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The impact of group decision making on indecisiveness-related decisional confidence

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Abstract

Indecisiveness is an individual difference marked by chronic choice difficulty and delay in decision making. This study examined whether past differences between decisives and indecisives at the individual level also emerge at the group level. Ninety-seven undergraduates were identified as decisive or indecisive using Frost and Shows' Indecisiveness Scale and were then assigned to individual or group conditions. Both individuals and groups completed the same task of selecting a speaker to give a talk on campus from a set of five choice alternatives. Indecisiveness was related to post-task confidence at the individual level, but not at the group level. Process variables revealed few differences. The results suggest that past findings of differences between group and individual confidence might be due to changes in the confidence of indecisive individuals only.

The impact of group decision making on indecisiveness-related decisional confidence

While decision making can at times be challenging for anyone, individuals who experience difficulty in decision making across a wide range of situations are often described as *indecisive*. Indecisiveness refers to the extent to which an individual experiences chronic difficulty and delay in decision making (Crites, 1969). The developmental origins of indecisiveness are not well understood, but personality characteristics associated with it include neuroticism (Jackson, Furnham, & Lawty-Jones, 1999), trait anxiety (Rassin & Muris, 2005a), obsessive-compulsive components (Frost & Shows, 1993, Rassin & Muris 2005a), perfectionism (Frost, Martin, Lahart, & Rosenblate, 1990; Frost & Shows, 1993), self-consciousness (Ferrari & Dovidio, 1991), and low self-esteem (Salomone, 1982). Indecisiveness has not been found to be related to perceptual decision speed or working memory capacity (Ferrari & Dovidio, 1997), suggesting motivational rather than cognitive origins. Broadly speaking, the construct is of practical significance in that indecisiveness has been associated with greater difficulty in making life decisions such as choice of college major (Gayton, Clavin, Clavin, & Broida, 1994) or career (Germeijs & De Boeck, 2003), lower levels of confidence in one's decisions (Ferrari & Dovidio, 2001), greater decisional worry and regret (Ferrari & Dovidio, 1991), and lower levels of life satisfaction (Rassin & Muris, 2005b).

Laboratory studies have revealed a number of differences in the behaviors of indecisive versus decisive individuals. Many such studies use an information board paradigm in which choice alternatives (e.g., Course A) and dimensions (e.g., course

meeting time) form the row and column labels of a grid whose information cells are initially hidden from view. Participants uncover individual information cells (e.g., "Course A meets at 2 pm") before making a choice, and their information search paths are recorded. Use of this paradigm and others have revealed that, relative to decisive individuals, indecisive individuals tend to avoid decisions containing conflict when possible through delay, prolonged search for an option that is ideal on all dimensions (Patalano & Wengrovitz, 2007), and choice of an "I don't know" option (Rassin & Muris, 2005b). When the situation demands that a choice be made, indecisive individuals take more time to decide (Frost & Shows, 1993), are more easily distracted (Patalano, Juhasz, & Dicke, in press), and are more likely to narrowly limit the dimensions on which they compare alternatives in determining a preference (Ferrari & Dovidio, 2000, 2001). Once they have established a preference, they gather more information about this alternative to be certain that it is a "correct" choice (Ferrari & Dovidio, 2000; Rassin, Muris, Booster, & Kolshoot, 2008). These varied behaviors likely reflect different means of trying to minimize conflict and to increase certainty about an alternative. While there is no evidence that indecisiveness is associated with differences in decision outcomes in laboratory settings, indecisive individuals report lower levels of confidence in their final choice (Ferrari & Dovidio, 2001) suggesting that they might be less committed to the choice and thus less motivated to defend or implement it.

The present work is motivated by the question of whether indecisiveness-related behaviors seen in individual decision situations also emerge in group decision making contexts. Do the same behaviors seen at the individual level also influence the

decision process when one is, for example, a member of a department charged with selecting a job candidate to hire, a committee developing a plan for reducing business operating costs, or a research team planning the details of a scientific study? This question has important implications for the creation of organizational decision-making teams in that findings could suggest either that indecisiveness should be of key consideration in group formation or, alternatively, that individual indecisiveness-related behavior is not manifested in group contexts. The question also has implications for decision makers looking for means of reducing the burdens of high effort and low confidence associated with indecisive decision making, for whom group decision making opportunities might be sought out in career and personal contexts. Might such opportunities benefit individual decision makers or provide even further challenges to proactive, effective decision making? The issue of individual differences and group decision is also important in a broader sense in that little past work has considered when and how characteristics of individual group members contribute to understanding the emergent collective behavior of the group (De Grada, Kruglanski, Mannetti, & Pierro, 1999; LePine, Hollembeck, Ilgen, & Hedlund, 1997; Armstrong & Priola, 2001).

One possibility is that indecisiveness is compounded at the group level as individuals jointly promote and escalate process behaviors associated with indecisiveness, such as search for an ideal alternative followed by an eventual narrow constriction of dimensions, resulting in low decision confidence. This possibility is consistent with past work that has found that individuals with low self-esteem—a strong correlate of indecisiveness—make poorer decisions in groups than do those

with higher self-esteem (Brockner & Hess, 1986; Schwartz, Wullwick, & Shapiro, 1980), which has also been found with other manifestations of individual differences at the group level (e.g., need for closure; De Grada et al., 1999). In contrast, however, group decision making has been well-documented as generally leading to increases in decisional confidence in the context of both intellective tasks (i.e. where there is a correct response; Puncochar & Fox, 2004; Sniezek & Henry, 1989; Sneizek, 1992) and judgment tasks (Ono & Davis, 1988; Stephenson, Clark, & Wade, 1986). To the extent that this observed effect of group decision making on decision confidence extends to indecisive as well as decisive individuals, such confidence might undermine decisional tendencies usually driven by low confidence, actually reducing corresponding indecisiveness-related behaviors in the group context.

To address this research question, the following study examined the decision making behaviors of indecisive versus decisive individuals working alone versus in small groups. Indecisiveness was measured using a prescreening scale and a median split was used to categorize prescreened individuals as high versus low. Participants were then run either singly or in three-person homogenous groups (i.e., three indecisive or three decisive individuals; similar to Schwartz et al., 1980), and given the decision task of selecting a fictional speaker to deliver a campus talk. Participants used a computer display to view as much information about each speaker as desired (on dimensions such as speaker fees, topic of talk, past reviews of speaker, etc.) before making a choice. The task was similar to past studies (e.g., Ferrari & Dovidio, 2001; Patalano & Wengrovitz, 2007; Rassin, et al., 2008) except that more information was made available about each alternative to reduce the likelihood of

systematic viewing of all information. After the decision task, a post-task survey was administered individually to assess how decision makers approached the task and perceived the decision process and outcome.

