11, SD = 0.13)\) were more susceptible to persuasion than participants who formed beliefs about C. E. based on individual-level formation \((M = 4.06, SD = 0.13)\), \(F(1, 129) = 23.90, p < .01\). This indicates that although participants were willing to infer beliefs about C. E. based on only knowing information about Caledonians, beliefs arrived at in this manner were less strongly held than beliefs
based on information directly about C. E. The effect of the covariate, initial beliefs, was non-significant, $F(1, 129) = 0.30, p = .59$.

The two-way interaction between type of information at formation and disconfirmation was significant, $F(1, 129) = 33.89, p < .01$. The means associated with this interaction are depicted in Panel A of Figure 1. The left side of Panel A shows that when beliefs about C. E. were initially formed on individual-level information, individual-level disconfirmation was substantially more effective than category-level disconfirmation, $F(1, 129) = 33.52, p < .01$. In contrast, as depicted on the right side of Panel A, when beliefs about C. E. were formed on category-level information, the difference between individual- and category-level disconfirming information was not significant, $F(1, 129) = 1.81, p = .18$.

Another effect of interest was the three-way interaction. Interestingly, no significant three-way interaction was found, $F(1, 129) = 0.64, p = .42$. Thus, the relative matching effect reflected by the critical two-way interaction was the same regardless of variability condition. No other significant interactions were predicted nor found ($ps > .17$).

**Attitudes.**

A 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA was conducted with final attitude scores as the dependent variable and initial attitude scores as the covariate. Like beliefs, smaller numbers indicate greater attitude change as attitude-inconsistent items were reverse-coded then averaged to calculate the attitude score. We expected that the effects on attitudes would
Figure 1.

Panel A. Beliefs: Level of formation by level of persuasion for C. E. (Adjusted means).

Panel B. Attitudes: Level of formation by level of persuasion for C. E. (Adjusted means).
be somewhat weaker than the effects on beliefs (because beliefs were directly targeted by the disconfirming information) but that the pattern of effects would be similar to beliefs.

As with the beliefs measure, the predicted main effect of type of disconfirmation was significant, $F(1, 129) = 82.14, p < .01$, with less positive attitudes toward C. E. after receiving individual-level disconfirmation ($M = 2.75, SD = 0.12$) than after category-level disconfirmation ($M = 4.27, SD = 0.12$). As predicted there was no main effect of variability ($p = .51$). As with beliefs, although not expected, the main effect of type of information at formation was significant with category-level formation ($M = 3.19, SD = 0.12$) being more susceptible to persuasion than individual-level formation ($M = 3.83, SD = 0.12$), $F(1, 129) = 14.33, p < .01$. The effect of the covariate, initial attitude, was non-significant, $F(1, 129) = 0.09, p = .77$.

The critical two-way interaction between type of information at formation and disconfirmation was significant, $F(1, 129) = 24.70, p < .01$. This interaction took the same form as the corresponding interaction for beliefs and is depicted in Panel B of Figure 1. As illustrated on the left side of Panel B, when attitudes regarding C. E. were based on individual-level information, individual-level disconfirmation was much more effective than category-level disconfirmation, $F(1, 129) = 30.56, p < .01$. Turning to the right side of that panel, this difference was not significant when attitudes regarding C. E. were initially formed on category-level information, $F(1, 129) = 2.45, p = .12$.

Similar to the results for beliefs, the three-way interaction between type of information at formation, type of information at disconfirmation, and expected variability was non-significant, $F(1, 129) = 2.36, p = .13$. No other significant interactions were predicted nor found ($ps > .49$).
Experiment 2

Experiment 1 provided initial evidence for our hypotheses. This second experiment was designed to extend these findings by demonstrating the generalizability of the effects beyond the impression formation domain and to highlight the importance of taking into account level of representation when trying to change beliefs about any sort of individual instance, not just specific to beliefs about individual people. We believe that this is a general belief change process of individual instances that applies not only to individual members of social groups, but any sort of object that can be conceptualized as an individual instance of a broader category. Therefore, the context of a newspaper was chosen as the belief object with a specific section of the newspaper comprising the individual instance and the newspaper as a whole comprising the category. The materials were adapted from Paik et al. (2009).

Method

Participants.

Participants were 362 introductory psychology students who voluntarily participated, and received course credit or $5 for taking part in the study.

Design and procedure.

