



Extraversion as a moderator of the cognitive dissonance associated with disagreement

David C. Matz^{a,*}, Petra M. Hofstedt^b, Wendy Wood^c

^a Department of Psychology, Augsburg College, 2211 Riverside Avenue, Campus Box 44, Minneapolis, MN 55454, USA

^b Iowa State University, Ames, IA, USA

^c Duke University, Durham, NC, USA

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ABSTRACT

A common finding in research on cognitive dissonance is that people vary in their reactions to dissonance arousing situations. To evaluate whether individual differences in extraversion explain this variation, the authors examined data from a study demonstrating that disagreement within a group creates cognitive dissonance. Participants believed that other members of their group either agreed or disagreed with their own position on an issue of interest to the group. Although those exposed to disagreeing others generally experienced more dissonance discomfort than those exposed to agreeing others, introverts experienced more discomfort than extraverts. As a likely consequence of the dissonance discomfort, introverts also showed more attitude change in the direction of the majority than did extraverts. This study not only demonstrates that extraversion can moderate feelings of cognitive dissonance, it also offers an explanation for this moderation in terms of vulnerability to arousing experiences.

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1. Introduction

Possibly no theory in psychology has received as much attention as Festinger's (1957) theory of cognitive dissonance. One of the more common findings to emerge from the research on cognitive dissonance is that people differ widely in their reactions to dissonance arousing situations (see Brehm & Cohen, 1962). Among the individual difference variables speculated to account for these differences is the personality trait of extraversion. In this study, we test the hypothesis that extraversion moderates the feelings of discomfort associated with dissonance. Specifically, we hypothesize that, because extraverted people tend to be less easily aroused in general than introverted people, they are less likely to experience dissonance brought on by exposure to attitudinally inconsistent information.

1.1. The nature of dissonance

The state of cognitive dissonance has been described as a psychological discomfort similar to the notion of hunger, frustration, or disequilibrium (Festinger, 1957). Like hunger or frustration, it

is supposed that dissonance acts as a drive state, need, or tension. The presence of dissonance leads to actions to reduce it, just as, for example, the presence of hunger leads to action to reduce hunger (Festinger, 1957, 1958). Classic theorists likened the dissonant predicament to a state of "botherment" (Berkowitz, 1968) or "arousal" (Brehm & Cohen, 1962). Subsequent research has supported the notion of dissonance as an arousal state that people are motivated to avoid or abolish (for reviews, see Fazio & Cooper, 1983; Kiesler & Pallak, 1976).

In an attempt to further examine the motivating properties of dissonance, Elliot and Devine (1994) set out to show that dissonance led directly to aversive feelings (or psychological discomfort), and that these feelings could be alleviated by implementing a dissonance-reduction strategy. Within a counterattitudinal advocacy paradigm, participants who voluntarily supported positions opposing their own showed increased levels of psychological discomfort on a self-report measure of emotions. However, discomfort was reduced when participants were given the opportunity to restore consistency by changing their attitude and stating a new position. Suggesting that the advocacy manipulation generated dissonance and not a general shift in affect, no differences emerged on self-reports of negative self-evaluations or positive emotions. This approach to investigating the psychological discomfort associated with dissonance is unique in that explicit emotions were identified to describe the experience of dissonance.

* Corresponding author. Tel.: +1 612 330 1155; fax: +1 612 330 1649.

E-mail address: matz@augsborg.edu (D.C. Matz).

Although the concept of dissonance has often been studied in the context of counterattitudinal advocacy, dissonance is not limited to this circumstance. Festinger (1957) maintained that dissonance is commonly aroused by exposure to attitude-discrepant information. Exposure to such information may come, for example, from friends, family members, or coworkers who express attitudes different from one's own. Thus, interpersonal disagreement is hypothesized to create dissonance and motivate action designed to restore consonance. Festinger reasoned that dissonance in this situation could be reduced by changing one's own attitude, by trying to convince others to change their attitudes, by disassociating oneself from the source of discrepant information, or by eliciting additional supportive information.

