Are Groups More or Less than the Sum of their Members? The Moderating Role of Individual Identification

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Running Head: Groups Need Selves

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**Short Abstract**

Groups sometimes perform better and other times worse than the sum of their individual members. Differentiation of selves is a crucial moderator. Group pathologies (e.g., social loafing; depletion of shared resources) are linked to submerging the individual self in the group. These pathologies are decreased when selves are differentiated. Differentiating individual selves contributes to the best outcomes of groups (e.g., wisdom of crowds effects; division of labor). Anonymous confidentiality may hamper differentiation by allowing selfish or lazy efforts to go unpunished, but also can facilitate differentiation by enabling people to think and judge without pressure to conform.
**Abstract**

This paper seeks to make a theoretical and empirical case for the importance of differentiated identities for group function. Research on groups has found that sometimes groups perform better and other times worse than the sum of their individual members. Differentiation of selves is a crucial moderator. We propose a heuristic framework that divides formation of work or task groups into two steps. One step emphasizes shared common identity and promotes emotional bonds. The other step, which we emphasize, group members take increasingly differentiated roles that improve performance through specialization, moral responsibility, and efficiency. Pathologies of groups (e.g., social loafing, depletion of shared resources/commons dilemmas, failure to pool information, groupthink) are linked to submerging the individual self in the group. These pathologies are decreased when selves are differentiated, such as by individual rewards, individual competition, accountability, responsibility, and public identification. Differentiating individual selves contributes to many of the best outcomes of groups, such as with social facilitation, wisdom-of-crowds effects, and division of labor. Anonymous confidentiality may hamper differentiation by allowing people to blend into the group (so that selfish or lazy efforts are not punished), but it may also facilitate differentiation by enabling people to think and judge without pressure to conform. Acquiring a unique role within the group can promote belongingness by making oneself irreplaceable.

Keywords: accountability, brainstorming, groups, group process, identity, self, social facilitation, social loafing
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The Moderating Role of Individual Identification

Research and theory about the self developed over many years, largely independently of research and theory about groups. When theorists occasionally would seek to merge group theory and self theory, the focus was generally on the group self, as in shared group identity. In this manuscript, we make a case for the value of differentiated selves: Groups benefit greatly from differentiation of selves. The emergence of human selfhood might have been shaped by selective adaptation for playing an individual role in a group.

Allport (1924) wrote, “There is no psychology of groups that is not essentially and entirely a psychology of individuals” (p. 4). The point of departure for this manuscript is that Allport’s assertion is fundamentally, even outrageously, wrong. In our view, the relationships among individuals are not fully reducible to properties of the separate individuals. On this, we think we are in good company (see Asch, 1952; Lewin, 1952; Mead, 1934; Sherif, 1936). Economic marketplaces cannot be reduced to the acts and choices of individuals but comprise complex interactive systems. Much of social psychology’s long tradition of research on groups has emphasized that groups are different from and more than the mere aggregate of their individual members. Selves thus do not constitute the group but rather play roles within the group’s system. And differentiated roles make more powerful and effective systems.

A careful reading of the literature on groups yields not one but two thematic traditions denying that a group is equal to the sum of its parts. Unfortunately, their themes contradict each other. One line of work, dating back at least to Le Bon’s (1895) depiction of the group mind, depicts groups as generally worse than individuals acting alone. The other, whose exponents include the seminally influential economist Adam Smith (1776), extols how groups produce and achieve far more than collections of independent, isolated individuals ever could.

The tension between these two traditions was apparent in two of the earliest works in social psychology. Triplett (1898) observed and then confirmed empirically that people performed better in a group than when alone, in such domains as racing bicycles and winding fishing rods. Not much later, Ringelmann (1913; see also Kravitz & Martin, 1986) observed and confirmed empirically that people performed worse in groups than when alone, such as when pulling a heavy load together. Research in the modern era has continued to yield findings of both sorts, namely that being in groups sometimes makes people work harder and perform better but sometimes makes them slack off and perform worse than when alone.

In this manuscript, we propose, first, that both traditions of group research have valid points and important findings. It is quite true that sometimes groups are better than the sum or average of their parts — and in other cases far worse. Second, we shall propose the hypothesis that the difference can be largely explained on the basis of differentiation of individual selves. That is, groups surpass individuals when members of the group are individually identified and responsible, and contribute as distinct entities. Meanwhile, the worst outcomes of group processes come when individual identities are submerged in the group. By submerged in the group, we mean any of the following: people are not held accountable nor responsible, they are not in competition nor playing a distinct role, they are not publicly identified nor rewarded. It is a
loss of individual or collective awareness of how group members differ from each other. Submersion of the self into the group is thus the opposite of differentiation.

An exhaustive review of all relevant work may be impossible and certainly is impossible within the length constraints of journals like this. Hence our review is admittedly incomplete and selective. We reiterate that we seek to make the case for a theoretical position, and we welcome commentaries that provide alternate theories and additional evidence.

1. THEORY: Why Groups Differentiate Selves
People generally live in interacting groups, and they have done so everywhere on earth and throughout history. Groups confer benefits to individuals and can accomplish things that loners cannot. Groups also extract sacrifices. Group systems require individuals to set aside some self-interest, but members are tempted to pursue self-interest at group expense. Hence group benefit depends on overcoming selfish desires so that people cooperate and contribute rather than free-riding or cheating. To be sure, the motivations of individual group members may vary from prosocial to selfish, as well as from eager for information to indifferent (De Dreu, Nijstad, & van Knippenberg, 2008). Managing the diverse and sometimes problematic motivations of individual members is often key to the group’s success.

Two classes of reasons beyond self-interest will motivate people to contribute to group welfare, even at cost to themselves. First, if they love the group or identify passionately with it, they will want to advance its welfare and derive satisfaction from doing so. Second, they may contribute because the other group members put pressure on them to do so, such as by material incentives (e.g., rewards, punishments) and social incentives (e.g., moral reputation, laws). The second set of reasons thus reverts to appealing to the individual’s self-interest and aligning it with pro-group, prosocial behavior.

Some readers may regard the distinction between group goals and individual goals as artificial, because groups consist of individual members and cannot really have motivations except in the minds of its members. Discussion of group goals is shorthand for saying that individual goals, right down to survival and reproduction, are facilitated by participation in groups, but the benefits of groups often require efforts, contributions, and sacrifices by individual members in order to achieve them. Maximum individual advantage can be attained by sharing in group benefits without contributing, but if all members follow that strategy, there will be nothing to share. Groups therefore confer their advantages (and prevail over rival groups, thus also benefitting members) insofar as they motivate people to contribute even to the short-term detriment of individual selfish goals.