This study had a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) between-participants design. The procedure was generally similar to that of Experiment 1.

Formation phase. Participants were told that they would receive information about an ostensibly real newspaper called The Chronicle. Participants randomly assigned
to the high variability condition received information that led them to believe that there was a great deal of variability among the sections of a newspaper. For example, the high variability manipulation informed participants that the different sections of the newspaper were autonomous and that various sections differed significantly from one another. Those randomly assigned to the low variability condition received information that led them to believe that there was very little variability among the sections of a newspaper. For example, participants in the low variability condition were told that the various sections of the newspaper were not autonomous and decisions were ultimately made by the editor-in-chief. Therefore, the various sections of the newspaper did not differ significantly from one another.

Next, they were randomly assigned to read an essay about the sports section of The Chronicle, framed at either the individual-level (e.g., “The sports section has had reporters of the highest quality”) or at a category-level (e.g., “The Chronicle has had reporters of the highest quality”). The descriptions were designed to suggest target characteristics (e.g., high quality journalists, attractive layout, and first to report breaking news) designed to create a positive impression of the sports section. Participants completed measures of beliefs and attitudes about the sports section, and entitativity regarding the newspaper in general.

Disconfirmation phase. Participants then read disconfirming information, again at either the individual (i.e., the sports section specifically) or category level (i.e., The Chronicle) that directly countered the initial positive beliefs about the sports section. As in the level of initial belief manipulation, the information in the two passages was virtually identical except for the level at which it was framed, either individual (e.g., “The
Chronicle’s sports section once employed the best sports journalists in the field. However, in recent years, many of these top-tier journalists left”). Beliefs and attitudes about the sports section, and entitativity regarding the newspaper were measured again, and finally, participants completed a cognitive response task.

Measures.

Beliefs. Participants’ beliefs were assessed with a scale consisting of 10 items that were relevant to the formation materials and 6 filler items. Participants indicated their beliefs on a 7-point scale, with 7 indicating that the sports section definitely possesses the trait, and 1 indicating that the sports section does not at all possess the trait. The target beliefs score was calculated by reverse-coding belief-inconsistent items then averaging the pertinent items. Therefore, scores could range from 7, indicating maximum endorsement of the belief-consistent items and no endorsement of the belief-inconsistent items, to 1, indicating no endorsement of the belief-consistent items and maximum endorsement of the belief-inconsistent items. Cronbach’s alpha for initial beliefs was .70 and .71 for final beliefs.

Attitudes. This experiment used the same attitude measure and coding procedure as Experiment 1 with the exception that the target attitude object for the measure was changed to the sports section of The Chronicle. Cronbach’s alpha for this scale was .91 for initial attitudes and .93 for final attitudes.

Entitativity. Perceived group entitativity was measured with a five-item scale containing items for some of the target traits from belief formation, such as accurate and high quality journalists. The target entitativity score was calculated using an average of
all the items. Thus, scores could range from 1, indicating low group entitativity on the set of traits, to 10, indicating high group entitativity on the traits. Cronbach’s alpha was .87 for initial entitativity and .85 for final entitativity.

Results and Discussion

Tests of formation manipulations.

Descriptive analyses indicated that the overall target belief score mean was 5.18 ($SD = 0.71$), thus suggesting endorsement of the target traits. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA on initial target beliefs indicated that the level of endorsement was similar across variability conditions. However, there was a significant main effect of belief formation condition such that participants who received individual-level information had more positive initial beliefs ($M = 5.39$, $SD = 0.05$) than those who received category-level information ($M = 4.98$, $SD = 0.05$), $F(1, 357) = 32.59$, $p < .01$.

The mean for initial attitudes was 5.46 ($SD = 1.03$) indicating a positive evaluation of the newspaper. A 2 (type of information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA indicated that attitudes did not differ across variability conditions. As with beliefs, there was a significant main effect of belief formation condition such that participants who received individual-level information had more positive initial attitudes ($M = 5.77$, $SD = 0.07$) than those who received category-level information ($M = 5.15$, $SD = 0.07$), $F(1, 358) = 35.41$, $p < .01$.

