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Quality of group decisions by board members: a hidden-profile experiment

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Abstract

Purpose – Reaching decisions in a deliberative manner is of utmost importance for boards, as their decision-making impacts entire organisations. The current study aims to investigate (1) the quality of group decisions made by board members, (2) their confidence in, satisfaction with, and reflection on the decision-making, and (3) the effect of two discussion procedures on objective decision quality and subjective evaluations of the decision-making.

Design/methodology/approach – Board members of various Dutch non-profit organisations ($N = 141$) participated in a group decision-making task and a brief questionnaire. According to the hidden-profile paradigm, information was asymmetrically distributed among group members and should have been pooled to reach the objectively best decision. Half of the groups received one of two discussion procedures (i.e. advocacy decision or decisional balance sheet), while the other half received none.

Findings – Only a fifth of the groups successfully chose the best decision alternative. The initial majority preference strongly influenced the decision, which indicates that discussion was irrelevant to the outcome. Nevertheless, board members were satisfied with their decision-making. Using a discussion procedure enhanced participants' perception that they adequately weighed the pros and cons, but did not improve objective decision quality or other aspects of the subjective evaluation. These findings suggest that board members are unaware of their biased decision-making, which might hinder improvement.

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Originality/value – Rather than using student samples, this study was the first to have board members participating in a hidden-profile task.

Keywords Board members, Decision quality, Discussion procedure, Experiment, Group decision-making, Hidden-profile paradigm

Paper type Research paper

Introduction

A core activity of boards is to carefully consider the pros and cons of different strategic options as they engage in joint decision-making. On a day-to-day basis, board members decide on the strategy and policy of an organisation, which can impact, for instance, who is hired, where budgets are cut and how risks are managed. One way organisations try to foster sound decision-making at the top level is by forming a diverse board containing members with differing and complementary expertise. Creating informationally diverse boards is recommended as a way to enhance the quality of discussions and decisions because more perspectives are available to the decision-makers (e.g. [Van Knippenberg and Schippers, 2007](#)). In theory, when board members exchange and consider all their unique knowledge and information, this should contribute to the quality of the decision-making and result in better decisions at the highest level of organisations. Therefore, informationally diverse boards consisting of individuals who can bring a different perspective to the table have the *potential* to reach better-informed decisions than non-diverse boards.

Nevertheless, meta-analytic findings by [Lu et al. \(2012\)](#) revealed that decision-making groups often fail to share the specialist information each member individually possesses. Due to group confirmation bias, groups tend to stick with the option that is preferred by most group members prior to discussion, leading to little information sharing and consequently biased decisions (e.g. [Brodbeck et al., 2007](#)). Although this line of research has mostly been conducted among undergraduate students, a literature review by [Sohrab et al. \(2015\)](#) showed the difficulty to overcome such pitfalls and, more specifically, that discussion procedures which aim to improve group decision-making are often ineffective. While some discussion procedures have succeeded in improving certain aspects of group decision-making, such as information sharing or satisfaction with the decision-making, none of them have led to a solid improvement of decision quality ([Sohrab et al., 2015](#)). However, it is yet unclear whether similar results would be obtained among highly experienced decision-makers such as board members ([Schulz-Hardt and Mojzish, 2012](#)). In this study, the central question is as follows: *To what extent do board members fall prone to group confirmation bias and how does it affect objective decision quality and subjective evaluations of the decision-making?*

Board members of various Dutch non-profit organisations ($N = 141$), a population that is often hard to reach for research purposes, participated in a group decision-making task and a brief individual questionnaire to evaluate their decision-making process and outcome. According to the *hidden-profile paradigm* ([Stasser and Titus, 1985](#)), information was asymmetrically distributed among group members and should have been pooled to discover the best decision alternative. This paradigm is a valuable approach to imitate informational diversity in boards. As most boards are composed of members with differing backgrounds and expertise, board members' task is to share their complementary information to enrich the decision-making and reach high-quality decisions. Hence, by applying the hidden-profile paradigm to the decision-making of board members, we are able to make inferences about how well these high-level decision-makers succeed in sharing information to reach the objectively best decision.

The current study aims to investigate (1) the quality of group decisions made by board members, (2) their confidence in, satisfaction with, and reflection on the decision-making, and (3) the effect of two discussion procedures on objective decision quality and subjective

evaluations of the decision-making. Investigating these aims via a hidden-profile task enables us to measure decision quality *objectively* in terms of choosing the best decision alternative, and *subjectively* by surveying the extent to which participants are convinced of the correctness of their decision, satisfied with the group process, and perceive themselves as reflective of the decision-making. Measuring objective decision quality is a major advantage of the hidden-profile paradigm, as it is difficult – if not impossible – to measure decision quality objectively in real life (Amason, 1996). This also explains why most board research to date has been focused on subjective outcomes. Additionally, with an experimental design, we explore whether the use of one of two discussion procedures (i.e. advocacy decision or decisional balance sheet) influences decision quality and the subjective evaluations of the decision-making. Although discussion procedures are popular tools that aim to optimise board decision-making, there is no robust evidence that these tools improve decision quality (Sohrab *et al.*, 2015). By providing half of the groups a discussion procedure, while not providing a procedure to the other half of the groups, we investigate how well board members succeed in sharing information to reach the objectively best decision, and whether using a discussion procedure improves the decision-making.