In an experiment designed to test the assumption that exposure to interpersonal disagreement leads to dissonance, Matz and Wood (2005, Study 1) measured feelings of dissonance brought about by disagreement within a group. Members of four-person groups were presented with evidence suggesting that all other members of the group either agreed or disagreed with their own position on an issue of relevance to the group. Feelings of dissonance discomfort were assessed by participants completing the emotion measure developed by Elliot and Devine (1994). As anticipated, those who believed the other group members disagreed with their position experienced elevated levels of dissonance discomfort compared with those who believed the others agreed with their position. This study provides evidence to support Festinger's (1957) contention that dissonance may arise from exposure to attitude-discrepant information.

1.2. Individual differences

Previous research has helped to define circumstances that can lead to dissonance and the emotional components associated with dissonance. However, not all individuals experience dissonance to the same extent. In fact, people differ widely in their reactions to situations designed to arouse cognitive dissonance (see Brehm & Cohen, 1962). Over the years, researchers have attempted, with mixed success, to pinpoint the individual difference factors responsible for moderating the effects of cognitive dissonance. For example, researchers have considered the moderating effects of cognitive control (Bishop, 1967; Wolitsky, 1967), self-esteem (Aronson, 1969), self-monitoring (Snyder & Tanke, 1976), locus of control (Laird & Berglas, 1975) and preference for consistency (Cialdini, Trost, & Newsom, 1995).

One of the more intriguing factors to be studied as a possible moderator of the effects of cognitive dissonance is the personality trait of extraversion. Although the specific makeup of the trait has changed some since its conception, the basic core concept has remained fairly intact. An extravert is often described as outgoing, poised, assertive, lively and energetic, whereas an introvert (on the other end of the spectrum) is reserved, socially aloof, and less interpersonally effective (Watson & Clark, 1997).

One theory that may account for the individual differences in reactions to dissonance is that extraverts possess a less excitable central nervous system than introverts (Eysenck, 1967, 1990). As a result, extraverts are less likely to experience negative emotions associated with elevated levels of arousal. Because introverts are more sensitive to the negative effects of arousal than extraverts, they are more likely to avoid arousal or engage in coping strategies to reduce it when experienced. Extraverts on the other hand are less sensitive to the adverse nature of arousal and are therefore more apt to be driven by the desire to acquire rewards despite any potential for arousal (Gray, 1972, 1991; see also Maio & Esses, 2001).

If extraverts are less prone than introverts to experience the psychological discomfort associated with arousal, then extraverts

may find dissonance producing situations less unpleasant than introverts. In a preliminary test of this assumption, Norman and Watson (1976) conducted two studies in which extraverts and introverts were exposed to dissonance inducing manipulations. In Study 1, participants rated the "pleasantness" of several hypothetical situations in which liked and disliked individuals held or did not hold attitudes similar to participants' own. Thus, both cognitively consistent (e.g., a liked person holding an attitude similar to one's own) and cognitively inconsistent (e.g., a disliked person holding an attitude similar to one's own) scenarios were evaluated. As expected, extraverts found the cognitively inconsistent scenarios less unpleasant than introverts. In a second study, dissonance was induced by having participants write counterattitudinal essays. To reduce the dissonance associated with this inconsistency, participants altered their opinions to bring them more closely in line with their recently stated positions. Introverts, however, experienced more opinion change after choosing to write a counterattitudinal essay than extraverts. Taken together, the results of these studies provide preliminary evidence that extraversion is capable of moderating psychological reactions to cognitive dissonance.

1.3. Present research

The present study expands on the small body of literature linking extraversion to dissonance moderation by directly assessing levels of dissonance discomfort. In the past, research connecting extraversion to cognitive dissonance has done so through the use of indirect measures of dissonance, such as attitude change (e.g., Norman & Watson, 1976). In the present study, we examine not only behavior indicative of dissonance (*viz.*, attitude change), but also the psychological discomfort that accompanies dissonance. By specifically examining the discomfort of dissonance, this study provides a direct test of Eysenck's (1967) assertion that extraverts are less apt than introverts to experience uncomfortably high levels of arousal. Thus, we attempt to demonstrate not only that extraversion can moderate responses to dissonance but also to provide evidence from affect measures to explain why this occurs.