Initial entitativity scores indicated that the newspaper was perceived as a fairly homogenous entity ($M = 6.82$, $SD = 1.96$). Importantly, as expected, a 2 (type of
information at formation: category or individual) x 2 (variability within category: high or low) between-participants ANOVA confirmed that participants who received the high variability manipulation perceived the newspaper as less entitative ($M = 6.56$, $SD = 0.13$) than those who received the low variability manipulation ($M = 7.11$, $SD = 0.14$), $F(1, 360) = 8.41$, $p < .01$. Also, individual-level information at formation ($M = 6.13$, $SD = 0.13$) produced perceptions of lower entitativity than category-level information at formation ($M = 7.54$, $SD = 0.14$), $F(1, 360) = 54.94$, $p < .01$.

**Beliefs.**

The primary hypotheses were examined with a 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA, with final target beliefs as the dependent variable and initial target beliefs as a covariate. Smaller numbers indicate more belief change.

The predicted main effect of type of disconfirming information was significant, $F(1, 350) = 7.74$, $p < .01$. Individual-level disconfirmation ($M = 3.17$, $SD = 0.05$) resulted in more belief change than category-level disconfirmation ($M = 3.38$, $SD = 0.05$). As predicted, there was no main effect of variability ($p = .46$). Although not originally predicted, as in the first experiment, the main effect of type of information at formation was significant with category-level formation ($M = 3.19$, $SD = 0.06$) being more susceptible to persuasion than individual-level formation ($M = 3.36$, $SD = 0.06$), $F(1, 350) = 4.74$, $p = .03$. Again, this suggests that although participants were willing to infer beliefs about the sports section based on information about The Chronicle, these beliefs were more susceptible to persuasion than beliefs based on information specific to the
sports section. The ANCOVA revealed a somewhat surprising negative effect of the covariate \( b = -0.24 \), \( F(1, 350) = 17.89, p < .01 \), which suggests that the more positive participants’ beliefs were initially, the greater the shift in beliefs.

The two-way interaction between type of information at formation and disconfirmation was marginally significant, \( F(1, 350) = 3.70, p = .06 \). The left side of Figure 2 shows that when beliefs were formed on individual-level information, individual-level disconfirmation was substantially more effective than category-level disconfirmation, \( F(1, 350) = 10.53, p < .01 \). However, when beliefs were formed on category-level information (right side of Figure 2), there was no difference between individual- and category-level disconfirming information, \( F(1, 350) = 0.37, p = .54 \).

Another effect of interest was the three-way interaction. Unlike Experiment 1, there was a significant three-way interaction, \( F(1, 350) = 3.96, p < .05 \). Panel A of Figure 3 illustrates the findings for low variability. The left side of Panel A shows that when beliefs were formed on individual-level information, individual-level disconfirmation was substantially more effective than category-level disconfirmation, \( F(1, 350) = 6.54, p = .01 \). However, when beliefs were formed on category-level information (right side of Panel A), there was no difference between individual- and category-level persuasion, \( F(1, 350) = 1.79, p = .18 \). This two-way interaction was significant, \( F(1, 172) = 6.31, p = .01 \). Panel B of Figure 3 illustrates the findings for high variability. The left side of Panel B shows that when beliefs were formed on individual-level information, individual-level disconfirmation was more effective than category-level disconfirmation, \( F(1, 350) = 4.61, p = .03 \). When beliefs were formed on category-level information (right side of Panel B), again individual-level disconfirmation was more
Figure 2.

Beliefs: Level of formation by level of disconfirmation for the sports section (Adjusted means).
Panel A. Beliefs for low variability: Level of formation by level of disconfirmation for the sports section (Adjusted means).

Panel B. Beliefs for high variability: Level of formation by level of disconfirmation for the sports section (Adjusted means).
effective than category-level disconfirmation, \( F(1, 350) = 4.92, p = .03 \). Not surprisingly, under high variability the two-way interaction was not significant, \( F(1, 177) = 0.002, p = .96 \) and hence the results under high variability are better characterized as a main effect of type of disconfirming information, \( F(1, 177) = 11.72, p < .01 \). Thus, the relative matching effect reflected by the two-way interaction differed as a function of variability condition. No other significant interactions were predicted nor found (\( ps > .12 \)).

**Attitudes.**

A 2 (type of information at formation: category or individual) x 2 (type of information at disconfirmation: category or individual) x 2 (variability within category: high or low) ANCOVA was conducted with final attitude scores as the dependent variable and initial attitude scores as the covariate. As in the prior study, we expected the results for attitudes would show a similar, but weaker pattern of effects to those obtained for beliefs.