Pitfalls in group decision-making: the hidden-profile paradigm

Why do decision-making groups often fall short in sharing and processing information? Over the past decades, the hidden-profile paradigm has been developed and widely used by scholars to examine this question, using a variety of decision-making tasks (Stasser and Titus, 2003). This paradigm entails that the best decision alternative is “hidden” and should be discovered by sharing all asymmetrically distributed information. Thus, in the hidden-profile paradigm, each group member has different information that should be pooled during discussion to reach the objectively best decision as a group. Previous hidden-profile studies convincingly showed that groups are often unsuccessful in sharing the available information. Systematic review articles (Brodbeck *et al.*, 2007; Schulz-Hardt and Mojzish, 2012; Sohrab *et al.*, 2015; Wittenbaum *et al.*, 2004) and a meta-analysis (Lu *et al.*, 2012) highlighted that most groups fail at detecting and solving hidden profiles. For example, Stasser and Titus (1985) showed in their seminal study that 83% of the groups chose the best decision alternative when all members had the same information, while only 18% of the groups did so when the information was asymmetrically distributed (hidden-profile paradigm). In a later review article, Brodbeck *et al.* (2007) estimated the average solution rate of hidden-profile tasks between zero and 30%, which indicates that groups are often unsuccessful in sharing all the available information to reach the best decision.

An essential feature of group decision-making that explains these outcomes is that individuals tend to stick with their initial preference (Stasser and Titus, 2003). Before engaging in joint decision-making, each group member usually has a decision alternative in mind that he or she favours, based on prior experience or previously acquired information. This initial preference is of great value to the individual but can be suboptimal in view of other perspectives which are not yet taken into account. Nevertheless, individuals often search for information that confirms their existing beliefs and are reluctant to deviate from their original judgement when contradicting facts are shared by others (Greitemeyer and Schulz-Hardt, 2003). Confirmation bias is also found at the group level (Brodbeck *et al.*, 2007); the option that is initially preferred by most group members – the initial majority preference – is chosen as the final group decision. This is in line with Janis’ (1982) groupthink theory describing the group’s desire to reach consensus. It explains that group members mainly discuss information that supports the initial majority preference, as this course of action leads to an agreement more quickly (Wittenbaum *et al.*, 2004). On the one hand, this creates a sense of comfort, as group members perceive themselves as credible and competent decision-

makers. On the other hand, it hinders reaching high-quality decisions, because predominantly arguments come to the fore that provide further support for the preferred option (Schulz-Hardt *et al.*, 2002).

Hence, we anticipate that the decision alternative which has the most support in the group prior to discussion – the initial majority preference – influences the group decision in such a way that this option is more likely to be chosen. In the current hidden-profile task, this will result in low decision quality. At the same time, we anticipate that participants are highly confident about and satisfied with the decision-making and consider themselves as fairly reflective of the decision-making.

The (in)effectiveness of discussion procedures

Although pitfalls in group decision-making are well documented in the hidden-profile literature, little is known about effective ways to overcome them and improve decision quality. At the top level of organisations, discussion procedures are often recommended that aim to enhance information sharing and improve the quality of decisions (Sohrab *et al.*, 2015; Wittenbaum *et al.*, 2004). As there are many discussion procedures available in organisational practice, which can be categorised as “role agreements” and “analysis tools”, we have chosen to test two procedures that we find especially relevant for the hidden-profile task. These include one procedure using role agreements, namely the advocacy decision, and one analysis tool, namely the decisional balance sheet. The *advocacy decision* entails that each group member is assigned to one of the decision alternatives to stimulate dissent and deliberation (Greitemeyer *et al.*, 2006). This tool aims to encourage groups to deviate from the initial majority preference, as it stimulates members to share information about all options that are presented in a hidden-profile task. The *decisional balance sheet* seeks to help individuals or groups to list the pros and cons of various decision alternatives as a way to objectify the decision-making process (Miller and Rose, 2015). This tool is meant to help structure the process of weighing the pros and cons of all presented options to reach the objectively best decision.

Whereas the use of discussion procedures is highly popular at the top level of organisations, a systematic review article showed no robust effects of several tools (e.g. the devil’s advocate, structured discussion, steps for diagnosis) and debiasing training – where participants learn how to use such tools – on decision quality under hidden-profile conditions (Sohrab *et al.*, 2015). For example, the experiment by Greitemeyer *et al.* (2006) demonstrated that their advocacy decision procedure enhanced information sharing but not the quality of decisions. Only one study showed a small significant effect of a similar procedure on decision quality in a subset of their sample ($N_{\text{groups}} = 25$; Waddell *et al.*, 2013). As acknowledged by the authors, this subset was, however, too small in sample size to draw firm conclusions. To our knowledge, no hidden-profile studies are available that directly test the effectiveness of the decisional balance sheet. This experiment investigates the impact of a role-agreement procedure (i.e. advocacy decision) and an analysis tool (i.e. decisional balance sheet) – in comparison to a control condition – on decision quality.