Dependent measures included both process variables and post-decision personal assessment variables. Process variables were those that have revealed indecisiveness-related process differences in various past studies including the amount of time to complete the task, the total amount of information collected during deliberation, the amount of unique information collected in the first versus second half of task performance, the amount of information collected about the chosen alternative, and informational search strategy. Informational search strategy refers to the extent to which one moves from one dimension to another within the same alternative, called *alternative-based search*, versus from one alternative to another within the same dimension, called *dimension-based search*. Personal assessment variables included each participant's reported confidence in the decision and their assessments of the decision process, the difficulty of the decision, and their dominant motivational goals during decision making.

Method

Participants

A group of 125 college undergraduates completed an online prescreening battery that included Frost and Shows' (1993) 15-item Indecisiveness Scale (e.g., "I try to put off making decisions," "I always know exactly what I want," "I often worry about making the wrong choice") and response were elicited from 1 (Strongly disagree) to 9 (Strongly agree). A median split (Md = 4.05) on individuals' mean

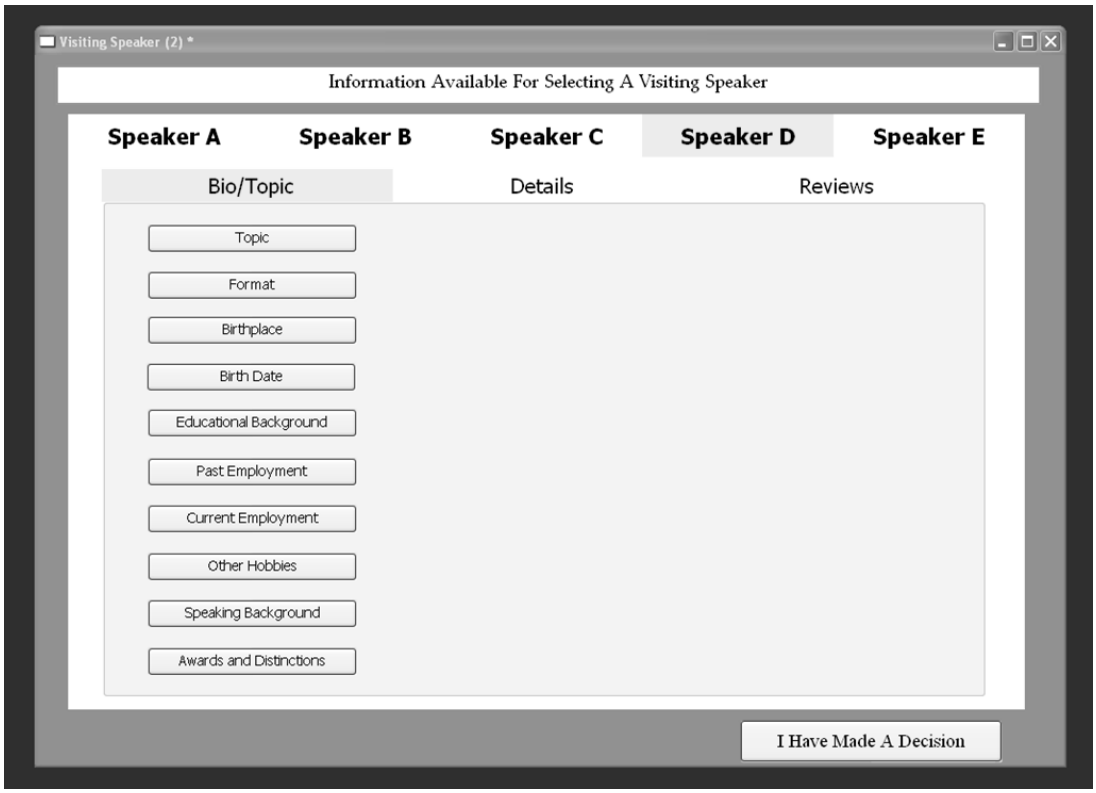
scores was used to categorize individuals as decisive versus indecisive. From this prescreened group, 97 volunteered to participate in the study in exchange for either Introductory Psychology course credit or monetary compensation. Each was quasi-randomly assigned to a grouping condition, to complete the task alone or as part of a homogenous group of three indecisive or decisive individuals. A total of 17 indecisive participants (13 female; scale M = 4.96, SD = .76) and 23 decisive participants (11 female; scale M = 2.80, SD = .92) were in the individual condition, and 27 indecisive participants (9 groups, 18 female; scale M = 4.85, SD = .58), and 30 decisive participants (10 groups, 12 female; scale M = 2.77, SD = .63) were in the group condition.

Decision Materials

An information profile was created for each of five potential campus speakers. Available information about each speaker was divided into three categories: *Bio/Topic* were units of information about the speaker's background and interests (e.g., "Educational Background"); *Details* were units about the speaker's talk requirements (e.g. "Availability"); and *Reviews* were brief peer and student reviews (e.g. "Peer Review 1"). A total of 26 units of information were available for each speaker. A piece of information could be obtained by using a computer mouse to click on a speaker name (from a menu), then a category label, and then an information label. For example, clicking on Speaker A → Bio/Topic → Past Employment would display "Went from earning PhD to teaching and working at the same West Coast university." on a screen. A unit of information would remain on the screen until a new unit was chosen. Speaker profiles were created such that all

speakers had pros (e.g., inexpensive speaking fee) and cons (e.g., lecture topic of limited appeal) and so that, if each unit of information were weighed equally, speakers would be approximately equally attractive, thus making the decision challenging. For a screenshot of the computer program used to access information, see Figure 1.

Figure 1. Screenshot of computer program used to access speaker information.