The predicted main effect of type of disconfirmation was significant, \( F(1, 353) = 6.01, p < .02 \), with attitudes being less positive after individual-level disconfirmation (\( M = 4.08, SD = 0.08 \)) than after category-level disconfirmation (\( M = 4.34, SD = 0.08 \)). No other main effects were significant (\( ps > .09 \)). The ANCOVA revealed a positive effect of the covariate (\( b = 0.43 \)), \( F(1, 353) = 59.53, p < .01 \).

The critical two-way interaction between type of information at formation and disconfirmation was not significant, \( F(1, 353) = 0.44, p = .51 \). Also, the three-way interaction between type of information at formation, type of information at disconfirmation, and expected variability was non-significant, \( F(1, 353) = 0.85, p = .36 \). No other significant interactions were predicted nor found (\( ps > .12 \)).
General Discussion

Summary of Results

Several key effects emerged across the two experiments. As predicted, we found a main effect of type of disconfirming information such that individual-level information was more effective in changing beliefs than category-level information. This effect was robust and consistent. It emerged for both the beliefs and attitudes dependent variables across both experiments. Also of interest was the somewhat unexpected, but nonetheless consistent finding that beliefs and attitudes about individual instances initially formed on the basis of category-level information were more susceptible to change than beliefs initially formed on the basis of individual-level information. This finding suggests that although people are willing to infer beliefs about individual instances on the basis of category membership, beliefs regarding individuals arrived at via this process are less strongly held than beliefs stemming from direct information about the individual instance.

Our prediction regarding the interaction between type of information at formation and disconfirmation was also supported. We found a relative matching effect such that when beliefs were initially formed on individual-level information, individual-level disconfirmation proved to be much more effective in changing beliefs than category-level disconfirmation. However, when beliefs were initially formed on category-level information, there was no difference in effectiveness between individual- and category-level disconfirming information. This interaction was significant for both dependent variables in Experiment 1 and marginally significant ($p = .06$) for the beliefs measure in Experiment 2 in the predicted pattern.
Lastly, in Experiment 2, we found that variability did seem to matter as illustrated by the significant three-way interaction between type of formation, disconfirmation, and variability for the beliefs measure. The pattern of results (see Figure 3) suggests that when a category’s perceived variability was low, people were more persuaded by individual-level disconfirming information when initial beliefs were formed on individual-level information. However, when initial beliefs were formed regarding category-level information, both types of disconfirming information were equally effective. In contrast, when a category’s perceived variability was high, people were less likely to extrapolate to the individual instance using category-level disconfirming information. Individual-level disconfirming information was always more effective, regardless of whether initial beliefs were formed regarding individual- or category-level information.

Implications of Findings

Advances. The findings obtained in our experiments contribute to the impression formation literature in several notable ways. First, although there has been some work on the malleability of impressions, most of this work has focused on on-line impression change. Perceivers make trait judgments about an individual as the information comes in (e.g., Hastie & Park, 1986; Lichtenstein & Srull, 1987) and these judgments may be provisional (Trope, 1998) and may change with further information about the context (Gilbert, Pelham, & Krull, 1988). However, these judgments are not considered to be completely finalized. Past research has not focused on how already consolidated impressions can subsequently be changed. Moreover, researchers know that impressions can be arrived at in different ways (e.g., categorical vs. piecemeal processing) but the
consequences of arriving at impressions using these different processes has been largely ignored. We have provided the first data to explicitly test that having a representation of individual instances at these two levels leads to differential susceptibility to impression formation revision and in so doing introduced the idea that the type of disconfirming information can matter when changing impressions.

Second, impression formation models have generally only been applied to people. The findings from Experiment 2, which did not use an individual person as the target of belief suggests that while not identical in every feature of our results, many of the effects of impression formation may translate beyond people as targets of belief. Thus, the applicability of the impression formation process may go beyond individual people to other objects and the same implications for change of these beliefs may carryover. This has interesting implications for existing models of impression formation such as Fiske and Neuberg’s (1990) continuum model and Brewer’s (1988) dual process model.