Furthermore, it is yet unknown how discussion procedures affect the subjective evaluations of decision-making in hidden-profile tasks. To date, few scholars have investigated whether the use of discussion procedures make groups more positive or negative about their decision-making (e.g. more or less satisfied) (Schulz-Hardt *et al.*, 2002). On the one hand, it can be assumed that the use of such procedures provides groups with a sense of security that may enhance satisfaction with the decision-making. On the other hand, using a discussion procedure may lead to more discussion or conflict and, in turn, less satisfaction with the decision-making. To our knowledge, merely one hidden-profile study investigated how the use of a discussion procedure affects confidence in and satisfaction with the decision-

making. This study by Schulz-Hardt *et al.* (2002) suggests that using an advocacy decision procedure somewhat decreased confidence and increased satisfaction, but these differences were non-significant, and thus inconclusive. In the current experiment, we gain more insight into these subjective effects of using discussion procedures. It may be that its use increases participants' subjective evaluations of the decision-making but does not improve objective decision quality. In that case, using a discussion procedure has the potential hazard of overconfidence; thinking you are right, even when you are wrong.

Method

Participants and design

Supervisory and managing board members of various Dutch non-profit organisations were invited to one of six regional member meetings organised by their professional association. Managing board members of non-profit organisations are responsible for strategic planning as well as the day-to-day management of the organisation (Cornforth and Edwards, 1999). Supervisory board members of non-profit organisations have the primary duty to monitor, advise and appoint the managing board of the organisation. At these non-profit organisations, board members receive substantial salaries and professional training. Thus, these board members are not volunteers. The six meetings with an identical setup took place within the same year at various locations in the Netherlands (i.e. respectively Zwolle, Amsterdam, Eindhoven, and three times in Utrecht). In four of the six meetings, groups used a discussion procedure during decision-making (experimental condition), while in the other two, groups did not use any procedure (control condition). Whether a participant was part of the experimental condition or the control condition was dependent on which meeting this participant attended.

A total of 141 board members participated, of which 105 (74%) were supervisory board members and 36 were managing board members. At the start of each meeting, participants were randomly assigned to groups of three ($N_{\text{groups}} = 47$), which led, by chance, to 28 (60%) *mixed groups* of supervisory and managing board members, and 19 *homogeneous groups* of supervisory board members only. Of the 47 groups in total, 24 were part of the control condition and 23 of the experimental condition. In the experimental condition, eight groups used the decisional balance sheet and 15 groups the advocacy decision procedure. As initial analyses did not reveal significant differences between the two discussion procedures on any of the dependent variables, they were collapsed into one experimental condition. This procedure led to more mixed groups in the control condition than in the experimental condition (respectively 19 vs 9; $X^2(1, N = 47) = 7.82, p = 0.005$). We therefore controlled for type of group in analyses where the experimental condition was compared to the control condition.

We did not ask participants for demographic information other than their function title (i.e. supervisory board member or managing board member) because other types of diversity than informational diversity (e.g. gender, ethnicity) were beyond the scope of this study. Moreover, as participating in an experiment is unusual for board members, we did not want to raise concerns about anonymity.

Materials

The group decision-making task was based on the one used by Schulz-Hardt *et al.* (2006) and was aligned with the profession of the participants to make it as realistic as possible. Board members were instructed to choose the best candidate for a management position at a fictitious organisation. Groups had to choose from three candidates, named *A*, *B*, and *C*, of which candidate *B* was the objectively best candidate. Groups based their decision on candidate profiles, each consisting of ten characteristics. The selection of these characteristics was based

on official documents listing the desired competencies of board members in the profession that we examined. Examples of positive characteristics of candidate *B* were “[The candidate] motivates, develops, and guarantees professional competence of employees and makes decisions as much as possible in consultation” and “[The candidate] reflects on and learns from one’s professional conduct and stimulates this within the organisation”. Examples of negative characteristics of candidate *B* were “[The candidate] delays decision-making by continuously searching for information” and “[The candidate] has difficulty holding on to long-term goals due to emerging interests of different parties”. All materials were constructed in the Dutch language and are available upon request from the first author.

The hidden-profile paradigm required that some parts of the information were available to all group members (*shared* information), while other parts were not (*unshared* information). Before group decision-making, each participant received information sheets which specified three positive and three negative characteristics of candidate *B* and four positive and two negative characteristics of candidates *A* and *C*. Because of the asymmetrical information distribution, group members would be tempted to prefer candidate *A* or *C* over candidate *B*. However, if group members succeed in pooling all the available information into complete candidate profiles, they would realise that candidate *B* has seven positive and only three negative characteristics, whereas candidate *A* and *C* have four positive characteristics alongside six negative characteristics (see Table 1).

As a pre-test, eight board members who were part of the organising committee of the member meetings were asked to rate all 30 characteristics on a 5-point scale (1 = very negative, 5 = very positive) and to privately write down their preferred candidate. Based on the complete candidate profiles, all board members individually chose candidate *B* as the best candidate. This confirmed the intended setup of presenting this candidate as the objectively best decision alternative. Hence, when all the available information was considered, candidate *B* should be recognised as the objectively best candidate.

Procedure

Upon arrival at the meeting, participants were randomly assigned to groups of three by providing them with a nametag displaying a group number. The instructor briefly introduced the aim and the procedure of the experiment and asked participants to sign the informed consent if they agreed that their data could be used anonymously for scientific purposes. Only when all three group members had signed the informed consent was the group included in the analyses. The experiment consisted of three phases, namely, initial preference, group decision-making, and subjective evaluation.