Post-Task Questionnaire

A post-task questionnaire was composed of three parts. First, participants were asked which speaker they [or their group] chose and their confidence in the decision on a 7-point Likert scale (1 = Not at all confident, 7 = Extremely confident). Second, they evaluated their decision process, rating their agreement with a set of

process-related statements (1 = Very strong disagreement, 7 = Very strong agreement). The statements were: (a) "I am satisfied with my [my group's] decision making process" (*process satisfaction*), (b) "Choosing what information to look at was stressful" (*search stress*), (c) "I feel that I [my group] spent enough time considering all of the options" (*time sufficiency*), (d) "I had difficulty personally deciding who the best speaker was" (*personal difficulty*), and (e) "Picking the best speaker would be a difficult task for anyone" (*universal difficulty*). Third, they ranked the following three goal statements in order of importance to them: to get the "correct" answer, to work in a productive fashion, and to complete the task quickly. Finally, participants also completed a set of individual difference measures unrelated to the present work that will not be discussed here.

Procedure

Participants—either one or a group of three—were seated in front of a large computer projector screen with a single wireless mouse for navigation. They were told by the experimenter that they were to imagine that they were charged by the president with choosing a speaker to bring to campus for an important university-wide lecture, and that they could examine as much information as they wished about five candidate speakers displayed on the screen before making a choice. In the group condition, participants were further instructed they needed to approach the task as a team, from selecting which pieces of information to view to arriving at a unanimous final decision. After orienting participants to the computer display, the experimenter left the room and allowed the participants to begin. Once a decision had been reached, participants clicked a button to indicate task completion and were then instructed by

the computer to turn to post-task booklets placed in nearby individual cubicles. The study took approximately one hour to complete. In addition to the computer recording all button presses made by the participants, a video camera recorded audio-visual data, the latter collected largely to check for active participation by all members in the group condition.

Results

A review of the videos by the experiments confirmed that the task was generally performed as expected. For the groups, members spoke approximately equally and divided control of the mouse, and there were no obvious gender differences in behavior. Discussion was present over the whole task and was largely devoted to planning the next piece of information to view and stating opinion about the alternative being viewed. This continued until a consensus emerged from the group and a choice was made. There were no differences in the choice made as a function of grouping condition or indecisiveness category: Speaker A (28%), Speaker B (41%), Speaker C (2%), Speaker D (10%), and Speaker E (19%).

Process Variables

Process variables used as dependent measures were: total time on the task, number of information units selected, number of unique information units selected (clicking the same unit multiple times was counted only once), number of information units selected about the eventually chosen alternative, and percentage of alternative-based shifts. Information and shift variables were also further broken down by temporal half of the task (i.e., the first vs. second half for each individual or group). Means and standard errors as a function of indecisiveness category (indecisive vs.

decisive) by grouping condition (individual vs. group) for all process variables are shown in Table 1. Note that because all members of a group shared process performance, a case was a group (not an individual) for this condition. A two-factor ANOVA was conducted for each process variable. Indecisiveness category did not influence process variables either alone or through interaction with grouping condition (p's > .100). Grouping condition influenced the decision process in that groups took longer to do the task (1059 sec. vs. 759 sec.; $F(1, 57) = 1.392$, $p = .001$) and looked at less unique information than did individuals in the second half of the task (34 vs. 44; $F(1, 57) = 7.498$, $p = .036$). The time results are not surprising in that group task required the additional activity of coordination of responses. The information results suggest that both individuals and groups generally searched information in a similar manner but that groups allocated efforts somewhat differently in the latter half of the task, spending more time revisiting information than looking at new information. What was surprising about these findings was that, even in the individual condition, process differences that have emerged in past work were not observed.

A coder blind to condition assignments also coded the videos for time to first proposal of a preference, time to first proposal of eventually chosen preference, and time to first elimination of an alternative. No indecisiveness-related differences were observed (t's < 1.00, p's > .100). The coder also listed the dominant choice strategies for each video (e.g., linear weighted, elimination-by-aspects, etc.), for which no discernable differences in choice strategy were observed. The videos were, in sum, fully consistent with the process data.

Table 1

Process Results by Grouping Condition and Indecisiveness Category

	Individual (n = 40)		Group (n = 19 groups)	
	Indecisive	Decisive	Indecisive	Decisive
Time (min)	13 (1.3)	21 (1.2)	17 (1.8)	20 (1.8)
Total information (units)	126 (11.1)	118 (9.5)	108 (15.3)	115 (14.5)
Unique information total (units)	93 (7.5)	91 (6.5)	78 (10.3)	80 (9.8)
Unique information 1 (units)	51 (4.8)	48 (4.1)	46 (6.6)	46 (6.3)
Unique information 2 (units)	43 (3.9)	44 (3.4)	32 (5.4)	35 (5.1)
Selected alternative (units)	29 (3.3)	33 (2.8)	34 (4.5)	35 (4.2)
Alternative-based search (%)	24 (1.7)	29 (1.4)	33 (2.3)	31 (2.1)

Notes: SE's shown in parentheses. For Unique Information, 1 and 2 refer to first and second halves of task based on overall time to complete task. A main effect of grouping condition (individual vs. group) was found for Time and Unique Information 2 (p*'s* < .05); there were no main effects of indecisiveness category or an interaction (p > .10).

Confidence Post-Test Variable

Means and standard errors as a function of indecisiveness category (indecisive vs. decisive) by grouping condition (individual vs. group) for this variable are shown in Table 2. Because group members gave independent responses, a case was the individual (and no longer the group) for the group condition. Because prescreening indecisiveness scores were available, linear regression was used to analyze the relationship between grouping condition, indecisiveness score, the interaction, and the outcome measures. Indecisiveness score alone was not a significant predictor so

results are reported with it removed from the model. For the confidence outcome measure, grouping condition (β = -.240, $t(94)$ = -2.50, p = .014) and the condition by indecisiveness score interaction (β = .299, $t(94)$ = 3.12, p = .002) were significant predictors of confidence. Follow up analyses revealed that indecisiveness score was negatively correlated with confidence in the individual condition (r = -.48, p = .002), but not in the group condition (r = -.14, p = .312; see Figure 2). In other words, more indecisive participants were less confident in their responses than were more decisive ones *only* when they worked individually; when participants worked in groups, they were largely very confident in their responses.