People certainly do use categorical and piecemeal processing when forming impressions of individuals, but this may not be exclusive to beliefs about individual persons. People may also use these types of processing for other objects. Interestingly, Brewer (1988) alluded to the value of examining these processes for objects other than individuals. She noted that members of nonsocial object categories are largely viewed as similar in contrast to social objects. She speculated on the implications of nonsocial objects leading to individuated versus personalized processing. Although our findings do not speak specifically to her speculations, they do suggest that processes discussed in these models may be relevant more broadly to general systems of beliefs beyond the context for which these models were originally intended.
Lastly, this research program complements findings from Paik et al. (2009). This earlier program of research examined belief change about categories. Specifically, it examined what happens when beliefs about categories are formed on individual- or category-level information and the implications of this for subsequent change of category beliefs. The current experiments reveal the other side of this picture (what happens when beliefs about individual instances are formed on individual- or category-level information). Hamilton and Sherman (1996) noted that while there is an extensive body of research that examines perceptions of individuals and an extensive body of research that examines perceptions of groups, these two areas have largely remained separate. They suggested that in fact, these two domains have much in common and that similar mechanisms and processes may actually be at work. Together with the earlier paper by Paik and colleagues (2009), this research program constitutes a step toward examining belief change of both individual instances and categories, bridging this often overlooked divide.

Interestingly, a comparison of the two sets of studies indicates a fair amount of symmetry in the findings. That is, the present findings in many respects constitute the reverse image of the findings observed by Paik et al. (2009). The observed main effect of type of disconfirming information and the interaction between type of information at formation and disconfirmation in the present studies are essentially the opposite of those reported in Paik et al. (2009).

These symmetries notwithstanding, there are at least three aspects of the present findings that are not symmetrical to the earlier studies on beliefs about categories. First, the present studies indicated that beliefs about individuals are more malleable when they
are based on information at the category level than when derived from information at the individual level. Interestingly, Paik et al. (2009) found no evidence of a main effect for type of information at formation. That is, forming beliefs about categories on the basis of individual-level information was no more vulnerable to change than beliefs about categories formed from category-level information.

Second, the current studies provided mixed evidence for a possible role of perceptions of variability within categories whereas the earlier work by Paik et al. (2009) found no evidence that perceptions of variability had any effect on belief change. Thus, these two sets of studies highlight that there are clearly some differences in the process by which people extrapolate characteristics about individuals from categories as opposed to extrapolating characteristics about categories from individuals.

Third, the nature of the two-way interactions in this paper differs slightly from the two-way interactions in the earlier paper. Like the earlier paper, the two-way interactions in the current studies illustrated the tendency for the effectiveness of category-level disconfirmation against initial beliefs that were based on category rather than individual-level formation. However, unlike the prior paper, individual-level disconfirmation was not more effective against initial beliefs formed from one type over the other. Thus, it appears that the two-way interaction between type of formation and disconfirmation for belief change about individuals is wholly driven by the differential effectiveness of category-level disconfirmation and unrelated to the effectiveness of individual-level disconfirmation against the different types of formation.

**Unresolved issues.** Although these experiments constitute an important first step in examining the role of level of representation in belief change of individual
instances, there are a few issues that remain to be addressed. Across both experiments there were more robust changes at the belief level compared to attitudes. However, this is not completely surprising as the information that participants were given were designed to specifically target beliefs and this pattern is similar to the one found in Paik et al. (2009) for category-level beliefs and attitudes. Also, we found stronger effects for the impression formation paradigm (Experiment 1) compared to the newspaper paradigm (Experiment 2). However, our findings with the impression formation paradigm do generalize in most respects to our findings with the newspaper paradigm. As already discussed in detail, there is evidence in Experiment 2 for the same pattern of results found in Experiment 1 for the main effects of type of initial information and disconfirming information (for both beliefs and attitudes), and the two-way interaction between type of information at formation and disconfirmation (marginal for beliefs).