Information type and valence	Candidate		
	<i>A</i>	<i>B</i>	<i>C</i>
<i>Shared information</i>			
Positive	4	1	4
Negative	0	3	0
<i>Unshared information</i>			
Positive	0	6	0
Negative	6	0	6
<i>Available information to each individual</i>			
Positive	4	3	4
Negative	2	3	2
<i>Available information to the group</i>			
Positive	4	7	4
Negative	6	3	6

Table 1.
Asymmetrical
distribution of
information, based on
Schulz-Hardt
et al. (2006)

Initial preference. First, the instructor introduced the task to jointly choose the best candidate for a management position at a fictitious organisation and handed out the candidate information sheets. Participants were instructed to individually read and memorise the information about the candidates in preparation for group decision-making and to privately write down which candidate they preferred. Participants were asked not to discuss their information sheets with their group members at this stage and not to make notes. On the information sheets, it was explained that the three candidates had been selected by a recruitment agency based on letters and first-round interviews where the candidates were evaluated on the desired competencies. The information sheets emphasised that the competencies were all considered equally important by the organisation for which the selection was made. Ten minutes were available for this task. All candidate information sheets were then collected.

Group decision-making. Second, groups were instructed to reach a joint decision based on the information they had just read. Parallel to previous hidden-profile research, the instructor emphasised that one of the candidates was the objectively best candidate and that it was the group's task to find out which one this was. Participants were not explicitly told that their information was different from other group members, nor that it was crucial to share all the available information to discover the best candidate. In the *control condition*, the instructor did not provide groups with a discussion procedure but asked them to jointly reach a decision. In the *experimental condition*, the instructor handed groups one of two discussion procedures, namely, the advocacy decision or the decisional balance sheet procedure.

For the *advocacy decision procedure*, the instructor handed out three cards with "A", "B", and "C" to each group, representing the three candidates. Participants were asked to blindly draw one of the cards, to determine which candidate they had to represent within their group (e.g. when a participant drew the card with an "A", this meant that he or she had to advocate for candidate A during discussion). In this way, it was assured that each candidate had a representative. Next, participants were instructed to discuss anything they remembered about this candidate – both positive and negative characteristics – and to invite group members to respond or add to this by taking turns. Participants were also told not to express their initial preference in this process and to reach a joint decision by weighing the pros and cons of all candidates.

For the *decisional balance sheet procedure*, the instructor handed out a sheet to each group, displaying a table that listed all ten competencies (in rows) and the three candidates (in columns). Participants were instructed to rate each competency as positive (+) or negative (–) for all three candidates, based on the information about the candidates they had just read. Participants were also told that they should weigh these pros and cons to reach a joint decision and that it may be necessary to deviate from their initial preference.

In all conditions, as soon as groups had reached a unanimous group decision, they were asked to raise hands so that the instructor could register the time spent on discussion. Fifteen minutes were available for this task.

Subjective evaluation. Third, participants received an individual questionnaire. On this questionnaire, participants noted the group decision and privately evaluated the decision-making process and outcome, specifically their confidence in the correctness of the decision, satisfaction with the group process, and reflection on the decision-making. Additionally, they described – in keywords – what they remembered about each candidate. Participants were asked not to discuss the questionnaire with other group members at this stage. Five minutes were available for this task.

The experiment took 30 minutes in total. During the final hour of the meeting, the instructor gave an interactive presentation about the topic in which the best candidate was revealed, and participants discussed their experiences.

Measures

The *initial preference* of each group member was derived from the candidate information sheets on which participants individually noted their initial preference prior to the discussion. When two or three members of a group initially preferred the same candidate, this group was coded as 1 = majority (vs 0 = no majority).

Objective decision quality was derived from the questionnaire that was completed by participants after group decision-making – the post-decision-making questionnaire – on which participants wrote down the candidate their group had chosen. Decision quality was coded as 1 = best candidate (*B*) chosen (vs 0 = suboptimal candidate (*A* or *C*) chosen).

Subjective evaluation of the decision-making was assessed with three measures, namely confidence in the decision, satisfaction with the group process, and reflection on the decision-making, which were measured on a 7-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree in the post-decision-making questionnaire. *Confidence in the decision* was measured with a single item: “I have the feeling that my group chose the best candidate”. *Satisfaction with the group process* was measured with three items: “I have the feeling that my group . . . substantiated its decision well”, “. . .reached its decision in a good manner”, “. . .reached its decision at a good pace” ($\alpha = 0.74$). *Reflection on the decision-making* was measured with two items: “In my group, I have tried to . . .be critical of my initial preference”, “. . .weigh the pros and cons of all candidates”. Thus, participants were asked about their perceptions of how much they reflected on their initial preference and the pros and cons of different options. Because of the construct’s low reliability ($\alpha = 0.28$), the two items were examined as separate indicators of reflection on the decision-making (i.e. reflection on the initial preference, and reflection on the pros and cons). For each measure, mean scores were computed for all groups.

In the post-decision-making questionnaire, participants were asked to *recall* information about each candidate: “What information about the candidates do you remember? Please use keywords”. The first author and an independent researcher working at the same university coded the keywords for each candidate into one of three categories: 1 = predominantly negative, 2 = neutral, 3 = predominantly positive. There was high inter-rater reliability: $ICC_{2,candidateA} = 0.90$ (95% CI [0.86, 0.93]), $ICC_{2,candidateB} = 0.91$ (95% CI [0.87, 0.94]), $ICC_{2,candidateC} = 0.84$ (95% CI [0.77, 0.88]). Therefore, the coding was averaged for each participant and mean scores were computed for all groups.