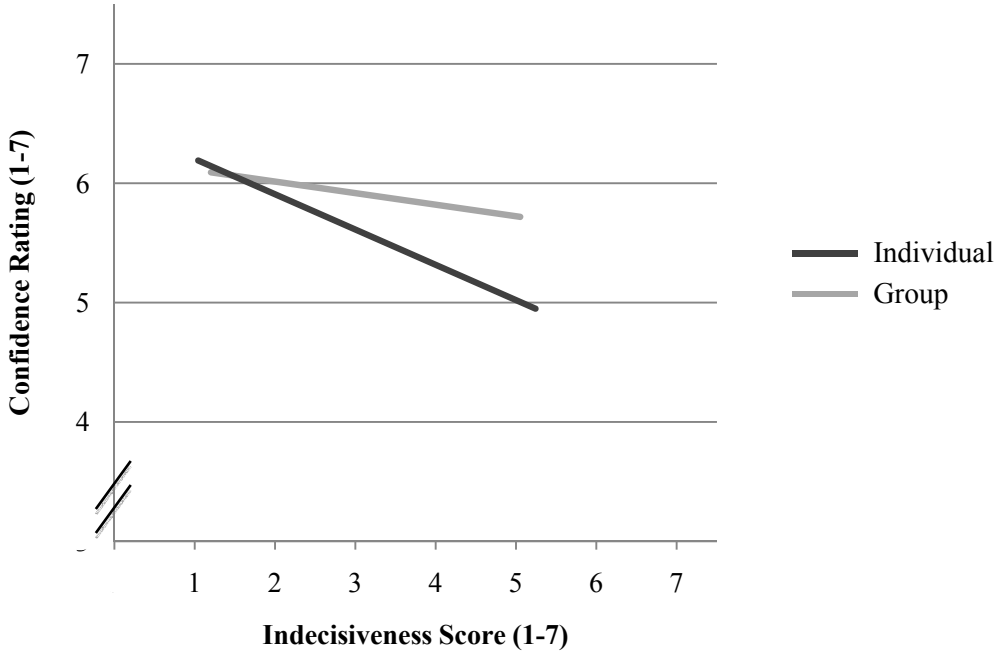
Table 2

Confidence and Post-Test Scale Responses by Grouping Condition and Indecisiveness Category

	Individual (n = 40)		Group (n = 57 individuals)	
	Indecisive	Decisive	Indecisive	Decisive
Confidence in Choice	5.3 (.15)	5.8 (.13)	5.8 (.12)	6.0 (.11)
Process satisfaction	5.1 (.25)	5.9 (.19)	6.2 (.20)	5.9 (.19)
Search stress	3.6 (.36)	2.9 (.31)	2.4 (.29)	2.2 (.28)
Time sufficiency	4.6 (.34)	5.3 (.29)	5.5 (.27)	5.3 (.26)
Personal difficulty	3.8 (.38)	3.6 (.33)	3.3 (.30)	3.1 (.29)
Universal difficulty	5.0 (.41)	4.7 (.36)	4.7 (.33)	4.5 (.31)

Notes: SE's shown in parentheses. Interaction significantly predicted differences in confidence as well as first three post-test variables (p's < .05); neither grouping condition nor indecisiveness score was individually predictive (p's > .10).

Figure 2. Comparison of decisional confidence ratings as sorted by individual or group condition and indecisiveness score.



Process Assessment Post-Test Variables

Means and standard errors as a function of indecisiveness category (indecisive vs. decisive) by grouping condition (individual vs. group) for this variable are shown in Table 2. Linear regression was again used to analyze the relationship between grouping condition, indecisiveness score, the interaction, and the outcome measures. Indecisiveness score was not a significant predictor so results are again reported with it removed from the model. Results for the three process-related statements (the first three statements) were similar to one another and to the confidence results. For *process satisfaction*, grouping condition (β = -.227, t(94) = -2.34, p = .021) and the

interaction (β = .255, t(94) = 2.63, p = .010) were significant predictors. Follow-up analyses revealed that indecisiveness score was negatively correlated with satisfaction in the individual condition (r = -.41, p = .008), but not in the group condition (r = .11, p = .408; see Figure 1). For *search stress*, grouping condition (β = .284, t(94) = 2.93, p = .004) and the interaction (β = -.203, t(94) = -2.10, p = .039) were again significant predictors. Follow-up analyses revealed that indecisiveness score was positively correlated with stressfulness of search in the individual condition (r = -.30, p = .056), but not in the group condition (r = .04, p = .717). For *time sufficiency*, only the interaction (β = .196, t(94) = 1.95, p = .054) was a significant predictor (grouping condition: β = -.140, t(94) = -1.39, p = .168). Follow-up analyses revealed that indecisiveness score was negatively correlated with sufficiency of time in the individual condition (r = -.31, p = .054), but not in the group condition (r = .01, p = .942). In sum, for process outcome variables, participants in the group condition rated the process more positively than did participants in the individual condition, and only for participants in the individual condition was indecisiveness related to more negative beliefs about the process. For the two difficulty-related post-task statements (*personal difficulty* and *universal difficulty*), neither indecisiveness nor the interaction predicted ratings (p's > .100).

Goal Ranking Post-Test Variable

Recall that participants were asked to rank the goal-related statements related to getting the correct answer, working productively, and completing the task quickly. The first choice of each individual is shown in Table 3. Only four participants chose completing the task quickly as either a first or second ranked variable, so a table of

second-choice results would roughly reverse the first two columns. A chi-square analysis collapsed over indecisiveness group revealed that participants in the individual condition were more likely than those in the group condition to identify obtaining a correct answer as their first goal, while those in the group condition were more likely to choose working productively ($\chi^2(2, N = 93) = 8.96$, $p = .011$). No other patterns were observed, including any involving indecisiveness (p's < .100). The results illustrate that, for both indecisive and decisive individuals, when working alone, obtaining the correct answer was most often one's primary goal while, when working in a group, this goal was often surpassed by a desire to work productively.

Table 3

Post-Test Dominant Goal by Grouping Condition and Indecisiveness Category

	Individual (n = 40)		Group (n = 57 individuals)	
	Indecisive	Decisive	Indecisive	Decisive
Answer correctly	11 (65)	13 (57)	7 (28)	9 (32)
Work productively	5 (29)	9 (39)	18 (72)	17 (61)
Minimize time	1 (6)	1 (4)	0 (0)	2 (7)

Notes: Percentages of individuals choosing this response are in parentheses. Collapsed over indecisiveness category, individuals and groups had different response patterns ($p < .05$).