1.1. Two Complementary Steps
The emergence of group activity can be divided heuristically into two steps. The first step involves the simple advantages of being in groups rather than alone. Belonging to the group is sufficient to furnish benefits that include collective vigilance, sharing of resources and information, and competitive advantages. Cohesiveness is a high priority for the group, because it keeps members loyal and motivated to work with the group. The individual’s goal is acceptance. Differentiation is not as important as shared identity at this stage.
The second step, our main focus, involves role differentiation. Role differentiation creates advantages and opportunities. It is no accident that all large corporations, governments, sports teams, and other such groups rely on it extensively. Larger groups permit more differentiated systems. Although animals may have some role differentiation, animal sociality does not have organizations with anything approaching the differentiated specializations found in a large (indeed even a small) corporation or university.

Our account of these heuristic steps bears some resemblance to Turner’s (1965) theory of group formation. He proposed that all groups require a “forming” stage, where acceptance and agreement are emphasized. This is followed by a “storming” stage, emphasizing differences and disagreements.

Thus, one key difference between the steps is whether the group functions mainly on the basis of how the various members are the same vs. are different. The benefits of shared group identity have been the focus of much theory and research, especially under the aegis of social identity theory (e.g., Hogg, Abrams, Otten, & Hinkle, 2004; Turner & Tajfel, 1982). We seek to complement that work with an elucidation of the benefits of differentiation. Differentiation in this sense involves being individually identified and/or performing a distinct role as part of a system. Indeed, the effectiveness of the system may be based on different selves playing different roles. Differentiation should facilitate the gains drawn from systems as well as moral control of individuals by the group.

Role differentiation is thus not merely difference for the sake of difference but rather difference for the sake of facilitating systems. We use the term system gain to refer to the margin by which the members of a systematically organized group can achieve better results than the same number of individuals working together but without a system. A group may consist of various talented individuals who come together to compete against others in battle, marketplace, or sports arena. That same group would succeed better, however, if they adopted a system that fosters performing complementary roles. The difference is system gain.

The crucial point is that system gain depends on differentiated selves. System gain capitalizes on members performing different roles. Specialization increases efficiency (as individuals gain skill at their specific tasks and do not have to learn or perform other skills) and quality (as everything is done by an expert) (Smith, 1776). In contrast, if everyone is the same and does the same things, that is hardly a system, and there will be no system gain. Differentiation underlies many features of groups that will figure in our literature review, including accountability and evaluation, responsibility, indispensability, and independent judgment.

The second step thus builds on the first. Although both steps (cohesive identification and differentiation) can occur at any point, we think there would generally be a sequence. The benefits of a cohesive group may occur quite early in group formation. Passionate commitment to the group (the first step) may motivate people to do their best in the short run, but in the long run it will almost certainly be useful for the group to hold individuals responsible for their actions, and so differentiation is needed.

Crucially, the individual’s goals change at the second step. Merely securing acceptance is no
longer sufficient. Being similar to everyone else and being a moral actor are key to the first step (gaining acceptance), but performance of individual, differential roles is key to the second. Hence, being different may become an important strategy in service of belongingness: A group cannot afford to lose a member who performs a unique function for the group, and so acquiring a unique skill can make someone indispensable. Being liked may be sufficient for the first step (gaining approval), whereas earning respect (by competent, ethical performance) becomes important at the second step.

The assertion that people have both a motivation to be different and a motivation to be the same as others in the group is the centerpiece of Optimal Distinctiveness Theory (Brewer, 1991, 2012). The present approach acknowledges its debt to that theory and proposes one substantial change. In Optimal Distinctiveness Theory, the differentiation motive is postulated as something that requires no further explanation but is also linked to not being included in the group (Brewer, 1991, p. 477). The implication is that people want to be close but not too close to others, and so they increase or decrease their conformity in order to gain acceptance or gain distance, respectively. In an important sense, then, the motive to differentiate is treated in that theory as going against the need to belong. This view has been preserved in many other influential theories about group processes (e.g., De Dreu, Nijstad, & van Knippenberg, 2008; Hinsz, Tindale, & Vollrath, 1997). In contrast, we regard differential individuation as a strategy to promote belongingness.

1.2. Forestalling Potential Misunderstandings
It is useful to distinguish two main kinds of group tasks: productive achievement and information use (e.g., sharing and accumulating knowledge, group decision making). Both can benefit from differentiated selves, but the role of group control is different. When productive achievement costs effort or other resources, groups benefit from public differentiation so they can monitor individual efforts and hold people responsible, such as by rewarding high contributors and punishing slackers and cheaters (Leary & Forsyth, 1987). For informational tasks, private differentiation benefits the group by promoting individual thought and judgment, whereas group control promotes conformity and undermines independent thinking.

Anonymity is thus not the opposite of differentiation and at times can even facilitate it. Anonymity protects individuals from being controlled by the group. For informational tasks, such as voting, anonymity can help ensure independence of judgment. However in performance contexts, anonymity may detract from good group outcomes by protecting free riding and other selfish, antisocial acts.

Selfishness is not the same as human selfhood and in fact long precedes it. Selfishness is rooted in the very nature of life, insofar as every living organism delineates a boundary between itself and its environment. It lives or dies as a totality, and its motivations are designed by natural selection to promote and prolong its life (plus kin and offspring). Human selves have this same selfish core — alongside additional features that enable them to overcome this natural selfishness if there are good reasons to do so. The desire to achieve social acceptance within a group may provide just such a reason.

1.3. Moral Control in Large Groups
Groups benefit insofar as individuals follow the rules and do what is best for the group — that is, groups benefit from moral behavior. The first step, identifying with the group, can motivate people to do what is good for the group, and so it can yield some improvement in moral behavior. With the second step, however, the group can exert control over individuals by holding them accountable. Thus, the first step relies on inspiration and voluntary self-sacrifice to improve moral quality, which can be effective at times, especially when there are strong emotional bonds. The second step enforces moral behavior by rewarding virtue and punishing vice, and so in the long run it is likely more effective than the first at promoting moral behavior. The sequence is evident in macrosocial trends. Friedman (2002) pointed out that moral rules and laws generally promote quite similar behaviors, but the motivational basis changes as societies evolve. In small groups characterized by stable relationships based on emotional bonds, people care about each other and reputation, and so people are motivated to act morally. As society grows larger and interactions with strangers increase, the (weaker) emotional ties become inadequate to ensure good behavior, and so moral suasion is replaced by law enforcement.

We assume competition among groups has been an important factor in human evolution. Successful competition depends on size and system. In many competitions, larger groups tend to prevail. Primitive battles were generally won by the larger group (e.g., Morris, 1965), and achieving numerical superiority has been a major goal of modern military efforts too. In fact, many major wars have ended with double or triple as many soldiers under arms as began the war (Hubbard & Kane, 2013) — even despite extensive casualties.

As groups became larger and more evenly matched, a second factor, role differentiation, provided powerful advantages (e.g., McNeill, 1982). This is the crux of our model, that groups do best when they first start by developing commitment and identification in a group of individuals, and then move to instantiating and emphasizing distinct identities and roles, especially as the group gets larger.