Time spent on discussion was registered by the instructor in minutes and seconds when groups indicated that they had reached a decision.

Results

Objective decision quality and subjective evaluations

Only eight of the 42 groups (19%) chose the best candidate (five groups did not reach a unanimous decision). As can be seen in [Table 2](#), considering the scale midpoint, groups were quite confident about the correctness of their decision and rated the group process as satisfactory. Moreover, they perceived themselves as fairly reflective of their initial preferences and their assessment of the pros and cons. Thus, as anticipated, even if decision quality was low, groups were confident about and satisfied with the decision-making and considered themselves to be reflective of the decision-making. Interestingly, the subjective measures were not significantly related to objective decision quality, neither was time spent (see [Table 2](#)). These findings suggest that subjective evaluations of the decision-making and time spent on discussion do not predict higher decision quality.

Among the study variables, confidence was positively related to satisfaction and to reflection on the initial preference (i.e. the more confident groups were about their decision, the more satisfied they were with the group process and the more they considered themselves

Table 2.
Means, standard
deviations and
correlations

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. Condition (0 = control, 1 = experimental)			-										
2. Initial preference (0 = no majority, 1 = majority)			0.06	-									
3. Decision quality (0 = suboptimal candidate, 1 = best candidate)			-0.12	0.22	-								
4. Confidence	4.99	1.13	-0.03	0.48**	-0.02	-							
5. Satisfaction	5.46	0.66	0.06	0.34*	-0.01	0.50**	-						
6. Reflection: initial preference	4.88	0.74	0.07	0.07	0.15	0.36*	0.25	-					
7. Reflection: pros and cons	5.71	0.67	0.40**	0.03	0.04	0.11	0.23	0.01	-				
8. Recall: candidate A	2.17	0.57	0.01	-0.05	-0.11	-0.04	-0.11	-0.14	0.10	-			
9. Recall: candidate B	1.98	0.60	0.06	0.08	0.36*	-0.15	-0.13	-0.27	0.14	-0.08	-		
10. Recall: candidate C	2.28	0.51	0.01	-0.07	-0.53**	0.14	0.12	-0.09	0.22	0.24	-0.16	-	
11. Time spent	11.44	3.52	0.33*	-0.11	-0.05	-0.43**	-0.43**	-0.03	0.07	-0.01	0.16	-0.23	-
12. Type of group (0 = homogenous, 1 = mixed)			-0.41**	0.18	-0.24	0.04	0.15	-0.03	-0.33*	0.04	0.05	0.04	0.04

Note(s): * $p < 0.05$, ** $p < 0.01$

as reflective of their initial preference; see Table 2). Further, initial majority preference was related to higher confidence and satisfaction. Although there were only seven groups without an initial majority preference, this seems to suggest that groups with an initial majority preference were more convinced of and more satisfied with their decision-making than groups without an initial majority preference. Also, time spent was negatively related to confidence and satisfaction, which indicates that groups who spent less time on discussion were more confident about and more satisfied with their decision-making. Decision quality was positively related to the recall of candidate *B* and negatively to the recall of candidate *C*, which indicates that groups that had chosen the objectively best candidate (*B*) remembered this candidate more positively and candidate *C* more negatively.

As shown in Table 2, condition related to reflection of the pros and cons and to time spent on discussion, which gives a first indication that the use of a discussion procedure affects some aspects of the decision-making. Although not hypothesised, we additionally test whether using a discussion procedure affected time spent on discussion. Lastly, the correlation between type of group and reflection on the pros and cons indicates that mixed groups perceived themselves as *less* reflective of the pros and cons than homogeneous groups. As described previously, there were more mixed groups in the control condition than in the experimental condition. Therefore, type of group is included as a control variable when comparing the experimental condition to the control condition.

Influence of the initial majority preference

In 35 of the 42 groups, there was an initial majority preference (i.e. two or three group members preferred the same candidate). More specifically, in 28 groups, two of three members preferred the same candidate, and in seven groups, all three members preferred the same candidate. To test whether the initial majority preference influenced the group decision, a chi-square test was conducted among the 35 groups with an initial majority preference. Results showed that there was a strong effect of the initial majority preference on the group decision, $X^2(4, N = 35) = 35.14, p < 0.001$. From the 35 groups, 29 groups (83%) chose the option that was initially preferred by the majority of the group. To provide more detail, Table 3 shows that 74% of the groups in which the majority initially preferred candidate *B*, also chose candidate *B* as their final decision. In the same vein, 67% stayed with the initial majority preference for candidate *A*, and 94% stuck with their initial majority preference for candidate *C*. Thus, as anticipated, the initial majority preference strongly influenced the group decision, which suggests group confirmation bias.