Discussion

First, indecisiveness was negatively related to post-decisional confidence for individuals working alone, with indecisiveness accounting for 23% of the variance in confidence ratings, but this relationship did *not* extend to individuals making decisions in groups, with group members being overall more confident in their decisions. Second, the latter pattern of findings extended to participants' reflections on specific aspects of the decision process including satisfaction with the decision process, the stressfulness of search for information, and the sufficiency of the time devoted to search. Third, indecisive and decisive individuals showed similar performance to one another when working alone as well as when working as a group, but groups looked at less unique information and spent more time in deliberation than individuals. Finally, individuals working alone more often ranked being correct at their dominant goal, while those working in groups more often ranked working productively first.

How does working in a group influence the decision behaviors of indecisive and decisive individuals? Or, put differently, do indecisiveness-related decision behaviors of individuals continue to emerge in a group decision making context? The confidence findings address this question, illustrating that confidence related differences seen here and in past work (e.g., Ferrari & Dovidio, 2000) at the individual level, do not emerge at the group level. Rather, individuals working in groups are, on average, about as confident in their choices as the most highly decisive individuals working alone. This pattern extends beyond confidence *per se* to also include the decision maker's perceptions of the decision process, including overall

satisfaction, the stressfulness of search, and the belief that there was adequate time for decision making. Group decision making seems to have the effect of increasing the confidence level of indecisive individuals, even when the group is composed solely of such individuals, while having minimal effects on the already high confidence levels of decisive individuals. These findings provide initial evidence that indecisiveness need not be a consideration in the establishment of at least some decision making groups, and that indecisive individuals might in fact gain confidence by seeking out contexts for group, rather than individual, decision making.

These findings also offer a better understanding of group confidence effects observed in past literature (e.g., Ono & Davis, 1988; Punchochar & Fox, 2001; Sniezek & Henry, 1989; Sniezak, 1992; Stephenson et al., 1986) in which individual decision confidence is higher after working in a group versus working alone. For example, Sneizek and Henry (1989) found that group members were confident in their judgments of the frequency of deaths from various causes, while Ono and Davis (1988) found that group members were more confident in their judgments about a fictional criminal case. The present findings suggest that these basic effects may be largely the result of initially indecisive individuals increasing confidence in the group setting, rather than the group setting have a small but uniform increase on the confidence of group members. While there is the possibility of ceiling effects here as in many other situations, the fact that the highest possible confidence rating (a “7”) was used 11% of the time suggests that participants recognized that they had, but often chose not to use, the option of giving a higher confidence score. The present finding is practically consequential in that confidence in one’s decision is known to

impact the likelihood of realizing a decision (e.g., Bolger, Pulford, & Colman, 2008; Petrocelli & Sherman, 2010), as well as on one's ability to influence and persuade others (Zarnoff & Sniezek, 1997).

How might collaboration have resulted in increased confidence here? Various explanations have been proposed to account for increases in confidence in group decision contexts, especially in situations in which no corresponding increase in accuracy can be measured. According to *persuasive arguments theory* (Vinokur & Burnstein, 1974), interaction allows people to collect information that persuades them to shift their views. For example, a group member might make a compelling argument about the growing use of emergency rooms for routine care that shifts views about the value of health care reform. According to *rational construction theory*, engaging in discussion motivates people to create more coherent arguments to explain their views, which in turn increases confidence (Heath & Gonzalez, 1995). In other words, groups motivate people to focus on attending and integrating relevant information into a coherent argument. *Social comparison theory* posits that people often want their expressed views to conform with those of other group members and so are motivated to adjust their beliefs in the socially valued direction (Baron & Roper, 1976). Additionally, it has been proposed the group nature of a task can diffuse individual accountability for a choice and related judgments (Buehler, Masservey & Griffin, 2005).

The present findings are perhaps most consistent with rational construction theory in that this perspective assumes *not* that individuals gather new or different information or necessarily alter their beliefs but, rather, that social interaction

prompts them to explain their views such that these views become more coherent. This theory is consistent with the present findings that groups took more time to decide but actually looked at less new information than did individuals, and placed greater premium on a productive process over "correctness," suggesting that relatively more time was spent reflecting on existing information rather than engaging in new exploration late in decision making. For indecisive individuals, who typically require greater certainty in a choice before committing to it, the additional coherence might have essentially increased their certainty in their choice to a point that gave them the same level of confidence as more decisive individuals. Ironically, Heath and Gonzalez (1995) also found that while the major reason individuals believe they consult others prior to decision making is to gather information, the result of seeking advice might more often be that confidence is built than that new information is obtained or used. This seems to be particularly true of indecisive individuals, who appear to deal with low confidence through strategies of both seeking information and avoiding information when, in fact, focusing on deeply processing a moderate amount of relevant information might be a more successful confidence building strategy.

The one finding that was unexpected in the present study was that the confidence findings at the individual level were not associated with a corresponding difference in the decision process for indecisive versus decisive individuals, contrary to past work. The results might best be seen as highlighting that low confidence is essentially a proximal cause rather than a result of some indecisiveness-related process differences in decision making. Confidence level might feed into the decision process and serve as a cue to the decision maker as to whether enough evidence has

been accrued about a choice alternative that commitment is warranted (see Busemeyer & Townsend, 1993, for computational account of evidence accrual). However, how indecisive individuals resolve the experience of low confidence might depend on the situation. Responses could range from committing to a choice anyway, to searching for an ideal option, to seeking information that could strengthen an alternative, to ignoring information that could weaken one. We imagine that unlike past information board studies, which have focused on the decision of choosing a college course, the present university speaker task simply was not of enough personal significance to elicit some of the behaviors seen in the past. However, in some ways these results are fortuitous in that they provide evidence for a central role of confidence in conceptualizations of indecisiveness.

In conclusion, the present work provides initial evidence that individual indecisiveness does *not* manifest itself in low decisional confidence for decision group members suggesting that this variable might not be of concern in the organization of effective decision groups. Second, the study provides evidence that the well-established influence of group interaction on decisional confidence might be particularly strong for indecisive individuals. This is of practical significance to indecisive individuals who may be able to utilize group interaction to motivate attention to key information and the development of coherent explanations. However, the work also suggests that indecisive individuals are no less susceptible to group overconfidence biases than is the population more generally. And third, the present work speaks to the nature of indecisiveness itself, suggesting that decisional confidence might be a particularly robust indicator of indecisiveness that drives

process differences seen in other studies. Some important areas of further work include developing a better understanding the relationship between individual difference cues and other cues used to assess decisional confidence, the influence of different types of groups and advisors (e.g., mixed indecisiveness levels, members with different values) on indecisiveness-related decision making for both short and long-term decisional satisfaction, and the manner in which decisional confidence might feed back to influence search for decision-related information.