An authoritative review by Levine and Moreland (1990) concluded that most factors that make groups effective and satisfying deteriorate as group size increases. On that basis, one might anticipate that people would eschew large groups, whereas in empirical fact historical progress has seen gradual increases in operative group size. Large groups must thus have some compelling advantages — yet they also must become able to function without some of the motivational processes found in small groups. These advantages may derive from simple numerical advantage (e.g., more warriors on the battlefield), but many depend on differentiation. Large groups can provide much more differentiation and specialization than can small groups. Hence large markets, large universities, and large corporations have advantages over smaller ones, especially in terms of greater specialization. Both informational and performance goals are served by having many individuals contributing their unique talents, knowledge, and expertise.

The emphasis on differentiation thus may come after initial drives for acceptance, partly because of the tendency for successful groups to grow larger and less intimate over time. It is well established that in large groups, feelings of social connection are weaker than in small groups (e.g., Levine & Moreland, 1990; Mueller, 2012). A larger group is therefore more likely to have slackers and other rule breakers, and so individual identification is useful for motivating people with rewards and punishments.
Our two-stage model is illustrated with an example from ancient Chinese history. At one point ten thousand (!) independent political domains consolidated into seven. According to Fukuyama (2011), this was mostly accomplished by larger groups conquering and integrating their smaller neighbors (so having many members was decisive for group success). The ensuing process by which the seven merged into one China was dominated by the complex administrative and military systems using extensive role differentiation developed by the Qin (so system gain was decisive).

2. REVIEW OF EVIDENCE
We turn now to a presentation of research findings. Our central hypothesis is that groups will produce better results if the members are individuated than if their selves blend into the group. We posited that being identified with and accepted into the group is essential in the initial stages. Self-sacrifice for the group’s goals can come at this stage, following from commitment to the group. Later, the group will be successful to the extent that it fosters individuality.

The section first addresses the two main types of group process, group task performance (2.1) and then informational processes (2.2). Following this, two further sections examine the broader question of group moral control (2.3) and then evidence about the two-step sequence (2.4).

2.1 Task Performance

2.1.1 Social Facilitation
Social facilitation largely involves improvements in effort and performance caused by the presence of others. To be sure, sometimes the mere presence of others impairs performance, especially when complex, poorly learned tasks are involved (Zajonc, 1965). But such tasks mainly require skill, and there is little a group can do in the short run to improve skilled performance. Performance gains are presumably based on increased effort. These fit our theme that groups seek to control individuals and improve their performance by means of identifying them individually so as to incentivize effort.

Several factors amplify social facilitation: individual identification, accountability, and anticipated evaluation (which motivates the desire to be favorably regarded by others) (for reviews, see Bond & Titus, 1983; Geen & Gange, 1977; Guerin, 1986). These are only possible based on identifying people individually.

Competition pits individuals against each other and thus invokes evaluation, accountability, and other hallmarks of individuality. VanTuinen and McNeel (1975) showed that performance improved with explicit competition but not when participants merely worked together. In another condition, performance improved based on a cash incentive despite working alone. Thus, improvement stemmed either from competing against someone or from working as an individual for a contingent reward. Both differentiate the self (to compete and to seek individual reward).

Many studies have provided evidence that one reason performance improves in the presence of others is that people want to perform well so others will think well of them (evaluation apprehension; Cohen & Davis, 1973; Feinberg & Aiello, 2006; Henchy & Glass, 1968; Martens
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Good (1973) showed that performance was facilitated when participants were told that the experimenter (as opposed to a computer) would evaluate their performance. In a further twist, Good found that only participants who had been led to expect a favorable evaluation showed the performance improvement, which suggests that expecting an unfavorable evaluation can wipe out the gains from evaluation apprehension (see also Bray & Sugarman, 1980; Greene, 1979). (Thus perhaps “evaluation optimism” rather than “evaluation apprehension” would be the more precise term for what causes performance to improve.)

Evaluation by others, rather than self-evaluation, appears to be crucial for social facilitation (Szymanski, Gerczynski, & Harkins, 2000). Thus, social facilitation is about the self as seen by others. Bond (1982) showed that performance is not simply a matter of arousal and item difficulty — rather, it depends on the composite image of self that one thinks is being communicated in that situation. He showed that when easy items were embedded in a set of mostly difficult items, performance was impaired even on the easy ones too. Conversely, when a few difficult items were embedded in a mostly easy problem set, performance was unimpaired.

To summarize, the idea that people perform better in groups is one of the fundamental arguments for the value of groups, and so social facilitation is likely adaptive. Crucially, however, these benefits mainly occur when people are individually identified and motivated to care about how others will evaluate them — consistent with the view that differentiated selfhood facilitates group function.

2.1.2. Social Loafing

Social loafing is the tendency for people to reduce effort when in a group. The reduction of effort produces an overall loss of output, because the members of the group do poorer work and produce less than they would produce individually. Ringelmann (1913) first verified a drop in performance in the context of teams of men pulling together with less force than the sum of their individual efforts. This phenomenon was revived, with methodological improvements, by Latané, Williams, and Harkins (1979). Participants worked harder when alone than when part of a group. Loafing was even found when people actually performed alone but believed they were part of a group. Williams, Harkins, and Latané (1981) showed that identifying people individually eliminated social loafing.

The theory of social loafing derived from earlier work on diffusion of responsibility, a pattern by which the pressure to take action is divided among the group members (Darley & Latané, 1968). Being anonymous, so that one’s identity is submerged in the group, increases the tendency for everyone to leave difficult or risky jobs for someone else (e.g. Schwartz & Gottlieb, 1976, 1980). Thus, the larger the group, the more diffusion of responsibility.
A meta-analytic review by Karau and Williams (1993) confirmed that social loafing is reduced by making people identifiable, especially when individual evaluation is possible. Also, social loafing is reduced by giving people non-redundant roles in the group (i.e., indispensability), so that one member’s lack of contribution will not be offset by another member’s performance. Karau and Williams proposed that social loafing depends on people’s appraisal of how much the group performance depends on their own contribution, how much group outcomes depend on group performance, and how much the individual will benefit from the group’s performance and outcomes. People work hardest when they believe their own individual effort will contribute to valued group outcomes (that will benefit the group and the self) (also Karau & Williams, 1995). For example, Weldon and Mustari (1988) provided evidence that social loafing occurs mainly when people believe their contribution to the group is dispensable. Likewise, they found that feeling that one’s own work is indispensable could motivate high effort and good work even when one is anonymous.

Evidence for the importance of moral control was provided by work on perceived procedural fairness (De Cremer, Hoogervorst, & Desmet, 2012). Leaders often punished the least-contributing member of the group. Such practices communicate to group members that their behavior is being individually tracked. Group performance improved as a result of this sort of legitimate individuation and punishment.

In sum, the social loafing literature supports the general pattern that group performance is harmed when people feel submerged in the group — and improved when group members are individually identified. It also shows that people perform well when they have unique roles and make contributions they regard as indispensable. These fit the main themes of our theory. Individual identification facilitates responsibility and accountability, thus putting moral pressure on individuals to behave well. Indispensability involves differentiating the roles performed by different members, which is useful for groups that have complex systems. There are certainly ample signs of the first step of group work: caring about the group and identifying with it reduce social loafing. But differentiation improves the group’s ability to motivate people to exert themselves on behalf of the group goals.