As can be derived from Table 3, merely six groups deviated from the initial majority preference. It is interesting to note that in four of these six groups, the candidate that was chosen was preferred by the “minority” group member who preferred a different candidate than the other group members. In the other two groups, no one initially preferred the

Initial majority preference		Group decision			Total
		A	B	C	
A	N	6	1	2	9
	%	67%	11%	22%	100%
B	N	1	6	1	8
	%	13%	74%	13%	100%
C	N	0	1	17	18
	%	0%	6%	94%	100%
Total	N	7	8	20	35
	%	20%	23%	57%	100%

Table 3.
Initial majority
preference by group
decision

Table 4.
One-way ANOVA of
recall by initial
majority preference

Variable	Initial majority preference	M (SD)	Univariate effect of initial majority preference	Univariate effect of initial majority preference vs. other two candidates [contrast test]
Recall: candidate A	A	2.50 (0.38)	$F(2,32) = 3.17,$ $p = 0.055$	<i>Contrast A vs. B and C:</i> $t(32) = 2.51, p = 0.017$
	B	1.96 (0.65)		
	C	2.02 (0.51)		
Recall: candidate B	A	1.48 (0.51)	$F(2,32) = 9.03,$ $p = 0.001$	<i>Contrast B vs. A and C:</i> $t(32) = 3.72, p = 0.001$
	B	2.54 (0.53)		
	C	2.04 (0.51)		
Recall: candidate C	A	2.13 (0.48)	$F(2,32) = 5.43,$ $p = 0.009$	<i>Contrast C vs. A and B:</i> $t(32) = 3.09, p = 0.004$
	B	1.83 (0.33)		
	C	2.48 (0.53)		

candidate that was later chosen by the group. Thus, in most instances, for a candidate to be chosen, there should have been at least one group member who preferred this option prior to discussion. Additionally, one-way analyses of variance (ANOVA) revealed that the initial majority preference (e.g. candidate *B*) influenced the extent to which positive information was recalled about that candidate (see Table 4). For example, when candidate *B* was initially preferred by the majority, more positive information was recalled about this candidate in comparison to the other two candidates. In sum, the initial majority preference influenced the group decision and the amount of positive recalled information about this candidate, which, on average, resulted in low objective decision quality but highly positive subjective evaluations of the decision-making.

As this study aimed to examine how the initial majority preference influences group decisions, the seven groups in which each group member preferred a different candidate were not included in the analyses just described. However, it is interesting to note that none of these groups chose the objectively best candidate (i.e. three groups chose candidate *A* and four groups chose candidate *C*). Because of the small number of groups, it was not possible to adequately test whether groups without an initial majority preference did significantly different on the decision-making task than groups with an initial majority preference. To provide insight into all 42 groups that reached a decision, Table 5 illustrates the relationship between the number of group members that initially preferred the best candidate (*B*) and decision quality. Although the number of groups is highly uneven, this offers some indication that the more group members initially preferred candidate *B*, the higher the chance this

Table 5.
Number of group
members that initially
preferred the best
candidate (*B*) by
decision quality

Number of group members that initially preferred the best candidate (<i>B</i>)		Decision quality		<i>Total</i>
		Suboptimal candidate (<i>A</i> or <i>C</i>)	Best candidate (<i>B</i>)	
Zero	<i>N</i>	18	0	18
	%	100%	0%	100%
One	<i>N</i>	14	2	16
	%	88%	12%	100%
Two	<i>N</i>	2	5	7
	%	29%	71%	100%
Three	<i>N</i>	0	1	1
	%	0%	100%	100%
<i>Total</i>	<i>N</i>	34	8	42
	%	81%	19%	100%

objectively best candidate was chosen. To illustrate, when only one group member initially preferred candidate *B*, this candidate was chosen by merely two groups, but when two group members initially preferred candidate *B*, it was chosen by five groups (see Table 5).

Effects of using a discussion procedure

To explore whether using a discussion procedure affected objective decision quality, a chi-square test was performed to compare the experimental condition to the control condition. Type of group was included as a control (layer) variable. The experimental condition was not significantly different from the control condition, $\chi^2(1, N = 42) = 0.62, p = 0.432$. Three out of 21 groups (14%) in the experimental condition chose the best candidate, as did five out of 21 groups (24%) in the control condition. These results were similar for both types of groups (homogeneous groups: $\chi^2(1, N = 16) = 0.87, p = 0.350$ vs mixed groups: $\chi^2(1, N = 26) = 1.80, p = 0.180$). Thus, using a discussion procedure did not improve objective decision quality.

To exploratively test how using a discussion procedure influenced the subjective dependent variables (i.e. confidence in the decision, satisfaction with the group process, reflection on the initial preference, reflection on the pros and cons) and time spent on discussion, a multivariate analysis of covariance (MANCOVA) was conducted. Type of group was included as a control variable. This analysis revealed significant multivariate main effects of condition ($F(5,38) = 4.42, p = 0.003$) and type of group ($F(5,38) = 2.81, p = 0.029$), but no significant multivariate interaction effect between condition and type of group ($F(5,38) = 2.07, p = 0.090$). The univariate effects in Table 6 show that condition influenced reflection on the pros and cons and time spent on discussion. Groups that used a discussion procedure perceived that they better weighed the pros and cons and spent more time on discussion, than groups that did not use a discussion procedure. As there were no interaction effects between condition and type of group on these variables, these effects did not depend on type of group.

Although there was no significant multivariate interaction effect between condition and type of group, there was a significant univariate interaction effect on satisfaction. Using a discussion procedure increased satisfaction with the group process in *homogeneous groups*, but not in mixed groups. Although the number of groups was highly uneven, Table 6 suggests that homogenous groups were less satisfied than mixed groups in the control condition but similarly satisfied in the experimental condition. There was no effect of condition on confidence and reflection on the initial preference. In sum, these results provide no evidence that using a discussion procedure improved objective decision quality or confidence in the decision and reflection on the initial preference. However, using a discussion procedure enhanced participants' impression that they adequately weighed the pros and cons, and increased the time used to reach a joint decision. Moreover, among homogeneous groups, using a discussion procedure increased satisfaction with the group process.

