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Social influence constrained by the heritability of attitudes

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ABSTRACT

Previous work by Tesser (1993) and Bourgeois (2002) found that heritable attitudes are more resistant to social influence and attitude change. The present study sought to replicate and extend previous work by utilizing attitudes and heritability estimates not previously used in studies examining the effect of heritable attitudes on social influence processes. It was hypothesized that attitudes with higher heritability estimates would change less after group discussion relative to attitudes with lower heritability estimates. As predicted, highly heritable attitudes did show greater resistance to social influence in the context of group discussion. The present findings add further support to the notion that attitude heritability is an important element of attitude change and extend previous work through the study of novel attitudes and heritability estimates.

1. Introduction

The transmission of attitudes, behaviors, and beliefs between members of an interacting social network is among the most widely supported phenomena in social psychology (Cialdini & Goldstein, 2004). From Newcomb's (1958) early work on college roommates to Festinger, Schachter, and Back's (1950) seminal work on MIT apartment complexes, decades of field and lab studies indicate that shared social space results in shared social identities and preferences (Harton & Bullock, 2007). Dynamic social impact theory (DSIT; Latané, 1996; Nowak, Szamrej, & Latané, 1990) suggests that as people influence each other their behaviors and attitudes become more similar (Harton, Green, Jackson, & Latané, 1998; Latané & Bourgeois, 1996, 2000), resulting in the emergence of stable social and cultural norms (Cullum & Harton, 2007; Harton & Bourgeois, 2003).

Yet not all social information is equal, and some attitudes and beliefs are more or less resistant to social influence relative to others. A wealth of work on attitudes strongly indicates that the intensity with which an attitude is held, an attitude's *strength*, significantly impacts a variety of attitudinal processes. Specifically, strong attitudes are more readily expressed, provide a more reliable basis for predicting future behavior, and are more resistant to change over time and in the presence of social influence (Petty & Krosnick, 1995).

While surprising, Tesser (1993) has suggested that attitude heritability may affect attitudes in a manner similar to *importance* (Krosnick, 1988), *accessibility* (Fazio, 1995), and *commitment* (Abelson, 1988). Indeed, twin studies have found that attitude heritability accounted for twenty-five percent of the variance in attitude importance and strength (Olson, Vernon, Aitken Harris, & Jang, 2001), indicating that heritability is related to attitude strength and thus is apt to have similar consequences for social influence and attitude change.

1.1. Heritable attitudes

While once controversial, the notion that some non-trivial component of many attitudes is heritable has received several lines of empirical support. Research by Eaves, Eysenck, and Martin (1989) examined over 400 MZ twin pairs and over 300 DZ twin pairs from the London Institute of Psychiatry Twin Registry. Eaves et al. found heritability coefficients for social attitudes ranging from .1 to .63, with 43 out of 60 items with heritability coefficients equal to or over .30. Significant heritability coefficients included attitudes toward religion, sex crimes, the death penalty, women's roles, and political orientation (Eaves et al., 1989). Specific investigations into particular attitudes have also found considerable heritability for religious attitudes and values (Waller, Kojetin, Bouchard, Lykken, & Tellegen, 1990) and work attitudes (Keller, Bouchard, Arvey, Segal, & Dawis, 1992).

More recent research by Olson et al. (2001) used a Canadian twin sample to establish several new attitudes as heritable (e.g. being a leader and getting along with other people). Olson et al. found that 22 out of 30 attitude items measured had significant

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genetic contributions. Olson et al. replicated the overall pattern of attitudes that have been shown to be high and low in heritability in previous research; for instance, attitudes toward the death penalty for murder, voluntary euthanasia, and organized religion all had high heritability coefficients, similar to previous studies. Olson et al. also found that behavioral characteristics high in heritability (e.g. sociability and athleticism) were correlated with similar highly heritable attitudes (e.g. attitudes toward leadership and athletics), indicating a possible causal mechanism for such attitudes and their heritability. The consistency of heritable attitudes across different samples suggests that these attitudes may have a deeper structure based in other heritable phenotypic traits.

Tesser has proposed several dispositional domains that might form a substrate of heritable attitudes: sensory structures, body chemistry, intelligence, temperament, and conditionability (1993); however, no empirical work to date has attempted to address this theoretical limitation concerning heritable attitudes. While the underlying factors contributing to attitude heritability are not yet well understood, several studies have indicated that heritable attitudes are consequential to social psychological processes.