To accomplish these objectives, we analyzed data originally collected by Matz and Wood (2005; Study 1, *see above*) to address dissonance disagreement, and used them to evaluate extraversion as a potential moderating variable. Specifically, we predicted that extraverts would exhibit less dissonance discomfort in the presence of disagreeing others than would introverts. Consequently, we also predicted that introverts, relative to extraverts, would be more compelled to alter their attitudes as a way to restore consistency when they experienced disagreement. Thus, in analyses on the experience of dissonance discomfort and attitude change, we anticipated significant interactions between agreement versus disagreement from others and participants' own level of extraversion.

2. Method

2.1. Participants

Two hundred five undergraduate students were recruited from introductory psychology courses at Texas A&M University. Students received credit toward a course requirement for participating in the study. Seventeen participants were eliminated from the final analyses for various reasons (7 reported no extreme attitudes and thus could not be exposed to positions that contradicted their own; 4 because they received incorrect feedback; 3 for failing to follow experimental procedures; 2 for having prior knowledge of the experiment; and 1 for failing to complete the personality measure). Thus, the final sample consisted of 188 participants (141 females).

2.2. Procedure

Participants met in groups of four to six for a study concerned with the accuracy with which people are able to predict the course of a group discussion. Participants were informed they would be presented initially with a short attitude survey and that (depending on condition) one of the items on the survey would be chosen for the topic of a group discussion. Some participants were led to believe that they would be discussing the issue with the members of their group (*discussion condition*); others anticipated no group interaction (*no interaction control condition*)¹.

Following the instructions, participants were escorted to cubicles where they completed an attitude survey. Upon completion, participants in the discussion condition were informed that they had been selected to participate in the group discussion. For each participant, an issue was selected on which he or she had expressed an extreme opinion (i.e., positions of “1”, “2”, “8”, or “9” on the nine-point attitude scale). Feedback forms established the *agree* and *disagree* conditions by indicating that all other participants selected for the discussion generally agreed with their own position (e.g., if the participant indicated a position of “1”, the others’ positions were reported as “1”, “2”, and “3”; $n = 96$) or generally disagreed with their own position (e.g., if the participant indicated a position of “1”, the others’ positions were reported as “7”, “8”, and “9”; $n = 92$). Thus, participants in the discussion condition believed that they would be discussing an issue on which they held extreme views with others who either agreed or disagreed with them. Similar feedback was given to those in the control condition (e.g., that others either generally agreed or disagreed with their response), but they were not expecting to interact further with the other members of the group. After receiving the feedback on others’ positions, participants completed an emotion measure, a questionnaire pertaining to the anticipated discussion (discussion condition) or their impressions of the other group members (control condition), and a personality measure. Participants then were debriefed and dismissed; no discussion took place.

2.3. Materials

Attitude survey. Participants indicated on nine-point scales (1 = *strongly against* to 9 = *strongly in favor*) their positions on seven social or campus issues: gun control, immigration laws, capital punishment, legalized abortion, a law to make flag burning illegal, a tuition increase to provide funding to attract minority students, and reinstating a university-wide bonfire celebration that had been terminated because of safety concerns.

Feedback forms. Feedback forms indicated the issue selected along with the responses attributed to three other group members who were supposedly also selected to continue with the experiment.

Emotion measure. To assess feelings of dissonance discomfort, negative self-evaluations, and positive emotions, participants completed an emotion measure (devised by Elliot & Devine, 1994). Respondents indicated on 7-point scales (1 = *does not apply at all* to 7 = *applies very much*) the extent to which 24 words or short phrases reflected how they were feeling at that moment. To derive the emotion indices, we conducted a principal-components factor analysis. An examination of the resultant scree plot revealed a clear three-factor solution that closely matched that obtained by Elliot