Discussion

Composing boards of individuals with differing backgrounds and expertise theoretically increases the possibility to draw upon a broader and more diverse range of insights and information and, in turn, to make more informed decisions. However, previous hidden-profile research among student samples suggests that groups often fail to share all the available information. This can be explained by the group's tendency to stick with the option that is initially preferred by the majority, leading to biased decisions (e.g. Brodbeck *et al.*, 2007). To what extent do board members fall prone to this group confirmation bias and how does it affect objective decision quality and subjective evaluations of the decision-making? In this study, board members were invited to participate in a group decision-making task, with the

Table 6.
MANCOVA of
subjective DV's and
time spent by condition
and type of group

Variable by condition	Total M (SD)	Type of group		Univariate effect of condition	Univariate effect of type of group	Univariate effect of condition × type of group
		Mixed group M (SD)	Homogenous group M (SD)			
<i>Confidence</i>						
Control	5.01 (1.11)	5.02 (1.17)	5.00 (0.94)	$F(1,42) = 0.01,$ $p = 0.922$	$F(1,42) = 0.04,$ $p = 0.847$	$F(1,42) = 0.02,$ $p = 0.884$
Experimental	4.96 (1.18)	5.04 (1.11)	4.90 (1.26)			
<i>Satisfaction</i>						
Control	5.42 (0.65)	5.60 (0.39)	4.78 (1.02)	$F(1,42) = 2.05,$ $p = 0.160$	$F(1,42) = 2.89,$ $p = 0.097$	$F(1,42) = 4.90,$ $p = 0.032$
Experimental	5.50 (0.68)	5.43 (0.56)	5.54 (0.76)			
<i>Reflection: initial preference</i>						
Control	4.85 (0.71)	4.80 (0.73)	5.03 (0.67)	$F(1,42) = 0.02,$ $p = 0.900$	$F(1,42) = 0.01,$ $p = 0.911$	$F(1,42) = 0.67,$ $p = 0.417$
Experimental	4.93 (0.80)	5.04(0.68)	4.86 (0.88)			
<i>Reflection: pros and cons</i>						
Control	5.44 (0.65)	5.45 (0.72)	5.40 (0.37)	$F(1,42) = 6.03,$ $p = 0.018$	$F(1,42) = 1.32,$ $p = 0.257$	$F(1,42) = 2.00,$ $p = 0.165$
Experimental	5.99 (0.61)	5.67 (0.62)	6.19 (0.52)			
<i>Time spent</i>						
Control	10.12 (3.67)	10.39 (3.77)	9.14 (3.46)	$F(1,42) = 7.41,$ $p = 0.009$	$F(1,42) = 1.56,$ $p = 0.219$	$F(1,42) = 0.01,$ $p = 0.908$
Experimental	12.60 (2.93)	13.52 (2.07)	12.01 (3.31)			

aim to investigate how they subjectively evaluate not only their confidence in, satisfaction with, and reflection on the decision-making but also objective decision quality. Additionally, we examined whether the use of a discussion procedure influenced the quality of decisions and the subjective evaluations of the decision-making.

The current study found that most groups of board members were unsuccessful in reaching the objectively best decision when the information was asymmetrically distributed (hidden-profile paradigm). Only a fifth chose the best option of three alternatives presented, which is in line with previous hidden-profile studies among student samples (Brodbeck *et al.*, 2007). This finding suggests that board members are just as (un)successful as undergraduate students in reaching high-quality decisions under hidden-profile conditions. That is, when board members individually possessed all the available information (in the pre-test), they easily identified the objectively best decision alternative. When that information was, however, asymmetrically distributed (in the hidden-profile task), most groups of board members were unable to choose the best decision alternative. Nonetheless, the participating board members were quite confident about the correctness of their decision and satisfied with the group process. Moreover, they perceived themselves as fairly reflective of their initial preference and their assessment of the pros and cons. These subjective evaluations and also the time spent on discussion were not predictive of objective decision quality. This suggests that even board members can be overconfident about the quality of their decisions.

Moreover, groups predominantly based their decision on the initial majority preference. When most group members initially preferred a particular candidate, this option was most likely to be chosen and also more positively remembered. This indicates that even experienced and professional decision-makers such as board members fall prone to group confirmation bias (Schulz-Hardt *et al.*, 2002), which might explain why board members did not share all the available information and consequently did not reach the best decision. For the few groups that did deviate from the initial majority preference, the group decision was usually initially preferred by a “minority” group member, who preferred a different candidate than the other group members. This suggests that this group member was successful in convincing the other group members (i.e. the majority) to choose one’s initial preference. Possibly, this person was an “influencer”, who can be characterised as an independent, powerful or dominant group member (Johnson *et al.*, 1996; Zajac and Westphal, 2005). It could also be that this person was part of a group that was particularly cooperative or participative and therefore more open to dissent (De Dreu and West, 2001; Toma *et al.*, 2013). Future research could shed more light on group processes in board decision-making where minority influence comes to the fore.