2.1.3. Division of Labor
Division of labor is one powerful process by which individual differentness can improve outcomes via system gain. Adam Smith’s (1776) classic treatise on economics began by discussing the benefits of division of labor in a pin factory. Division of labor enabled the factory to produce far more pins than a comparable number of individuals working separately. Babbage (1832) explicated the monetary savings to an organization that stemmed from extending division of labor to subtasks. Artisans who built entire products needed a wide range of skills and hence were expensive. Dividing the task into segments, each performed by a different person with a narrow skill set, reduced labor costs considerably — while also improving quality (because of specialization). Thus, seemingly paradoxically, a collection of individuals with relatively limited skills could outperform a collection of experts who did not specialize.

The benefits of division of labor are now widely accepted. It would be inconceivable to have a successful large organization without it, so that everyone did all tasks. West (1999) compared flute manufacturing at two factories that were quite similar except that one used a 19-step
division of labor whereas the other had no division of labor. Productivity was almost four times higher with than without division of labor. Another study with a Japanese bank found improved performance due to specialization, which is another aspect of division of labor (Staats & Gino, 2012).

Although division of labor is mainly a topic for other disciplines such as economics and sociology, psychology has some relevant echoes. Research on transactive memory has found that groups remember things better insofar as they assign various members to specialize in remembering different things (Wegner, 1986). A meta-analysis, including studies of actual organizations and ongoing work groups in business, sports, and military combat, found that performance was indeed substantially improved insofar as group members specialize in their knowledge plus keep track of who knows what (DeChurch & Mesmer-Magnus, 2010). Crucially, they found that the benefits of differentiation tended to emerge over time, which is consistent with our two-step model. Shared identity is crucial in the first stage and promotes quick gains, whereas differentiation improved performance over the long run.

That groups spontaneously seek to divide labor so as to maximize outcomes was suggested by Chatman, Boisnier, Spataro, Anderson, and Berdahl (2008). They showed that when one group member was the sole person of that gender, others deferred to that person on tasks relevant to that gender, and the person’s performance improved. Thus, having an individual identity within the group that marks one out as likely to be good at something causes one to be accorded something like expert status on that task, as reflected in being treated as a leader — and it improved performance of the differentiated person.

The benefits of division of labor arise not just from having different people do different things but also from coordinating them into an integrated system. Specialized expertise at making one part of a flute is useless unless there are other specialists who make the other parts. In a group performance study using a hidden profile mystery task (in which the solution is known only when the group integrates information possessed by different members; see below), Stasser, Stewart, and Wittenbaum (1995) found that the best performance came from groups in which different members knew which others had which kinds of relevant information. They concluded that cognitive division of labor requires group members to know who knows what. This is relevant to our theme that the benefits of the group require that members know each other’s differentiated identities within the group.

A field study at several call centers in India manipulated the initial training to emphasize either one’s individuality and unique potential contribution, the greatness of the organization, or skills training (neutral control group) (Cable, Gino, & Staats, 2013). Individual differentiation yielded the best results, both in terms of performance (measured by customer satisfaction) and staying with the organization over six months. A laboratory study yielded similar results, with performance, retention (returning for a second session), and subjective engagement highest among those whose initial instructions had emphasized individual, unique contribution rather than emphasizing being part of a group that already does wonderful things. In this case, at least, differentness was more motivating than sameness.
In sum, division of labor is one of the founding principles of economic organization and human group performance — because it confers huge benefits to most task performance. Division of labor is a paradigmatic example of system gain, and it is essentially based on differentiated selves who perform different, complementary tasks, especially in a system in which members know who will do what and trust each other to do it.

2.2 Information, Judgment, Decision

We turn now to review phenomena related to the informational function of groups. Thinking in groups differs from thinking by individuals, such as by being simpler and more homogeneous (Hinsz, Tindale, & Vollrath, 1997). Le Bon’s (1895) characterization of the group mind as primitive and irrational provided an influential statement of the pessimistic view that groups are less intelligent than individuals. Optimism is however apparent in many quarters, not least in the endless proliferation of committees in all institutions.

2.2.1 Pooling Information for Group Decisions. Work by Stasser and colleagues (e.g., Stasser & Titus, 1985, 1987) has impugned assumptions about the value of committees. In those studies, some information was dispersed through the group, while other information was given to all group members. With the hidden profile research design, a large amount of information favoring one option is divided among the many group members (who thus must all say what they know in order to discover how much there is) while a smaller amount of information favoring the other option is given in entirety to every member of the group. The primary rationale for having committees is that different members can pool their different knowledge to produce a full picture (i.e., reveal the hidden profile). Unfortunately, the usual finding has been that the group members talk about the information they all have in common, and the individually held bits of information get left out of the discussion and decision processes. Hence committees make an inferior decision because they fail to capitalize on the differentiated knowledge of individual members (Stasser, 1999; Wittenbaum & Park, 2001; Wittenbaum & Stasser, 1996).

A meta-analysis by Lu, Yuan, and McLeod (2012) confirmed that these effects are quite large. Groups talked about shared information far more than individually held information. The larger the group, the more members focused on what information they had in common, and the more that tendency degraded the quality of the decision. In short, the hidden profiles generally remained hidden, and especially in larger groups.

We have proposed that groups often treat cohesion as a goal. Cohesion may seem all the more desirable in judgment and decision tasks insofar as consensus is sought, but cohesion does not necessarily improve group decisions. If the group members know there is dissent among them, they become more likely to bring up their unshared knowledge, and the group decision is improved (Brodbeck, Kerschreiter, Mojzisch, Frey, & Schulz-Hardt, 2002). More broadly, research on minority influence has shown that a persistent minority can stimulate the majority to think more carefully about the issue facing the group, thus ultimately improving the group (Nemeth, 1986). Disagreeing minorities may thus reduce cohesion (by undermining consensus) but in the long run can facilitate better information and decision processes.
Indeed, the mere fact of dissent seems to improve decision quality, even if the dissent consists wholly of advocating different non-optimal options. This was nicely shown by Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, and Frey (2006) who instructed three-person groups to make a hiring decision among four candidates. When group members started out arguing between two different non-optimal candidates, they talked long enough to allow the hidden profile (favoring a third candidate) to emerge. Nemeth (1986) also found that dissenting minorities could benefit the group even if the majority were not won over to the minority’s view, because the majority would respond to dissent with divergent thinking and thereby might discover new facts and options. Thus, the value of differentiated selfhood is not restricted to cases in which a minority advocates the best answer — differentiation helps even if no one initially advocates the best answer.

2.2.2. Brainstorming. The purpose of brainstorming is to generate creative ideas. The practice was first developed in advertising agencies (see Osborn, 1953). In brainstorming, group members share insights and ideas, stimulating each other toward more creative output.