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APPENDIX A

Speaker Information Materials

SPEAKER A
Topic: Growing Which Way: A Survey of Age and Its Alteration of Personal Identity
Format: Lecture with question and answer session to finish.
Birthplace: St. Louis, MO
Birth Date: July 5, 1965
Educational Background: BA in Sociology from Mid-West state college, PhD in Sociology from West Coast university." into card field
Past Employment: Went from earning PhD to teaching and working at the same West Coast university.
Current Employment: Professor at university in West Coast city, where they teach two Sociology courses to undergraduate students, one graduate seminar, and work on publishing original work.
Other Hobbies: Hiking, cooking, raising a 7-year-old daughter.
Speaking Background: Has given this lecture at four other colleges across the country. The talk is an abbreviated version of Speaker A's book on the same topic.
Awards and Distinctions: The Spencer Prize for excellence in Sociological Innovation, The A.D. Reiser Award for their most successful book, 2001's 'Aging in America.
Availability: Only in the month of April, is flexible except for Mondays-Wednesdays (teaching classes then).
Cost: $4,500
Travel Needs: Airfare included in cost. Has a child that will need to travel with them. Can be put up in the same room at hotel but will need care/babysitting support during time on campus.
Personal Requests: Allergic to peanuts, food should be adjusted accordingly.
University Connections: None.
Venue Specifications: Elevated stage, non-handheld microphone.
Length of Talk: 80 minutes.
Extra Participation: Will not be able to stay for longer than the talk.
Student Review 1: What an amazing person. Their talk made me really think about how I relate to people around me based on their age. My friends and I were talking about the issues Speaker A raised for the rest of the evening.
Student Review 2: What a boring topic. I could have cared less about old people and what Speaker A had to say about them.
Student Review 3: They were a solid speaker. I was surprised at how interesting the subject of age could be.
Student Review 4: I'd give it a B-.
Student Review 5: I read Speaker A's book for a class on identity last semester. While the book was really boring, I was very impressed by how good a speaker they were once they came to campus.
Peer Review 1: As another leading theorist in their field, I find Speaker A's didactic and uncompromising approach to this subjective area of research troublesome.

Peer Review 2: Speaker A presents an innovative approach to examining the construction of our identity through age in this sometimes tangential lecture, that nonetheless had the audience engaged enough for an invigorating question and answer session.
Peer Review 3: A great representation of their field. Their enthusiasm for what could have been a boring subject matter more than made up for my initial concerns.
Peer Review 4: A brilliant mind. We should all be so lucky to experience over an hour's worth of information so well composed and presented.
Peer Review 5: They're a fine speaker -- that is, when you get them away from their prepared notes and into a question and answer session.

SPEAKER B
Topic: How Much for That Gene?: The Economics of Science in the 21st Century
Format: Interactive discussion and lecture, combining audience participation with prepared remarks.
Birthplace: Spokane, WA
Birth Date: April 17, 1952
Educational Background: MA in Business from rural university in the West, MPP in Public Policy from same school.
Past Employment: Worked as economist for Mid-Atlantic firm, also employed by the government for a period of time working in the realm of public health and the economics of medicine.
Current Employment: Currently an economic consultant for various medical associations/organizations, also somewhat of a public figure as they write a weekly column for a prominent East Coast magazine about economics. Lives in the Mid-Atlantic region.
Other Hobbies: Not many; when they're not eating or sleeping, they're working.
Speaking Background: While Speaker B does have a wealth of lecture circuit experience when it comes to talking about money and public policy, this specific lecture is new and would be the first presentation of a series of ideas they just had published in article form in a national journal of economics.
Awards and Distinctions: The Sidney Award in 2004 for excellence in journalism, awarded for Speaker B's weekly magazine column.
Availability: Fall semester on Mondays and Fridays.
Cost: $5,400
Travel Needs: Will be driving to campus and will need to be reimbursed for gas on top of stated cost.
Personal Requests: Walks with a cane due to a recent car accident, will need a personal aide to drive/assist in getting them around.
University Connections: None.
Venue Specifications: Larger venue with slideshow capabilities, also AV system that allows for audio playback.
Length of Talk: 45 minutes
Extra Participation: Will be willing to show up earlier in the day to talk to whichever classes your group deems most suitable.

Student Review 1: I read the magazine Speaker B has a column in; they're the best, and the talk they gave was also just so cool. We were really lucky to have them to campus.
Student Review 2: I'm not a big fan. People seemed excited when Speaker B came to campus, but really, their talk seemed showy and without a lot of real content.
Student Review 3: What a rich mind. I was working hard to keep up with the pace they were talking at, but it was so so worth it.
Student Review 4: I had heard Speaker B's name before, but didn't really know what I was getting into when I went to see them talk. Thought it was a cool presentation, but didn't really pull anything away of value for myself.
Student Review 5: Such a great person. I went to say hello to Speaker B after the talk and they chatted with me for five minutes about their field and my interests in it. They were so warm and genuine, it was such a neat experience.
Peer Review 1: While Speaker B's column may make them look seem an invaluable voice for their field and to the layman, putting Speaker B in front of a crowd of people has provided decidedly mixed results -- their dynamic style sometimes came across as a bit erratic.
Peer Review 2: A bit of a stretch on their part. Clearly very well versed in the field of economics, but the relative amount they knew about medicine and science only highlighted this disparity which ultimately hurt the talk.
Peer Review 3: I've had the chance to see them talk before and while Speaker B's wry sense of humor keeps the audience engaged, it feels like they are a bit afraid to get down to real details on the subject.
Peer Review 4: What a brilliant mind. Thank goodness Speaker B was able to take time out of their busy schedule to come talk to our organization. The ability to talk about economics in such a (sometimes) accessible manner was invaluable to those of us who were looking to learn more about the intersection of economics with our field.
Peer Review 5: Speaker B's approach to this rich field of study seems undeservedly short. However, what a fun and warm personality, a very dynamic speaker.