1.2. Consequences of heritable attitudes

In a series of studies, Tesser (1993) showed that attitude heritability affects attitudes much like attitude strength. Tesser found that attitudes with higher heritabilities were responded to faster relative to attitudes with lower heritabilites, and interpreted this difference to indicate that heritable attitudes were more accessible (Fazio, 1995). Further, when participants rated a series of targets as desirable friends, romantic partners, and spouses, the targets were rated more favorably as the number of highly heritable attitude items the target reported agreed with the participant. Finally, Tesser presented participants with false normative information about other participants' responses to heritable attitude items, finding that attitudes with higher heritability coefficients were more resistant to normative influence, changing less in the direction of the false feedback as compared to attitudes with low heritability coefficients.

Extending Tesser's work, Bourgeois (2002) hypothesized that heritable attitudes would affect the outcomes of social influence at the group-level and tested this prediction in the context of dynamic social impact theory (DSIT; Nowak et al., 1990). Dynamic social impact theory suggests that as people interact and come to influence each other, stable social patterns, or cultural norms, will emerge at the macro-level (Latané, 1996). DSIT predicts that four specific phenomena will come to characterize groups as they influence each other over time: clustering (regional self-organization of distinct groups), correlation (emergent relationships between previously unrelated thoughts, feelings, and behaviors), consolidation (reduction in minority thoughts, feelings, and behaviors), and continued diversity (stable surviving minorities within a population). Bourgeois predicted that groups discussing highly heritable attitudes would show less clustering (*spatial self-organization*) and consolidation (*a reduction in minority viewpoints over time*) within social networks.

A wealth of previous work supporting DSIT suggests that over time, communication within groups leads to clustering and consolidation, where groups come to develop their own unique normative characteristics and minority attitudes and behaviors become increasingly marginal with on-going social influence (Cullum & Harton, 2007; Latané & Bourgeois, 2000; Nowak et al., 1990). However, heritable attitudes may represent a constraining factor, where heritable attitudes are more resistant to on-going social influence within groups.

Utilizing both lab-based and naturally occurring groups, Bourgeois (2002) examined the effects heritable attitudes have on social influence processes. Bourgeois asked small groups of participants to report their attitudes before and after a group discussion of the same attitudes. The attitudes themselves were taken from Eysenck's (1951) Public Opinion Inventory, and represented attitudes with high and low heritability coefficients. The post-discussion pattern at the group level was similar to that found by Tesser (1993) at the individual level; as heritability decreased there was increased change in attitudes after discussion which in turn led to a reduction in variability within the group. These results indicate that as the heritability of an attitude increases and consolidation decreases, attitude heritability can constrain social influence within groups.

In a larger field study, Bourgeois examined the effect of heritable attitudes among participants living in campus residence halls. Participants were given attitude measures at the end of the school year and asked to indicate their room number as well. Because DSIT predicts that spatial clustering will occur over time as a product of social influence, Bourgeois reasoned that the degree to which participant's attitudes clustered within the floor of their residence hall was in part an indication of attitude similarity due to social influence. The pattern for the field study was similar to the group-discussion findings; as the heritability of attitudes increased, the less predictive a participant's floor was for their attitudes and less spatial clustering for those attitudes occurred (2002). Across the lab-based and field studies, Bourgeois' hypotheses were supported, indicating that heritability of an attitude constrains social influence processes and thus the bottom-up dynamics of group-level self-organization.

1.3. Overview of the current study and hypotheses

The current study sought to replicate Bourgeois' previous experimental work while utilizing novel attitude items taken from a more recent twin sample (Olson et al., 2001). Bourgeois' previous work used attitude items with heritability estimates based on a British twin sample collected in the early 1970's (Eaves et al., 1989). In fact, the few studies to investigate the influence heritable attitudes have on other social psychological processes (Bourgeois, 2002; Crelia & Tesser, 1996; Tesser, 1993; Tesser & Crelia, 1994; Tesser, Whitaker, Martin, & Ward, 1998), have only utilized the attitude items and heritiability estimates reported by Eaves et al. (but see Conway, Dodds, Towgood, McClure, & Olson, 2011 for a notable exception). The current study utilized novel attitude items and heritability estimates based on a Canadian twin sample collected by Olson et al. (2001). Thus while the present study is both a theoretical and methodological replication of previous work, the use of novel attitude items taken from a novel twin sample constitutes a meaningful extension of the existing literature.