There were only two exceptions where the effects did not replicate from Experiment 1 to Experiment 2. First, in Experiment 2, we did not replicate the two-way interaction for attitudes. However, as we have already alluded to, the effects for attitudes were generally weaker than the effects for beliefs. It is also worth noting that the two-way interaction even for beliefs was weaker in Experiment 2 compared to Experiment 1 which implies that it would have been difficult to get the significant effect for attitudes. Second, we found no evidence of variability as a moderator in Experiment 1, but variability did moderate the interaction between type of information at formation and disconfirmation in Experiment 2 for beliefs. Again, this begs the question of whether there is something fundamentally different about belief change regarding social versus nonsocial objects or whether this is due to some other factor.
Experiment 2 differed from Experiment 1 in that it moved away from the impression formation paradigm. Instead of forming an impression of an individual (C. E.) based on either information specific to C. E. or information about the nationality of C. E. (Caledonian), the paradigm had participants form an impression of a section of a newspaper based on either information specific to that section, or extrapolated from information about the newspaper in general. Although the experiments differ in this respect, they also differ in another potentially consequential way. In Experiment 1, the level of representation manipulation involved nesting a specific individual (C. E.) within a collective (Caledonians). In Experiment 2, the manipulation involved nesting a smaller collective (sports section) within a larger collective (The Chronicle). Thus, the level of representation manipulation is more dramatic in Experiment 1. Using an earlier example, the degree of level of representation manipulation in Experiment 1 is like forming an impression of a specific Corolla (my neighbor’s red one) based on information about that specific Corolla or Toyota in general. The degree of level of representation manipulation in Experiment 2 is similar to forming an impression of the car Corolla (of which there are many) based on information about Corollas or Toyota in general.

Taking this into consideration, the discrepancy between Experiments 1 and 2 in whether variability acted as a moderating factor makes some intuitive sense. In the case of Experiment 1, there is some degree of variability at the level of the category but not so much at the level of the individual, as it regards a specific person. However, in the case of Experiment 2, because the individual instance is a smaller collective nested within a larger collective, there is some degree of variability at both levels.
Directions for Future Research

The preceding discussion highlights some interesting avenues for future inquiry. One useful direction would be to examine differing degrees of level of representation. In our experiments we have conceptualized the specific-category distinction broadly to include specific instances nested within collectives, but also smaller collectives nested within larger collectives. Although the degree of replication of our effects from Experiment 1 to Experiment 2 does suggest that similar processes are generally at work in belief change when level of representation differs in this way, the difference of variability as a moderator between the experiments also points to an important way in which different conceptualizations of the specific-category distinction could matter. Thus, it may be valuable to test different conceptualizations of the specific-category distinction within a single paradigm to tease apart how these distinctions may differ for the belief change process.

Taken together with the findings from Paik and colleagues (2009), these experiments suggest the utility of conceptualizing a general belief change process. Many of the same effects replicated from belief change of categories to belief change of individual instances (albeit in the opposite pattern as we predicted). However, these findings do not speak to the mechanisms underlying these effects which may be a direction of further inquiry and would further bridge the gap between social perception of individuals and groups. We look forward to examining these possibilities.
References


Footnote

1 For both experiments, an index of valence of cognitive responses was calculated. For experiment 1 analyses of this index revealed a pattern of results similar to those for the target belief and attitude measures which were statistically significant ($ps < .01$). For experiment 2, analyses of the cognitive responses index revealed a pattern of results similar to those for the target beliefs measure with a significant main effect ($p < .01$) and a marginal 3-way interaction ($p = .11$).
CHAPTER 4

GENERAL DISCUSSION
Summary of Results

As noted at the outset, level of representation (whether beliefs are arrived at an individual- or category-level) is a variable that has been recognized in various literatures throughout social psychology such as the stereotype and impression formation literatures. However, surprisingly, its consequences for changing beliefs have previously not been explored. The experiments in this research program represent a first step toward systematically investigating the role of level of representation in the general belief change process common to categories as well as individual instances for social and nonsocial objects.

Across the two manuscripts we found evidence for two opposite pattern main effects and two opposite pattern interactions. For beliefs regarding categories (Chapter 2), category-level disconfirming information was more successful in undermining initial beliefs than individual-level disconfirming information. For beliefs regarding individual instances (Chapter 3), the reverse pattern of results was found with individual-level disconfirming information being more successful in undermining initial beliefs than category-level disconfirming information. For the interaction, when initial beliefs about a category were formed from category-level information, category-level disconfirmation was more effective than individual-level information. When initial beliefs about a category were formed from individual-level information, this difference was attenuated. The opposite pattern was found for beliefs regarding individuals. When initial beliefs about an individual instance were formed from individual-level information, individual-level disconfirmation was more effective than category-level disconfirmation. However, when initial beliefs about an individual instance were formed from category-level
information, there was no difference in effectiveness between individual- and category-level disconfirmation.