SPEAKER C
Topic: The Philosophy of Perception: Knowledge, Perception, and Content
Format: Large lecture followed by small formal discussion with interested students, preferably philosophy majors.
Birthplace: Bradford, PA
Birth Date: January 3, 1951
Educational Background: BA in Philosophy in 1973 from a small East Coast liberal arts college. MA/PhD in Abstract Philosophy in 1982 from a Mid-West state university.
Past Employment: After receiving their doctorate in philosophy, Speaker C moved to the West Coast to teach at a larger university. Moved back east in 1990 when they were offered a tenure track position at the university they are currently employed by.
Current Employment: Now a tenured professor of philosophy at a small university in the Northeast, currently working on publishing an introductory Philosophy textbook. Speaker C teaches mostly graduate-level classes, but makes a point to teach at least one undergraduate seminar per school year.

Other Hobbies: Enjoys ballroom dancing, opera, directing student productions of Greek tragedies, and is also an avid chess player. With their spouse, Speaker C spends their vacations traveling around Greece to experience first-hand what they have called the divine nature of the birthplace of philosophy.
Speaking Background: Each year Speaker C travels to several universities to speak to philosophy undergraduate and graduate students. Most recently Speaker C spoke to a philosophy of ethics think tank in Washington, D.C. The speech and the following Q&A session were televised. Current lecture focuses on the topic of their upcoming book, the philosophy of perception.
Awards and Distinctions: Speaker C's seventh book, 'Perception as We Perceive It,' is now used in university philosophy classrooms across the country. Speaker C's sixth book, published in 2003 and entitled 'A Philosophical Reflection on Chess,' won numerous literary awards including the 2003 John P. Franz Award for Distinguished Writers in Philosophy.
Availability: Only fall semester, only Wednesdays and Fridays.
Cost: $5,250
Travel Needs: Lodging, preferably of a nicer nature. No transportation needed, though paying for the gas costs of travel is recommended.
Personal Requests: Two water bottles during lecture, and a third during the follow-up discussion session.
University Connections: None.
Venue Specifications: Requests a non-hand-held microphone for bigger lecture, as well as a screen to show a power point slide show. Needs two water bottles during lecture, and a third during the follow-up Q&A session.
Length of Talk: 90 minutes.
Extra Participation: Speaker C requires a follow-up formalized discussion session with a small group of interested students.
Student Review 1: Worst class I've ever taken on a topic that I love. He goes on tangents on totally unrelated subjects, like chess. I took this to learn about perception, not chess!
Student Review 2: Some may think he gets sidetracked, but when you look back on the class, you realize that everything Speaker C says is totally applicable to your education in the broadest sense. Take classes with this professor!
Student Review 3: Arrogant, gets side tracked too much. If you want to learn the info you have to go to office hours. They don't seem like they want to be teaching in the first place.
Student Review 4: Lectures are kind of hard to follow; get main points though. Needed to clarify a lot of what they said with the book to understand it.
Student Review 5: Speaker C is brilliant. They are dry as dust, and won't appeal to those who really love class discussions. However, they do field questions at all times during their lectures and is quite adept at answering them.
Peer Review 1: Engaging and full of new ideas, Speaker C's speech was more dynamic even than their famed brisk walking back and forth across the stage. The continual movement was, however, more energy-inducing than distracting, and the audience benefited from their evident passion for the subject. .

Peer Review 2: Speaker C's almost manic energy on stage didn't help their tendency to veer off topic. One might be better off buying their book.
Peer Review 3: Speaker C's speech yesterday on the perception of nothingness left audiences' mouths agape. It was, for many, the lecture of a lifetime. One listener explained, 'They blew me away.' I have never left a speech feeling so enthralled with the idea of not knowing anything, not being anything.
Peer Review 4: Although most listeners enjoyed the lecture, the majority of the students who attended the Q&A session did not find it as interesting.
Peer Review 5: Speaker C's ideas are novel and worthy of recognition, but their presentation of them leaves a little to be desired.

SPEAKER D
Topic: Printed Words: A Linguistic Approach to Media Analysis
Format: Lecture with a PowerPoint, question and answer session to follow.
Birthplace: Washington, D.C.
Birth Date: August 19, 1963
Educational Background: BA in Linguistics from Mid-Western state university, MA in Political Communications from East Coast university. No doctoral degree.
Past Employment: Staff writer for a prominent urban newspaper, junior assistant speech editor for a White House cabinet member.
Current Employment: Currently employed at a think tank in Washington, D.C. Does freelance journalism on the side. Lives in D.C.
Other Hobbies: Runs marathons across the East Coast, learning Sanskrit.
Speaking Background: Speaker D has never given a lecture of this size before. Has most commonly spoken to high school students in the greater D.C. area.
Awards and Distinctions: None.
Availability: Mondays-Fridays, after 3pm.
Cost: $4,500
Travel Needs: Needs train tickets and transportation to and from the train station, as well as lodging near or on campus.
Personal Requests: Wants to bring a friend who will need transportation and lodging, too.
University Connections: Uncle was a Professor at Wesleyan, retired several decades ago.
Venue Specifications: PowerPoint presentation is an essential part of lecture, quality of slide show needs to be very clear. Requires high-precision laser pointer.
Length of Talk: 75 minutes, plus Q&A after.
Extra Participation: Speaker D is interested in speaking with the Argus staff at an informal lunch.
Student Review 1: Speaker D seemed to freeze when students asked questions that addressed topics outside of a very specific field of interest. I mean, they obviously know a ton about their very precise subject, but anything outside of that - even if it's related - they seem to know nothing about!
Student Review 2: Speaker D's experience in the political world of Washington, D.C. was so interesting. I don't really remember what they said about analyzing media or anything like that, but their stories were awesome.

Student Review 3: Really interesting person, I want to work for them this summer. But maybe not the most qualified to give the lecture.
Student Review 4: It was clear that they weren't used to talking to a large class, but as soon as they got comfortable with us and even learned a few of our names, they opened up and the lecture was great! I'm so glad I showed up to class today.
Student Review 5: Speaker D's talk with our Government class was interesting and laid-back. They were quiet, seemed to be intimidated by the size of our class and the panel of professors present. Still it was a pretty worthwhile lecture, most of us enjoyed it.
Peer Review 1: Speaker D is the best speaker to come to our school this year; they captivated unmotivated high school students like no other I have ever seen.
Peer Review 2: Most everyone left the lecture with a very good sense of what Speaker D does every day, but not why their task is important. There was a universal desire for Speaker D to elaborate on the significance of the topic they were speaking about.
Peer Review 3: Speaker D is one of the most interesting, energetic, intelligent people in Washington today. If ever you get a chance to read their articles, or, even better, hear them speak, do not pass it up. Pay attention to Speaker D; they may be the next great mind in Washington.
Peer Review 4: Like their articles in the city's newspaper, Speaker D's lecture was replete with dry witticisms that kept the audience engaged and interested. Everyone who attended will be looking for their name to appear in the newspaper now.
Peer Review 5: Speaker D barely skimmed the surface of a fascinating and layered topic. It seemed as if they cut out all of the best parts of what would have been a very full and interesting lecture.