Based on the predictions of DSIT, it was hypothesized that social influence during group discussions would lead to attitude change within groups such that within-group similarity would increase following discussion (i.e. cluster) and overall diversity in group attitudes would decrease (i.e. consolidate). Further, based on previous research examining the influence of heritable attitudes on social influence within groups, it was hypothesized that highly heritable attitudes would show greater resistance to social influence (i.e. less clustering and consolidation), whereas attitudes low in heritability would be less resistant to social influence.

2. Method

2.1. Participants

Ninety-six participants (32 3-person groups) were recruited from introductory psychology courses, and received course credit

in exchange for completing the study. The average age of participants was 20.27 (SD = 2.98). Participants were predominantly freshmen (53%), Caucasian (90%), and female (68%).

2.2. Procedure

Upon arriving at the lab, participants were informed that the study involved various tasks, including surveys, and small group discussions. No more than nine participants were present at the start of each study session. After participants signed a consent form, the experimenter explained the study further and gave each participant a note card with a Greek name on one side and a group number on the other. Participants were told that for all survey measures they complete, the Greek name and group number was to be used so that no personal information could be used at a later time to identify them with their responses. Once this preliminary information was discussed the experimenter asked participants to respond to ten attitude items taken from Olson et al. (2001) The order of attitude items was counterbalanced across participants. The attitude items asked participants to rate their overall attitude toward the targets on a scale from −3 (extremely unfavorable) to 3 (extremely favorable) with 0 being neutral.

After completing the pre-discussion attitude measures, participants were placed into three-person groups and taken to separate rooms for the remainder of the study.

Once the room changes took place, each three-person group was told that they were going to discuss two issues for six min each. Each group discussed a highly heritable attitude (e.g., death penalty, open-door immigration, abortion, or voluntary euthanasia) and a low heritable attitude (e.g., easy access to birth control, castration as a punishment for sex crimes), and the order of the discussion topics was counterbalanced. The experimenter read the first discussion topic and left the room. After six min the experimenter entered the room, stopped the first discussion, read the second discussion topic and left the room again for another six min. After both discussion sessions the experimenter stopped the recording and informed the participants of the final phase of the study.

The final phase of the study involved an unrelated distracter task where participants read a brief scenario and answered questions. After the distracter task participants were given a post measure containing the same ten attitude items from the pre-discussion measures. Upon completing the post-discussion measures, participants were debriefed and thanked for their participation.

3. Results

3.1. Individual attitude change

Prior to testing hypotheses concerning attitude change, individual change scores were calculated for high and low heritable items. Change scores were calculated from the absolute value of the difference for each item before and after discussion. For example, a change score of zero was equivalent to no change after discussion, whereas change scores above zero were indicative of attitude change after discussion. Individuals were first treated as the unit of analysis. To test the hypothesis that highly heritable attitudes would change less after discussion relative to low heritable attitudes, a paired sample t-test was performed on high and low heritability change scores. There was a marginal difference between high and low heritable change scores, $t(95) = -1.44$, $p = .08$. Although only marginal, the means were in the predicted direction with highly heritable attitudes changing less ($M = .71$, $SD = .94$) than low heritability attitudes ($M = .91$, $SD = 1.04$), and the effect size was small to moderate, $d = .30$.

3.2. Clustering and consolidation

Individuals nested within groups were treated as the unit of analysis to test the hypothesis that highly heritable attitudes would show less clustering (group influence) and consolidation (reduction of diversity). Clustering and consolidation are both predictions of DSIT; however, previous research indicated that attitude clustering and consolidation are constrained by heritability of attitude (Bourgeois, 2002).

First, a 2 (heritability: high vs. low) by 32 (group) MANOVA analysis was used to test the hypothesis that groups would have contrasting influence on attitudes after discussion due to differences in attitude heritability. There was a significant interaction between group and heritability, $F(30,64) = 4.50$, $p < .001$, $\eta^2 = .68$. Note that pre-discussion similarity within groups was controlled by adding pre-high and pre-low attitude responses as covariates. The interaction analyses were followed-up with simple effects tests. Group remained a significant predictor for both low heritable attitudes, $F(31,62) = 3.19$, $p = .001$, $\eta^2 = .61$ and high heritable attitudes $F(31,62) = 1.71$, $p = .04$, $\eta^2 = .46$. But, as predicted, groups clustered more (accounted for more of the variance) on low heritable attitudes relative to high heritable attitudes.