In general, the early enthusiastic reports of brainstorming’s effectiveness were followed by a mass of sobering data that repeatedly found brainstorming groups produced fewer ideas and lower quality ideas than the same number of individuals working alone (for meta-analysis, see Mullen, Johnson, & Salas, 1991). Quite possibly the lower output in the group setting reflects social loafing or increased feelings of that one’s contribution is not unique and even is dispensable, which reduce effort.

Early rules for brainstorming groups prohibited criticism. In practice, sometimes members did criticize each other, and this was regarded as discouraging the group’s productivity. Recent work, however, suggests that the performance of brainstorming groups actually improves when people criticize each other during the process, contrary to the original system (Nemeth, Personnaz, Personnaz, & Goncalo, 2004). Criticizing each other during the process certainly differentiates the roles and conveys individual evaluation. Thus again, invoking individual identities improves performance of groups.

2.2.3. Conformity
Conformity research was stimulated by Asch’s (1952) finding that people would give an answer that was clearly, factually false if everyone else in the group had stated it. (The factually false answers came from confederates giving prearranged wrong answers.) A review by Bond and Smith (1996) upheld the basic finding and concluded that conformity is higher to the extent that people are emotionally invested in the group and wish to maintain cohesion. Deutsch and Gerard (1955) showed that anonymity enabled members to express their individual opinions without pressure to conform to the group. Thus, anonymous members made fewer mistakes than identified ones. Being identified to someone outside the group (i.e., the experimenter) also improved accuracy. Meanwhile, increasing the pressure for conformity heightened the tendency to conform to the group’s wrong answer. More recent work has confirmed that people who resist the tendency to conform to the group’s opinion can improve the informational performance of groups (Madirolas & de Polavieja, 2014).

The benefits of anonymity for judgment quality contrast with its costs in effortful performance (as the social loafing section showed). Making people anonymous rather than identifiable
increased social loafing but improved their willingness to express novel opinions during group decision tasks. In both cases, however, the optimal result depends on getting the person to behave as an autonomous, independent, responsible individual. As we explained in the theory section, anonymity shields the individual from group control, which can facilitate laziness and free riding but also frees people to think and judge for themselves.

Indeed, early work by Schachter (1951) showed that groups tend to dislike and reject dissenters who espouse opinions at odds with the emerging consensus. In practice, dissenters can be extremely valuable in improving group decisions. Schachter (1954) found that some groups even ended up switching to agree with the dissenter. But groups often reject a dissenter despite his or her potential value. As we theorized, the first step in group formation involves harmonious relationships to integrate individuals, and the second step improves performance via differentiated roles. Dissent may detract from the first even while benefiting the second. Research on minority influence, in particular, has shown that a dissenting minority can improve the thinking of the majority, even despite some negative reactions deriving from the initial loss of consensus (Nemeth, 1986). Moreover, the negative emotional and interpersonal reactions to dissenters constitute palpable pressure on people to conform, and many do, to the detriment of the group’s ability to profit from the diverse perspectives and knowledge of its members. Groups even go as far as ejecting dissenters if given the chance (Schachter, 1951; Tata et al., 1996).

2.2.4. Groupthink. Janis’s (1972) influential critique of group cognition and decision making, under the rubric of groupthink, also highlighted the role of dissolving into the crowd. Janis showed how committees and other groups had made costly and seemingly avoidable errors when all members focused their thinking on the same assumptions and information. Reviewing the literature, Esser (1998) remarked on the contrast between the hundreds of articles that cite groupthink and the relatively few direct empirical tests. Still, she concluded that the theory of groupthink had fared reasonably well empirically, although some factors such as time pressure and group cohesion had not played the vital roles the theory had suggested. The general implication is that group decision making is improved by differentiation and impaired by uniformity.

Some of the relatively poor thinking of groups is likely produced by social loafing, diffusion of responsibility, and the consequent reduction of cognitive effort. Petty, Harkins, and Williams (1980) showed that participants put less effort into various evaluative tasks when they were working in groups of 10 or 15 than when alone. Informational input (e.g., quality of argument) had stronger effects on individuals than on groups, and individual evaluations were stronger and more extreme than group ones, again reflecting the pattern that people put less effort into the decision when they are part of a large group.

2.2.5. Accountability
Accountability has been defined as the expectation that one may have to justify one’s beliefs, feelings, and actions to others (Lerner & Tetlock, 2003; Scott & Lyman, 1968; Semin & Manstead, 1983; Tetlock, 1992). Accountability emphasizes the responsibility of individuals to behave autonomously and present a valid basis for their actions, so it individuates the selves of group members. This can help the group succeed even when the motivations of individuals might be counterproductive, such as by being selfish or having low interest in the group’s
informational goals (De Dreu et al., 2008).

Accountability can overcome some of the informational failures already covered, such as the committee effect. Scholten, van Knippenberg, Nijstad, and de Dreu (2007) improved the quality and accuracy of group decisions by telling participants that they would have to explain the decision process later. De Dreu and van Knippenberg (2005) showed that process accountability (i.e., knowing that one would have to justify how one reached one’s decisions) reduced the negative reactions to people who brought up contrary views.

Likewise, accountability can improve the otherwise poor performance of brainstorming groups. When participants expected to have to explain and justify the process of generating ideas, they generated more ideas than in the non-accountable groups (Bechtoldt, de Dreu, Nijstad, & Choi, 2010). Indeed, one procedure that greatly improved the performance of brainstorming groups involved having participants first generate ideas individually and then bring them together to evaluate and combine them (Lamm & Trommsdorff, 1973; Mullen et al., 1991). Thus, individualizing the process improved group performance.

Accountability makes people think more thoroughly and carefully about their tasks than they would otherwise. This benefits the group by improving quality. Tetlock (1983) had participants simulate being jurors and form judgments about a defendant’s guilt. An irrational (primacy) bias was eliminated by telling participants in advance they would have to explain and justify their decisions. Weldon and Gargano (1988) likewise found that accountability (expecting to have to explain one’s ratings and decisions) reduced diffusion of responsibility and social loafing.

A review by Lerner and Tetlock (1999) concluded that only some types of accountability increase mental effort, and moreover increased effort is not necessarily beneficial. Being accountable to an audience or authority who values accuracy and fair process motivates people to try to be fair, objective, and accurate. But accountability to a biased authority or audience who desires a particular conclusion can increase bias toward that conclusion (Tetlock, Skitka, & Boettger, 1989). Accountability may also increase bias when the biased option is easiest to justify to others. Subsequent work found that sometimes people react to accountability with evasive tactics and buck-passing, so as not to be blamed for problematic stances (Green, Visser, & Tetlock, 2000). Still, in general its effects are beneficial more often than not.

Thus, the general pattern seems to be that accountability makes the person do what the group wants. This motivation is helpful when it leads to more careful and systematic thinking and therefore greater accuracy, but it is detrimental when it leads to embracing the group’s biases. Admittedly, classifying those outcomes as helpful vs. detrimental rests on assumptions that finding the truth is the supreme goal. Group cohesion and agreement may sometimes be higher priorities than the truth, and certainly many groups have been more interested in supporting their values and ideologies than in open-minded quest for truth. Such groups might therefore regard accountability as helpful even in some cases that we have labeled detrimental.