and Devine. Hence, a maximum-likelihood factor analysis with oblimin rotation was performed to assess a three-factor solution. The first factor, labeled *negative self-evaluations*, accounted for 27% of the total variance. The items that loaded highly ($>.50$) on this factor were combined into an index (i.e., “disappointed with myself”, “annoyed at myself”, “angry at myself”, “disgusted with myself”, “guilty”, “critical”, “shamed”, “regretful”, “frustrated”, “embarrassed”, “distressed”, and “negative”; $\alpha = .88$). The second factor, labeled *positive emotions* accounted for 17% of the total variance, and the high-loading items were combined into an index (i.e., “happy”, “good”, “energetic”, “friendly”, “optimistic”, and “content”; $\alpha = .87$). The third factor, labeled *dissonance discomfort*, accounted for 6% of the total variance and the high-loading items were again combined into an index (i.e., “uneasy”, “uncomfortable”, “tense”, “bothered”, and “concerned”; $\alpha = .81$). The item “anxious” was omitted from the final factor structure because of a low communality. The correlations among factors were as expected. That is, greater negative self-evaluations were associated with greater discomfort, $r(185) = .52, p < .01$, and greater positive emotions were associated with less discomfort, $r(185) = -.32, p < .01$, and less negative self-evaluations, $r(184) = -.16, p < .05$.

Discussion questionnaire: final attitude. After receiving the feedback indicating that the other members of their group either agreed or disagreed with their position, participants completed a questionnaire to assess their perceptions of the impending discussion (discussion condition) or their perceptions of other group members (control condition). These questionnaires were designed for the original Matz and Wood (2005) study and most items were not relevant to the present investigation. The one question of interest assessed participants’ final attitude. Specifically, those in the discussion condition were asked to forecast their attitude toward the selected issue following the supposed discussion (on the same 1–9 scale from the original attitude survey). Nonetheless, responses of extraverts and introverts were compared for each of the remaining questionnaire items. The only significant effects to emerge indicated that extraverts believed themselves to be more likable than did introverts, $F(1, 185) = 6.74, p < .02$, and that extraverts believed they would be more likely to attempt to persuade other group members during the discussion than would introverts, $F(1, 121) = 4.13, p < .05$. Because this questionnaire was not specifically designed for the present investigation, and the findings were generally as expected, the findings will not be discussed further.

Extraversion measure. To assess levels of extraversion, participants completed a commonly used version of the Big Five Inventory (see John & Srivastava, 1999). Participants indicated on 5-point scales the extent to which they agreed that 44 characteristics applied to them (1 = *strongly disagree* to 5 = *strongly agree*). The items of interest were the eight characteristics relating to the extraversion dimension (i.e., “is talkative”, “is reserved” [reverse scored], “is full of energy”, “generates a lot of enthusiasm”, “tends to be quiet” [reverse scored], “has an assertive personality”, “is sometimes shy, inhibited” [reverse scored], and “is outgoing, sociable”; $\alpha = .89$).

6. Results

For the analyses, participants were classified as extraverts ($M = 4.21, SD = .39, n = 89$) or introverts ($M = 2.84, SD = .51, n = 99$) based on a median split of mean scores on the extraversion subscale of the big five measure (cf. Norman & Watson, 1976; those scoring at the median were considered introverts). The design therefore included three-factors, group attitudes (others agree vs. disagree), group type (discussion vs. no interaction control), and level of extraversion (extravert vs. introvert). However, because group type is not relevant to our hypotheses and because

¹ Half of the participants anticipating group interaction expected to simply discuss the issue with other group members. The other half expected to discuss the issue and attempt to reach group consensus. Because this manipulation is not specifically relevant to the present investigation and because similar results were obtained in both conditions, we elected to combine these two conditions.

preliminary analyses indicated that extraversion did not interact with this variable in any of the analyses ($F_s < 1.0$), we collapsed across group type to create a 2 (Group Attitudes) \times 2 (Extraversion) design².

6.1. Emotional reactions

Mean discomfort, negative self-evaluations, and positive emotions were calculated by averaging participants' responses to each of the components of the emotion measure. Separate Group Attitudes \times Extraversion ANOVAs were used to analyze each of the emotion components.

A significant main effect emerged for group attitudes on feelings of discomfort (see Matz & Wood, 2005). Participants experienced significantly more dissonance discomfort when others disagreed with them than when they agreed, $F(1, 184) = 12.75$, $p < .01$, $\eta_p^2 = .07$. The predicted Group Attitudes \times Extraversion interaction was marginally significant, $F(1, 184) = 3.47$, $p < .07$, $\eta_p^2 = .02$. To interpret this interaction, separate one-way ANOVAs were conducted to investigate the effects of extraversion at both levels of the group attitudes variable. When participants believed that the other group members agreed with their position, extraverts and introverts did not differ in feelings of discomfort ($F < 1$). However, when participants believed that others disagreed with their positions, introverts experienced significantly more dissonance discomfort than extraverts, $F(1, 184) = 5.97$, $p < .02$, $\eta_p^2 = .04$ (see Table 1). No other effects were significant.