Lastly, the use of a discussion procedure (i.e. advocacy decision or decisional balance sheet) did not improve objective decision quality. Although the tools may have provided more structure to the discussion, this finding suggests that participants were still led by the initial majority preference and were not making better decisions. Moreover, the discussion procedures further enhanced participants’ impression that they adequately weighed the pros and cons and increased the time spent on discussion. Also, homogenous groups became more satisfied with the group process. Future research in which type of group is manipulated is needed to attest this finding. In sum, board members were more positive about certain aspects of their decision-making and used more time to reach a decision, but were not making better decisions. These results suggest that using a discussion procedure or tool activates a false sense of security; believing that the procedure helps the decision-making when this is, in fact, not the case.

Limitations and future research

Although the opportunity to experiment during member meetings allowed us to collect data among a sample of high-level decision-makers, it came with some practical constraints. First,

we were dependent on the number of board members that attended the member meetings, which resulted in a relatively small sample size. However, our sample of 47 groups was not unusual as a meta-analysis showed a range of 14–184 groups in previous hidden-profile studies, predominantly using student samples (Lu *et al.*, 2012). Additionally, the current study found large effect sizes on the objective dependent variables. Hence, we remain confident about the results of this study. Second, the current study was conducted among board members of non-profit organisations. We think it is likely that the overall processes described in this research can occur in for-profit as well as in non-profit boards. For instance, Zhu *et al.* (2016) showed that for-profit and non-profit boards share just as much information about internal resources, risks, and strategic planning in board meetings. Non-profit boards, however, discuss less information regarding financial measures. Future hidden-profile research should attest whether similar results are found among board members of for-profit and non-profit organisations.

Second, even though most groups quickly reached a decision (i.e. in less than 12 min), the available time for the experimental procedure was relatively short (i.e. 30 min) compared to previous hidden-profile studies (e.g. 100 min in Schulz-Hardt *et al.*, 2006). Possibly, participants could have recalled and shared more information if they had more time. In real life, board members usually have to memorise large amounts of information prior to board meetings where decisions are made and recall the information during those meetings. Therefore, we think our findings are relevant to the applied context of board decision-making. Although in this study time spent on discussion did not predict decision quality, it could be of interest for future research to examine whether spending more time on preparation and discussion helps real board decision-making. As this might depend on the type of decision-making, researchers could compare board decisions that require quick action (e.g. public relations issues) vs that provide more time for consideration (e.g. annual planning).

Third, although the design of the current study enabled us to measure decision quality objectively, which is difficult to do in real life, we were not allowed to record actual information-sharing behaviour, reflective behaviour or other behavioural mediators. It would be interesting for future research to observe the decision-making process to gain more insight into when and why board members do or do not share their information. As previous research has shown that providing access to information during discussion can increase information sharing (Sohrab *et al.*, 2015), it should be tested in future research whether this is also the case for board members. If so, this would imply for practice that board members should explicitly use and rely on information during group decision-making. Also, familiarity between board members and past experience of working together are relevant factors to take into account in such future studies, as these have been previously negatively linked to information sharing (e.g. Phillips *et al.*, 2004). Lastly, individual characteristics of board members (e.g. dominant personality) and group characteristics (e.g. cooperative norm) could be taken into account, as these might also impact information sharing and group decision-making.

Practical implications

The results of this study indicate that board members were unsuccessful in sharing the available information and reaching the objectively best decision because they were biased by the initial majority preference. Creating informational diversity by composing boards of members with divergent knowledge may therefore not be sufficient to mitigate group confirmation bias. Although human judgement and decision-making may never become flawless, board members should realise that the initial majority preference may not be the optimal decision and is likely to be based on incomplete information. It may help to ask all

members about which explicit and implicit information they individually possess. In this way, boards can find out which information is still missing and needed to obtain a complete picture. Otherwise, the risk of making suboptimal decisions increases with detrimental consequences, for instance, that the less competent candidate for a management position gets chosen.

Further, the current study showed that using a discussion procedure increased participants' perception that they adequately weighed the pros and cons of all options, but did *not* improve objective decision quality. This suggests that board members can become overconfident, and they should therefore be careful when relying on their subjective judgement of the decision-making. Also, care should be taken with applying unproven tools or procedures, as using them can create a false sense of security which can lead to less information sharing (see also Pronin and Kugler, 2007). As the effectiveness of procedures may strongly depend on the context in which they are used, board members could invest more in creating a supportive context. In hidden-profile research to date, elements of a supportive context have received limited attention, even though several possible ingredients for intervention have been suggested (e.g. chairmanship, team climate, accountability arrangements; for an overview, see Sohrab *et al.*, 2015). For instance, a discussion procedure, such as the advocacy decision procedure, may be only effective when the chairman allows for dissenting views. Hence, rather than using quick fixes such as discussion procedures or tools, intervening on contextual elements might be more effective to improve information sharing and decision quality in the boardroom.

Conclusion

In a group decision-making task, board members were influenced by the initial majority preference leading to biased decisions. Nevertheless, these high-level decision-makers were satisfied with their joint decision-making. The use of discussion procedures did not improve decision quality but only provided a false sense of security as it enhanced participants' impression that they adequately weighed the pros and cons of all options. Therefore, board members should be careful when relying on unproven discussion procedures. Further, they should realise that the initial majority preference may not be the optimal decision to diminish the risks of group confirmation bias and overconfidence.

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