2.2.6. Wise Groups. Despite the accumulation of findings indicating collective stupidity, it is possible for groups to perform feats of remarkable intelligence. Surowiecki (2004) presented multiple lines of evidence to indicate that the pooled knowledge of individuals can often
outperform even experts. In one dramatic study, he compiled data from the television game show
*Who Wants to Be a Millionaire?*, on which stumped contestants can consult various helpers. Contestants who asked their favorite expert did fairly well, getting the question right 65% of the time. Surprisingly, however, those who polled the studio audience did better, with a remarkable 91% correct.

How can crowds of individuals outperform knowledgeable experts? Surowiecki (2004) concluded that collective wisdom arises from highly individualized judgments: People make their own choices, largely independent of what everyone else thinks. For example, sports bettors win or lose money based on their individual bets. Groupthink and conformity pressures are minimal and hence unable to influence how an individual votes. Random errors will cancel each other out in a large sample, but if people make similar errors (such as due to bias or common intuitive processes) then accuracy will be reduced (Simmons, Nelson, Galak, & Frederick, 2011).

The wisdom of crowds is also, clearly, the underlying principle behind the usefulness of democratic voting by secret ballot. Some evidence has confirmed the benefits of secret voting. Two investigations used random assignment to condition in order to engineer how inhabitants of 299 villages in Afghanistan and Indonesia made decisions on which projects they wanted to pursue as part of a program funded by international nongovernmental organizations. In half of the villages, elites or other representatives made the decisions, whereas in the other half, villagers voted via secret ballot to decide which projects would be pursued. The villages were generally unfamiliar with secret ballots, whereas decision by elites had the advantages of tradition and familiarity. Yet large, robust findings indicated that the secret ballot yielded better outcomes, including objectively superior choices, greater satisfaction, and more perceived benefits among the villagers even a year later (Beath, Christia, & Enikolopov, 2012; Olken, 2010).

Comparison of voting records of people who do versus do not believe that their votes are secret showed that these beliefs have effects (Gerber et al., 2013). Labor union members who doubted the secrecy of their votes were less likely to vote against the union’s preferred candidates than those who believed their votes were safely confidential.

### 2.2.7 Conclusion

The intelligence of groups has been much discussed and debated, and replicable examples of both collective wisdom and collective stupidity have been found. The positive outcomes reflecting intelligent, wise decisions, and good creative and problem-solving performance are generally associated with people acting as independent selves, whereas submersion of individual selves in the group produces the negative outcomes. Expecting to be evaluated individually (accountability) and performance of unique, independent roles in the group tend to produce the best results. Thus, again, groups benefit from the autonomous operation of individual selves.

### 2.3 Prosocial and Antisocial Behavior

Thus far we argued that group task performance and information management are both facilitated by differentiating selves, but the difference depends on implications of group moral
control of the individual. Lack of identification frees individuals to misbehave by sloughing off on effort tasks but frees them to think individually on information tasks. If public identification facilitates groups’ moral control (good for effort management, bad for information and judgment diversity), it should generally push toward more prosocial than antisocial choices. For example, anonymous donations to charity are vastly smaller than identified ones (Satow, 1975).

2.3.1. Commons Dilemma and other Social Dilemmas
The “tragedy of the commons” was invoked by Hardin (1968) to explain the destructive depletion of commonly held grazing areas. When individuals are responsible for their land and livestock, they maintain their herd and land so that the grass continues to grow back, thereby making the resource sustainable — but when the land is held in common, individuals grow their herd and let it consume freely until the resource is overused to the point that it fails to renew.

Many studies have shown that identification and accountability can improve outcomes in the commons dilemma and similar situations. For example, De Kwaadsteniet, van Dijk, Wit, De Cremer, and de Rooij (2007) manipulated accountability by telling people that other group members would know how much they took from a renewable common resource pool, and by telling them they would have to justify their actions later. Accountability improved the sustainability of the resource and thereby improved the entire group’s long-term outcomes. Several studies have shown that the larger the group, the less cooperation and restraint members show, presumably because large groups increase diffusion of responsibility (Messick & Brewer, 1983; Orbell & Dawes, 1981).

With resource-contribution games, selfishness prescribes not contributing whereas the group benefits if everyone contributes. Cabrera and Cabrera (2002) concluded from multiple studies that publicly recognizing people’s individual contributions increased the total contributed. One important aspect of the commons dilemma is the expectation that the resource will get depleted anyhow, and so if one does not take extra resources for the self, these will simply enrich someone else — instead of believing that exercising personal restraint will improve renewal and sustainability. In other social dilemmas, too, the belief that one’s own efforts or contributions can be replaced by others may contribute to making individuals behave selfishly.

There are at least two ways to break this destructive cycle of self-fulfilling expectancies of mutual failure. One is to enhance trust among members that they can count on each other to serve the greater good rather than narrow self-interest. De Cremer, Snyder, and Dewitte (2001) showed that people’s willingness to restrain themselves and help the group depended substantially on whether people could trust others to do likewise. Both steps in the model are relevant, because people may trust others to contribute because the group members share feelings of solidarity and commitment — or because members are accountable, and free riders can be found out and punished.

The other antidote to destructive expectations (i.e., that one’s lack of contribution will not matter because others will compensate) is to structure the situation so that each person’s contribution is indispensable in some way. This pertains to the second step in our model, which highlights the importance of differentiation. Multiple investigations have shown that making individual contributions indispensable can help solve social dilemmas (Kerr & Bruun, 1983; Lynn &
Oldenquist, 1986; Stroebe & Frey, 1982; Van de Kragt, Dawes, Orbell, Braver, & Wilson, 1986). Indispensability depends on differentiation, obviously: One’s role in the group is not unique insofar as one’s contribution can easily be replaced by other members.

Indeed, accountability improves prosocial behavior in social dilemmas. People contribute more to the group resource pool if there is a system for punishing free riders (Fehr & Gächter, 2002). But such systems are costly to maintain, because members must make sacrifices to enforce punishment. De Cremer and Van Dijk (2009) showed that people make more such contributions if they expect to have to justify their actions, as compared to no accountability.

As for trust, research in accounting has suggested that individualized record keeping can enhance it and thereby facilitate system gain. Basu et al. (2009) conducted an experiment with the economic trust game to show that in complex environments, allowing people to keep records of everyone’s prior actions increased trust and increased the total yield on investment, thereby enriching everyone. Recordkeeping enabled mutually beneficial exchanges to increase, whereas defection and exploitation were penalized, thereby improving the moral quality of the social group. The authors extrapolated from their findings to note that in human history, the advent of recordkeeping (which depends on individual identification and accountability) enabled substantial gains in trade, wealth, and morality.

Some findings indicate that people sometimes do things to benefit the group as a result of personally feeling identified with the group. These findings point to the first step in group formation (developing a common bond), thus the precursor to our emphasis on role differentiation. The more that members identify with the group, the more they contribute to public goods games (De Cremer & van Dijk, 2002; De Cremer, van Knippenberg, et al., 2008). Kramer and Brewer (1984) found that people sustained the resource longer in a commons dilemma game if their collective social identity was made salient (see also Goldstein, Cialdini, & Griskevicius, 2008; Tyler & Degoe, 1995).