As expected, no main effect emerged for group type on negative self-evaluations ($F < 1$, see Table 1). Marginally significant results were obtained for the main effect of extraversion on negative self-evaluations, $F(1, 183) = 3.07$, $p < .09$, $\eta_p^2 = .02$, and for the Group Type \times Extraversion interaction, $F(1, 183) = 2.78$, $p < .10$, $\eta_p^2 = .02$. Essentially, these results suggest that extraverts held somewhat fewer negative self-evaluations than introverts and that this tendency was slightly more pronounced when others disagreed than when they agreed. No significant effects emerged in the analyses on positive emotions ($p_s > .20$; see Table 1).

6.2. Attitude change

Attitude change scores were calculated by taking the absolute value of the difference between participants' initial responses to the attitude issue and their subsequent responses after being exposed to others' positions³. Thus, attitude change scores could range from 0 to 8 and represented the amount of change toward the majority's position (see Table 2). Significant main effects emerged for group attitudes and extraversion indicating that those in the disagree condition experienced significantly more attitude change than those in the agree condition, $F(1, 119) = 5.61$, $p < .02$, $\eta_p^2 = .05$, and that introverts showed more attitude change than extraverts, $F(1, 119) = 6.06$, $p < .02$, $\eta_p^2 = .05$. The predicted Group Attitudes \times Extraversion interaction also was significant, $F(1, 119) = 7.15$, $p < .01$, $\eta_p^2 = .06$. To interpret this interaction, separate one-way ANOVAs were conducted to examine the effects of extraversion at both levels of the group attitudes variable. As expected, when participants believed that the other group members agreed

Table 1
Mean emotion ratings (and standard deviations)

Emotion rating	Group type			
	Others agree		Others disagree	
	Introverts	Extraverts	Introverts	Extraverts
Discomfort	2.41 (0.93)	2.47 (1.05)	3.47 (1.57)	2.77 (1.33)
Negative self-evaluations	1.72 (0.78)	1.71 (0.94)	1.84 (0.93)	1.46 (0.53)
Positive emotions	4.56 (1.27)	4.96 (1.20)	4.66 (1.18)	4.61 (1.32)

Note. Emotion ratings were given on 7-point scales with higher numbers reflecting greater dissonance discomfort, more negative self-evaluations, and more positive emotions. $n = 188$.

Table 2
Mean attitude change (and standard deviations)

	Group type		
	Others agree	Others disagree	Total
Introverts	.59(1.18)	2.03(2.39)	1.38(2.06)
Extraverts	.65(1.15)	.56(0.82)	.61(1.02)
Total	.62(1.16)	1.42(2.03)	

Note. Attitude change scores represent the change toward the majority's position. $n = 123$.

with their position, the magnitude of attitude change did not differ between introverts and extraverts ($F < 1$). However, when participants believed that others disagreed with their positions, introverts experienced significantly more attitude change than extraverts, $F(1, 119) = 12.73$, $p < .01$, $\eta_p^2 = .10$.

7. Discussion

This study demonstrates that extraversion moderates the psychological discomfort associated with cognitive dissonance. Across all participants, those who believed that other members of a group disagreed with their position on a given issue experienced increased levels of dissonance discomfort relative to those who believed that other group members agreed with their position. However, when we evaluated the experience of introverts and extraverts separately, only introverts experienced this heightened level of discomfort. That is, introverts reported feeling more "uncomfortable", "uneasy", "tense", "bothered", and "concerned" than did extraverts after learning that other group members disagreed with them. The minimal impact of extent of group agreement on negative self-evaluations and positive emotions suggests that being exposed to disagreeing others produces specific dissonance discomfort and not a more general shift in mood.