To test the hypothesis that low-heritable attitudes would show more consolidation within groups compared to high heritable attitudes a consolidation index was calculated for both high and low heritable attitude items within each group. This consolidation index was calculated by dividing group post-discussion standard deviations by group pre-discussion standard deviations for the high and low heritable items. These standard deviations came from the group mean for each of the discussed items (one high and low heritable item). Thus, groups with an index score of 1 had no consolidation, groups with an index score less than one consolidated, and groups with index scores greater than one had anti-consolidation (diversity increased within groups). Five groups were excluded from the analysis due to their pre-discussion agreement. If pre-discussion standard deviations are zero than no consolidation index can be calculated, thus some groups could not be used in the analysis. Three groups were excluded as outliers for having consolidation values more than two standard deviations from the mean for all groups.

Paired sample t-tests of the remaining groups showed a significant difference between low heritable ($M = .70$, $SD = .39$) and high heritable ($M = 1.02$, $SD = .45$) item consolidation indices, $t(23) = 2.25$, $p < .02$, $\eta^2 = .18$, thus groups discussing low heritable attitudes had a reduction in overall variability by nearly one-third after discussion but groups discussing high heritable attitudes did not showed no reduction in variability after discussion.

4. Discussion

The present study replicates Bourgeois's (2002) previous findings regarding heritable attitudes and social influence. In addition, this replication was obtained with different attitudes and heritability estimates derived from a more recent twin sample (Olsen et al., 2001). As predicted, attitudes with high heritability coefficients were less influenced by group discussion than were attitudes with low heritabilities. Thus, groups clustered less when they discussed highly heritable attitudes relative to low heritable attitudes. Because this was a within-subjects design, the difference between high and low heritable attitudes cannot simply be attributed to some quality of the groups themselves. Predictions about consolidation were also supported. Groups showed consolidation on low heritable attitudes but not on high heritable attitudes. The reduction in diversity for low heritable attitudes contrasts distinctly with no loss of diversity for highly heritable attitudes.

4.1. The origin of heritable attitudes

Despite their intriguing appeal as independent variables, little empirical or theoretical work has addressed the origin of heritable attitudes. Tesser (1993) and Bourgeois (2002) briefly discuss possible precursors to heritable attitudes, and both agree that a strong link between specific genes and attitudes is highly unlikely. Tesser proposed several dispositional domains that might form a substrate of heritable attitudes: sensory structures, body chemistry, intelligence, temperament, and conditionability (1993). Aside from Tesser's early proposed substrates, other alternative proposals may also be viable. For instance, Tesser (1993) argued that highly heritable attitudes have similar consequences to highly accessible attitudes. One could turn Tesser's interpretation around and argue that as attitudes become more accessible other aspects of a person's biologically constituted disposition begin to exert greater effect. As a group of individuals begins to interact with the object of an attitude (e.g. football, the Republican party, abortion, etc.) they all begin to acquire information concerning that attitude object. Presumably each individual within that group will begin to respond uniquely to the attitude object. As each member of the group habitually evaluates the attitude object, more and more of their response may come under greater genetic influence. The logic behind such a scenario is similar to the logic of basic twin designs-as environmental similarity increases, variance between individuals is increasingly due to genetic variation. The above scenario assumes that individuals within the hypothetical group are equally exposed to information surrounding the attitude object as well as having relatively uniform experience with the attitude object. These assumptions are rather lofty from the arm chair, but such scenarios could be artificially created in the lab (Fazio, Eiser, & Shook, 2004; Fazio, Sanbonmatsu, Powell, & Kardes, 1986) and thus controlled empirical tests would become a viable option unlike the vague proposals of the past.

4.2. Limitations and future directions

The present study suffered from minimum time resolution; noting attitude change/stability in less than an hour. Thus, only limited conclusions about heritability's effects on social influence processes over time can be drawn from the present study. Future research should expand the present study to investigate effect of attitude heritability on social influence across longer time intervals. Campus residence halls might provide an excellent means of testing attitude heritability's long-term impact on social influence. Previous research utilizing residence halls has proven successful at observing social influence processes across longer periods of time (Cullum & Harton, 2007). Residence halls may also provide a more ecologically valid means of testing hypotheses concerning heritable attitudes and social influence processes.

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