**Implications of Findings**

These findings have interesting implications for the specific context of stereotype change. The general tenor in the stereotype change literature has been pessimistic and researchers have argued that stereotypes rarely change in the face of disconfirming information (Park & Judd, 2005). As previously discussed, stereotypes are beliefs about categories of people. The most common approach in this literature has been to attempt to change beliefs about a stereotype by presenting disconfirming information involving one or more individuals of the category. Our findings suggest that the best way to change stereotypes may be by presenting disconfirming category-level information rather than the typical strategy of using disconfirming individual-level information.

Another implication of our findings for the stereotype literature regards a different way of thinking about the structure of stereotypes than has normally been discussed in the literature. A major debate in the stereotype literature has been whether the representation of stereotypes in memory are best described by prototype models (i.e., models that postulate stereotypes are represented as an average or typical member of a group) or exemplar models (i.e., models that postulate stereotypes are represented as a few specific members of a group). Our distinction between category-level beliefs at formation and individual-level beliefs at formation parallels this distinction but our approach suggests that it may be more appropriate to think of these models as two different types of stereotype structures, both of which can occur, rather than as mutually exclusive models.
It also suggests that stereotypes with these varying structures may not function in the same manner and has direct implications for change processes.

These findings also have noteworthy implications for the impression formation literature. Past impression formation research has not focused on how consolidated impressions can subsequently be changed. Furthermore, researchers such as Brewer (1988) and Fiske and Neuberg (1990) have recognized that impressions can be arrived at in different ways (e.g., categorical vs. piecemeal processing) but the consequences of arriving at impressions using these different processes has been largely ignored. Our findings present initial evidence that having a representation of individual instances at these two levels leads to differential susceptibility to impression formation revision and introduces the idea that the type of disconfirming information can matter when changing impressions.

This research program also has general implications for the persuasion literature. One important contribution of the present experiments is that they highlight two new variables that have not been previously discussed or tested in the persuasion literature: level of representation of beliefs at formation and level of representation of beliefs at disconfirmation. Attitude researchers have long recognized the importance of differentiating among attitudes derived from different types of information. For example, early formulations of the tripartite theory of attitudes postulated that it was important to distinguish between attitudes based predominantly on affect and attitudes based predominantly on cognition (e.g., Katz & Stotland, 1959). Similarly, researchers have also acknowledged the value of distinguishing among attitudes with different
motivational foundations such as utilitarian, value-expressive, social-adjustive, and ego-defensive functions (e.g., Katz & Stotland, 1959).

Thus, researchers have recognized the importance of understanding how attitudes are formed and the impact of this for subsequently changing these attitudes. Specifically, one idea that emerged in these areas was the notion of matching a persuasive communication to the basis of an attitude in order to increase the effectiveness of the persuasive appeal. For example, affectively versus cognitively based attitudes have been found to be differentially susceptible to affectively based versus cognitively based persuasive messages (e.g., Edwards, 1990). A matching strategy more often leads to greater attitude change. Similarly, attitudes based on different functions have been found to be differentially susceptible to persuasive messages that target different attitude functions (e.g., Snyder & DeBono, 1985) with a matching strategy leading to more persuasion.

This general matching hypothesis has acquired several studies beyond the confines of the original affect/cognition and attitude function matching literatures. More recently, this general matching hypothesis has been extended to other distinctions such as construal matching (Fujita, Eyal, Chaiken, Trope, & Liberman, 2008) and prevention-promotion matching (e.g., Cesario & Higgins, 2008). The commonality in each of these different distinctions is that some basis of a feature underlying an attitude is matched along the same feature for the persuasive communication and produces more attitude change than when these features are not matched. We have identified level of representation as another feature, not previously identified, that conforms to this general matching phenomenon in persuasion. Therefore, our results contribute to the knowledge
of factors that moderate belief and attitude change and have implications for effective belief and attitude change strategies, whether at the level of categories or individual instances.

**Directions for Future Research**

Although these findings add to our understanding of belief change in many ways, there are some unresolved issues that remain. One major difference between manuscript 1 and manuscript 2 has to do with the role of variability in the belief change process. There was no evidence of variability playing a role in manuscript 1 which examined belief change of categories. However, there was some mixed evidence of variability playing a role in belief change of individual instances in manuscript 2. For Experiment 1, there was no evidence of a three-way interaction. However, in Experiment 2 there was a significant three-way interaction between type of formation, disconfirmation, and variability. For those in the low variability condition, there was greater change when beliefs about individual instances that were formed on individual-level formation were targeted by individual-level disconfirmation compared to category-level disconfirmation. When beliefs about individual instances were formed on category-level formation, both types of disconfirming information were effective. For those in the high variability condition, individual-level disconfirmation was always more effective, regardless of whether initial beliefs about an individual instance were based on individual- or category-level formation. This discrepancy is particularly striking given that the manuscripts used the same materials that were only slightly transformed.