By directly assessing participants' emotions, we were able to examine Eysenck's (1967) hypotheses concerning the "excitability" (or arousal) of extraverts and introverts. Because extraverts are believed to possess a less excitable nervous system than introverts, they are supposedly less likely to experience the negative emotions associated with elevated levels of arousal. Indeed, extraverts in the present study reported lesser feelings of discomfort than did introverts when exposed to a dissonance arousing manipulation. As a likely consequence, extraverts were less compelled to change their attitudes in order to restore consonance than were introverts. Such findings are consistent with the claim that extraverts are less averse to elevated levels of psychological arousal than are introverts. By examining both direct and indirect measures of dissonance (viz., dissonance discomfort and attitude change), the present study not only demonstrated that extraversion can moderate the effects of cognitive dissonance but also provided an account for why this occurs.

It is interesting that the dissonance manipulation employed in the present study involved a social setting that may have been

² A preliminary test revealed that females ($M = 3.56$, $SD = .84$) reported higher levels of extraversion than males ($M = 3.26$, $SD = .81$), $t(186) = 2.19$, $p < .05$. To assess the impact of participant gender, the primary analyses were reconstituted to include gender as an independent variable. As expected, there were no significant main effects for gender ($p_s > .15$) or meaningful interactions with any of the dependent variables. As such, participant gender is not discussed further.

³ Because those in the no-interaction control condition were not expecting to participate in a group discussion, their expected attitude following a discussion could not be assessed. Thus, analyses examining attitude change were conducted for those in the discussion condition only ($n = 123$).

especially challenging for introverts. One might expect that introverts would experience elevated levels of arousal at the thought of interacting with others and certainly with disagreeing others. However, initial analyses indicated that the anticipation of interaction did not differentially impact introverts' and extraverts' feelings of discomfort, negative self-evaluations, or positive feelings. Only the manipulation of perceived group agreement led to differences in discomfort between introverts and extraverts. It appears, then, that participants responded to the dissonance manipulation in this study in a manner consistent with previous dissonance manipulations that were not social in nature (e.g., Norman & Watson, 1976).

The present study provides strong support for the notion that extraversion moderates feelings of dissonance. Nonetheless, because extraversion is a subject variable (and random assignment is not possible) it is difficult to generate definitive causal inferences about its effects on reactions to cognitive dissonance. It should also be noted that the predicted interaction between extraversion and level of agreement on feelings of dissonance discomfort was relatively small and in fact was only marginally significant ($p = .06$). Although it is perhaps not standard procedure to interpret marginally significant effects, it is worth noting that the predicted interaction did achieve statistical significance on the measure of attitude change. Furthermore, because our hypotheses for dissonance discomfort related specifically to the condition in which others disagreed, we focused our analysis on this condition and were able to demonstrate the anticipated effect. Lastly, in our efforts to be consistent with previous research (i.e., Norman & Watson, 1976), we elected to classify participants as either extraverts or introverts based on a median split of scores on the extraversion scale. By treating extraversion as a dichotomous rather than continuous variable, we were not able to examine more fine-grained relations such as the possibility that dissonance moderation is enhanced with increasing levels of extraversion.

This study is meant to serve as a stepping-stone for future research. Our findings suggest the usefulness of investigating individual differences in strategies of dissonance reduction. For example, when dissonance arises out of attitudinal heterogeneity within a group, introverted members may be more apt to take action to attempt to reduce the dissonance because it is more bothersome for introverts than extraverts. One way in which dissonance could be reduced in such a situation would be for group members to reach some sort of an agreement or consensus, thus reducing attitudinal discrepancies (Festinger, 1964; Matz & Wood, 2005). Along these lines, it is possible that introverts are more apt to show conforming behaviors in hopes of reducing the discomfort associated with disagreement. In other words, because of their greater sensitivity to the psychological discomfort associated with dissonance, introverts may be more likely than extraverts to seek out consensus, avoid disagreements with others, and compromise their own discrepant positions. This line of research may be particularly applicable to decision-making groups such as juries and committees.

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Aspects of this research not addressing the role of extraversion or attitude change have been published in Matz and Wood (2005). Correspondence concerning this article should be addressed to David Matz, Department of Psychology, Augsburg College, Campus Box 44, 2211 Riverside Avenue, Minneapolis, MN 55454. E-mail: matz@augsborg.edu.

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