SPEAKER E
Topic: The Interpretation of Truth: Negotiating Meaning in Everyday Life and Literature
Format: Large lecture only.
Birthplace: New York, NY
Birth Date: February 27, 1953
Educational Background: BA in Philosophy from an East Coast liberal arts university, PhD in Literary Studies from the same university.
Past Employment: Speaker E became an associate professor at the same university where they earned their PhD, teaching several undergraduate and graduate classes there.
Current Employment: Currently a tenured professor at East Coast liberal arts university, and head of the graduate Literary Studies program. Working on publishing their fourth book.
Other Hobbies: Writing forwards and introductions for other books in their field, faculty adviser of the undergraduate student newspaper, acclaimed pan-European wine tasting judge.
Speaking Background: Speaker E gives lectures all around the country, as well as at universities in Europe. This lecture is a preview of their coming book.
Awards and Distinctions: The Tim H. Marlan Award for outstanding achievement in literary academia, the 1998 Gostner Philosophy Prize for their acclaimed book on the

synthesis of philosophy and literary interpretation, nominated for the 2009 V.H. Weller award for their new book.
Availability: Available fall and spring, but only Tuesdays and Thursdays after 5pm.
Cost: $6,000
Travel Needs: Requires gas money for car trip, as well as lodging near (not directly on) campus for one night.
Personal Requests: Will bring their spouse who is in a wheelchair, so proper accommodations must be made.
University Connections: Their college roommate is a current Wesleyan professor.
Venue Specifications: Must be wheelchair-accessible, requires PowerPoint capability and non-handheld microphone.
Length of Talk: 90 minutes.
Extra Participation: None.
Student Review 1: Huge turnout at this lecture, how could you pass up an opportunity to hear Speaker E talk! All I have to say is they lived up to the hype.
Student Review 2: Speaker E knew what they were talking about, but they were dry so some people had trouble keeping their eyes open. Holding the lecture at night might have made it worse, though.
Student Review 3: I took their class last fall and learned a ton about a pretty cool topic, but had a lot of trouble listening to their dry voice three times a week! The readings were well-picked and the lectures were clear, but they were a little intimidating so I was scared at first to go see them during office hours in person.
Student Review 4: Speaker E is good professor. While their class only consists of lecturing, they know the information well. Granted my class was in the morning, and sometimes it was difficult to focus, but they cover a lot of in depth material. Once you get past the droning voice, the class is pretty good.
Student Review 5: I'd heard they were pretty boring in person, but they knew so much that I actually found the lecture pretty engaging.
Peer Review 1: Speaker E was eloquent, poised, and incredibly knowledgeable. They were very prepared and the lecture progressed nicely, not leaving any important detail out; very organized.
Peer Review 2: What a brilliant mind. Probably the foremost expert on their topic, Speaker E is really an asset to our university. It is rare to find a professor generating such original thought today.
Peer Review 3: Speaker E is not pleasant to work with; unyielding to anyone's ideas, they dominate every conversation and assume without question the correctness of their statements, no matter the subject. However, I admit that most of the time they are, actually, correct.
Peer Review 4: Speaker E gave the most intellectually stimulating lecture I have heard this year. I enjoyed it while listening, but now would be hard-pressed to explain anything that was said in my own words. The students in the audience probably fared no better.
Peer Review 5: We were lucky to get such a preeminent scholar to speak to us, however it might have been better to have them speak to a group of people who already had an interest and background knowledge in his subject. His lecture was not directed toward uninformed but interested people.

APPENDIX B

Post-task Questionnaire

Note: Questions affixed with a "*" indicates presence in the group-level questionnaire only. Questions are otherwise presented as in the individual-level booklet, with changes between it and the group-level booklet noted in brackets.

1. What speaker did you[r group] choose?
2. On a 1-7 scale, how confident are you that you[r group] made the best decision possible?

*3. If you had been completing the task on your own, would you have arrived at the same decision your group did?

*4. If no, which speaker would you have chosen?

*5. On a scale of 1-7, how much more or less information would you have collected if you had completed this task on your own (with 4 being the exact amount of information the group collected)?

6. On a scale of 1-7, how much do you agree with the following statements?
   a. I am satisfied with my [group's] decision-making process.
   b. Choosing what information to look at was stressful.
   c. I feel that I [my group] spent enough time discussing all of our options.
   *d. I felt that my voice was heard.
   e. I had difficulty personally deciding on who the best speaker was.
   f. Picking the best speaker would be a difficult task for anyone.

7. Please list up to five types of speaker information that most helped you make your decision
8. Put these statements in the order which they were your main goals during the task:
   a. My main goal on the task was to get the “correct” answer
   b. My main goal on the task was to work in a productive fashion [with my group]
   c. My main goal on the task was to complete the task in as little time as possible
   *d. My main goal on the task was to make sure the group understood my opinions and thought processes
9. What is your sex?
10. What is your year in school?

APPENDIX C

Frost and Shows' Indecisiveness Scale

1. I try to put off making decisions.
2 I always know exactly what I want.
3. I find it easy to make decisions.
4. I have a hard time planning my free time.
5. I like to be in a position to make decisions.
6. Once I make a decision, I feel fairly confident that it is a good one.
7. When ordering from a menu, I usually find it difficult to decide what to get.
8. I usually make decisions quickly.
9. Once I make a decision, I stop worrying about it.
10. I become anxious when making a decision.
11. I often worry about making the wrong choice.
12. After I have chosen something, I often believe I have made the wrong choice.
13. I do not get assignments done on time because I cannot decide what to do first.
14. I have trouble completing assignments because I cannot decide what is most important.
15. It seems that deciding on the most trivial things takes me a long time.