This discrepancy suggests some interesting avenues for future study. It is unclear whether these differences between the manuscripts are due to an inherent difference
between belief change of categories versus individual instances, or unique to the specific
materials used in the experiments. Follow-up studies could examine differing degrees of
level of representation. As previously discussed, in this research we conceptualized the
specific-category distinction quite broadly to include specific instances nested within
collectives, but also smaller collectives nested within larger collectives. The difference
of variability as a moderator between these instantiations points to an important way in
which different conceptualizations of the specific-category distinction could matter.
Therefore, it may be interesting to test different conceptualizations of the specific-
category distinction within a single paradigm to tease apart how these distinctions may
differ for the belief change process.

Another finding that was not consistent across the manuscripts was the main
effect formation. When target of judgment was an individual instance, we found that
people were willing to infer beliefs learned about a category to an individual instance of
the category. However, these beliefs were more susceptible to persuasion which suggests
that they are less strongly held than beliefs formed from information specific to the
individual instance. When target of judgment was a category, beliefs were equally
susceptible to persuasion regardless of type of formation.

A third asymmetry between manuscript 1 and manuscript 2 involves the nature of
the two-way interactions. In manuscript 1, the two-way interactions illustrated the
tendency for the effectiveness of category-level disconfirmation against initial beliefs that
were based on category- rather than individual-level formation. Likewise, individual-
level disconfirmation was more effective against initial beliefs that were based on
individual- compared to category-level formation. However, the pattern of these two-
way interactions differed slightly for manuscript 2. Again, category-level
disconfirmation was more effective against initial beliefs based on category-level
formation compared to individual-level formation. However, individual-level
disconfirmation was not more effective against initial beliefs formed from one type over
the other. Thus, unlike the pattern found in manuscript 1, it appears that the two-way
interaction between type of formation and disconfirmation for belief change about
individuals is entirely driven by the differential effectiveness of category-level
disconfirmation and unrelated to the effectiveness of individual-level disconfirmation
against the different types of formation.

These differences aside, in general there were similarities of results for our main
hypotheses. Across the experiments we found consistent evidence of a matching effect
for both beliefs regarding categories and individual instances. Indeed, the matching
hypothesis is the more dominant perspective in the persuasion literature and there is more
evidence of matching effects (e.g., Edwards, 1990; Snyder & DeBono, 1985). However,
there is a competing mismatching hypothesis and it may be beneficial to examine
whether there are contexts in which mismatching effects can be observed. For example,
in their experiments Millar and colleagues found evidence for a mismatching effect (e.g.,
Millar & Millar, 1990) which revealed that attitudes were more susceptible to persuasive
appeals that did not match the underlying nature of the attitude.

In trying to reconcile the conflicting findings, Millar and Millar (1990) and
Edwards (1990) speculated that the strength of the attitude may be the determining factor
of when matching versus mismatching leads to greater persuasion. Specifically,
matching effects are predicted to be more likely for newly formed attitudes that are
relatively easy to undermine with a direct attack on its underlying basis. Petty, Gleicher, and Baker (1991) also speculated that strength of the persuasive appeal could moderate the matching and mismatching effect in a similar manner. These speculations are consistent with our data as the beliefs and attitudes used in our experiments were newly formed in the laboratory setting and thus, perhaps predisposed to find a matching effect. Future research may benefit from an examination of attitude strength as a moderator of the matching/mismatching effect. Specifically, future experiments may use participants’ pre-existing beliefs and attitudes toward topics rather than using beliefs and attitudes created during the experimental session.

Additionally, our results revealed evidence of differential persuasion depending on how beliefs were initially formed and the type of disconfirming information that was used to change these beliefs. What our results do not speak to is the underlying process behind these differential effects. Moreover, examining the psychological mechanisms underlying these effects may give further insight into how belief change may or may not differ for categories versus individual instances.

In conclusion, we believe it is important to recognize commonalities in belief change of categories and individual instances. The same general principles appear to apply to both belief change of categories and individual instances, but our findings suggest that it may not be exactly the same in all respects. Thus, it is also important to examine where the belief change process might differ in important ways.
References