Various other studies have also shown improved cooperation in commons dilemma and other social dilemma situations as a result of enhancing a sense of group identity (Brewer & Kramer, 1986; Dawes, Van de Kragt, & Orbell, 1988; Rapoport, Bornstein, & Erev, 1989). By way of explanation, Van Lange (1999) proposed that “group identity leads to feelings of we-ness and personal responsibility, which enhances self-restraint” (p. 20). De Cremer and van Vugt (1999) proposed that identifying strongly with the group increases cooperation in social dilemmas because people place extra high value on the group’s collective project and welfare. They found that increasing group identification improved cooperation mainly among the members who started out oriented toward self and personal gain. Thus, personally endorsing the group’s goals and welfare improved cooperation.

### 2.3.2. Aggression and Mob Violence

Riots, football hooliganism, violent protest demonstrations, gang battles, and similar phenomena epitomize some of the worst, most vicious and destructive tendencies of groups. In general, these are characterized by reducing individuality and submerging the self within the group. Le Bon (1895) argued early on that the “group mind” was predisposed to simplistic
thinking and violent action. Notions of the group mind led to a flurry of research on deindividuation, defined as a temporary reduction in self-awareness, personal responsibility, and evaluation apprehension, usually brought about by immersing the self in a group. Assorted findings linked the deindividuated state to aggressive, antisocial behavior (e.g., Beaman, Klentz, Diener, & Svanum, 1979; Diener, Fraser, Beaman, & Kelem, 1976; Mann, Newton, & Innes, 1982; Nadler et al., 1982; Rogers & Ketchen, 1979; Zimbardo, 1969). Submersion in the group and loss of differentiated identity has been linked to lynch mob violence and wartime atrocities (Mullen, 1986; Watson, 1973).

A meta-analysis by Postmes and Spears (1998) concluded that deindividuation was mainly a matter of submerging oneself in the group and thusly following situational norms, such that when the group engages in bad behavior like cheating or stealing, deindividuation increases those tendencies. The primary effect of deindividuation was to reduce accountability, especially in enabling people to take illicit selfish benefits (e.g., cheating, stealing). They also found that problem behaviors increased with group size. All these points are consistent with our analysis, including their conclusion that deindividuation effects are less a matter of inner states and more a matter of group or mob rule. Deindividuation thus submerges the self in the group, and one may go along with doing harmful, destructive things.

Converging evidence about the aggressive tendencies of group processes can be found in research on the interindividual intergroup discontinuity effect, as reviewed by Wildschut, Pinter, Vevea, Insko, and Schopler (2003). In laboratory studies with prisoner’s dilemma and similar games, groups generally are less cooperative than individuals, in the sense that groups will choose more exploitative moves and fewer cooperative ones than individuals. Behavior becomes more antisocial and less cooperative when people are not being held individually responsible for their actions. In a group setting, individuals can support selfish and aggressive group decisions without taking responsibility, and if challenged they can say that their own support for such actions was simply a reaction to others’ initiative. When people are identified, the nastiness of groups (relative to individuals) is mitigated (e.g., Schopler, Insko, Drigotas, & Wieselquist, 1995). Likewise, simulated anonymous jurors tended to make guilty judgments and recommend harsh punishments, but individually identified jurors were more lenient (Hazelwood & Brigham, 1998).

Mob violence, antisocial behavior, and the aggressive tendencies of groups (more so than individuals) are in large part due to the submerging of the self into the group. A lack of personal responsibility and awareness of ethical standards — hallmarks of the deindividuated state — emerge when groups do not hold individual selves accountable. Moral control of the individual is far improved when people’s selves come to the fore, in support of the second step of our model. In further support, one study involved in a group context in which some group members believed they might have to be personally accountable for their actions, whereas others were not given accountability information. Aggression toward toward helpless victims was reduced in the accountability condition (Prentice-Dunn & Rogers, 1982). Differential identification of individual selves — the literal opposite of deindividuation — is what enables group moral control.

2.4. Evidence for Two Complementary Steps
We began by proposing that many of the most successful groups make use of two steps. The first involved building a sense of shared social identity, thus emphasizing sameness and cohesion among members. The second step involved increasing differentiation of roles and individuality.

Evidence for both steps in our theory was provided by a survey of managers at a Dutch bank about their middle-management teams (Janssen & Huang, 2008). A strong sense of shared identity promoted good citizenship behavior, such as helping and caring about others, but was irrelevant to creative performance. In contrast, a strong belief in one’s distinctiveness (e.g., highlighting one’s unique skills) was linked to high creativity while irrelevant to citizenship. Thus, the first step of shared social identity promotes cohesion and helping, but the second step of differentiation contributes to group performance.

Perceptions of various groups were studied by Spencer-Rodgers, Hamilton, and Sherman (2007). Being stable, having well-defined boundaries, and having highly similar members were characteristics ascribed to groups based on social categories (e.g., Californians, Jews, elderly). In contrast, task groups (e.g., juries, committees, theatre troupes) were seen as much more differentiated, as well as more agentic and entitative. Thus, social perceptions affirm the importance of both steps. In particular, groups that have a job to do are seen as having higher levels of role differentiation, consistent with the view that differentiation facilitates performance.

Assorted evidence supports the value of shared group identity for promoting good citizenship, helping, harmony, and loyalty to the group (Kirkman & Shapiro, 2001; Moorman & Blakely, 1995; Penner, Dovidio, Piliavin, & Shroeder, 2005; Van Vugt & Hart, 2004; Zdaniuk & Levine, 2001). Various findings have also shown that identifying with the social group increases contributions in public goods and sharing resources situations (e.g., De Cremer et al., 2008; Tyler & Degoey, 1995). The first step of building shared identity is undeniably useful for the group. Nonetheless, the second step of differentiation provides substantial advantages over the long run.

One possible proxy for the first step would be group cohesion, which seemingly expresses the members’ embrace of the common group identity. A meta-analysis by Mullen and Copper (1994) noted that there has been considerable debate as to whether cohesion is linked to group performance at all. They concluded that the link is real but small. Moreover, the causal arrow points both ways, and the increase in cohesion following good performance is stronger than the (nonetheless still real) causal effect of cohesion on performance. The effect is also stronger in small than large groups. All these findings are congenial to our analysis, which emphasizes that shared identity can occasionally help performance but is not a major factor, so that the second step (differentiation) is more important. We also suggested that competition among groups led to forming ever larger groups, so although shared identity might have been sufficient with small groups, differentiation would become more important over time, as groups become larger. A small group such as a team relay may succeed by motivating members with shared identity even if there is no differentiation of roles, but the competitiveness of large organizations depends heavily on an effective system of differentiated roles and individual accountability.

Commons dilemma and other social dilemma patterns provide valuable evidence that both steps in group formation are important. They require the person to choose between immediately
selfish, antisocial actions and enlightened self-interest via prosocial cooperation. Restraint and cooperation only benefit the self, however, if others act the same, and so trust in the group is required. Findings show that identifying strongly with the group and embracing a shared social identity are helpful (step 1 of our theory) — as are individual identification and the associated effects of responsibility and accountability (step 2). These are not contradictory findings but rather complementary phenomena. The first step in group formation is embracing the shared social identity, which helps promote trust and willingness to cooperate. The second step is differentiation of selfhood, which enforces responsibility and motivates people to sustain the prosocial behavior that enables the entire group to benefit in the long run.

A conformity study that manipulated both steps was reported by Abrams, Wetherell, Cochrane, and Hogg (1990). They used an Asch conformity measure, in which confederates gave erroneous answers to a judgment task, and the measure was how much the true participants went along with those erroneous answers. The confederates were presented as belonging either to the participant’s ingroup or an outgroup, and the participant’s responses were either public or private and anonymous. In private, the group made no difference, but conformity was high when participants made public responses in front of the ingroup (and not in public responses to the outgroup). Thus, shared identity led to poor performance by increasing conformity, presumably motivated by desire for acceptance based on similarity. Anonymity allowed people to think for themselves, thereby creating the benefits of differentiation.

Leaders can either suppress different perspectives by telling everyone what to do and think — or can solicit inputs from all and strive to integrate them. These styles were compared in a laboratory study by Lorinkova, Pearsall, and Sims (2013). Groups with directive leaders came together faster and performed best in the early rounds, while the groups with leaders who heeded different inputs floundered. After the fifth round, however, the performance results shifted heavily in favor of groups with leaders who sought to include all different viewpoints. Thus, sameness based on cohesion as directed by a take-charge leader worked best at first, but in the long run capitalizing on differentiation produced best results.

A meta-analysis on the effects of work group diversity on innovation by Huelsheger, Anderson, and Salgado (2009) reported separate analyses for background diversity (gender, ethnicity, age) and job-related diversity (differences in specialized function, skills, training, expertise, etc). Background diversity is relevant to the first step, because it complicates the formation of shared identity (Mannix & Neale, 2005). Sure enough, this form of diversity failed to improve innovation and had if anything a negative effect. This supports the view that the first step benefits from common identity (but in general contributes only weakly if at all to performance). In contrast, diversity of skills and roles had a positive effect on innovation, producing better results for both the individual members and for the group as a whole.

We have reported multiple findings indicating that enthusiastic identification with the group can overcome selfish tendencies, thus strengthening the group (e.g., with social loafing). This too seems congenial to the argument that accountability becomes useful in the long run. Newly formed groups may often generate enthusiasm for the shared identity, so that all pitch in and work hard. At some point, however, some members may be tempted to pursue a selfish agenda, and so accountability is needed. Consistent with that view, Van Vugt and de Cremer (1999)
found that instrumental leaders who punished noncontributing members had more effective groups than leaders who focused on simply building harmony in the group, particularly when group identification was low. When members identified strongly with the group, the two types of leaders were equally effective. Apparently, then, moral control of individual selves is conducive to long-term success.

3. DISCUSSION

We began by noting the paradoxical contradiction between two traditions of research on groups: groups have been shown to be both better and worse than sets of separate individuals. Much of the difference can be explained on the basis of differentiation of selves. A broad and diverse set of evidence converged to indicate that groups function better when members have differentiated identities than when individuality is lost as people blend into the group.

We suggested that groups form in two heuristic steps. The more fundamental one involves the construction of a shared group identity, which when embraced by individuals motivates them to work on behalf of the group. The second step (our main focus) involves a vast increase in performance and efficiency. Its key is not sameness but difference, insofar as different members use different skills to perform different roles in an interlocking, interactive system.

Differentiation does not contradict but rather builds on the sense of shared identity, which continues to be helpful. Indeed, we reviewed multiple lines of evidence that strong personal identification with the group (strong social identity) can motivate high effort and good behavior — very much unlike loss of individuality into the group, which had largely negative effects. Shared social identity is beneficial, whereas sameness in thought and action was often less helpful for the group than differentiation. Put another way, differences among the group members are often crucial to the group’s success. Groups may flourish by recognizing and capitalizing on those differences. In a highly competitive environment, they may need to do so in order to survive. Even some findings that emphasize identification with the group as beneficial also showed the importance of individual identification, such as in procedural justice and accountability. Also, the historical and worldwide shift toward ever larger groups suggests that shared group identification will become less important (partly because big groups do not inspire such strong effects) whereas differentiation (e.g., specialization) will become increasingly important.

Over and over, we found that people contributed better as individually identified members and did worse when individual identity was downplayed or lost. In performance settings, people worked harder and did better insofar as they were individually identified, accountable, individually competing or otherwise evaluated, eligible for rewards contingent on individual performance, and the like. Social loafing occurred when people felt like indistinguishable members of the group, especially in the sense that their own efforts and contributions would not be known to other group members, as if no one knew or cared how much the member contributed. Knowing one’s work would be individually identified to the other group members was a powerful cure for social loafing and other detrimental processes.

Another antidote to social loafing was a feeling of being indispensable: People did well even under relative anonymity if they believed that their individual contribution to the group was unique and necessary for the group’s success. That signifies differentiation. If others could substitute for
oneself with no penalty to the self, then one loafed. In social dilemma situations, groups managed their resources best when people were individually identified, whereas anonymous and non-accountable systems tended to deplete resources and do poorly. When judgments had to be made, accountable members put in more thought and effort than others, also producing more output. Generally, keeping track of individual selves improved group performance in multiple ways. These furnish a basis for arguing that human selves evolved in order to facilitate successful performance by groups.

Turning to the informational functions of groups, we found evidence that groups benefit when members participate as separate, autonomous individuals. Pressures to conform to the group’s consensus often yielded detrimental results, whereas independent thinking and even overt dissent often helped the group reach more accurate judgments and make better choices. The superiority of secret ballots over other systems of group decision is one familiar sign of this: The shield of anonymity frees the individual from having to conform to the group’s (or leader’s) preferred views, thereby enabling the individual to think and choose autonomously. Other work has shown that anonymity and independent thought enable groups to be wiser even than experts. Conversely, pressures to conform to the group can bias judgments (especially toward the group’s favored views), can curtail information sharing, and may foster groupthink and its costly errors.

Moral behavior was also relevant. Morality generally encourages people to overcome selfish impulses and do what is best for the broader group (though this fact becomes complicated when groups engage in immoral activities). Higher moral principles and virtuous action were generally facilitated by individual identification and accountability. In such cases, anonymity enabled people to indulge their prejudices, overconsume precious resources, and claim a share of collectively available benefits while contributing little or nothing to meeting the costs.

Indeed, the benefits of individuation go beyond what we have reviewed. People are more helpful when individually identified than when submerged in the group, as in research on diffusion of responsibility (Darley & Latane, 1968; Latane & Nida, 1988). Conversely, they are more aggressive when submerged in the group, as in cases of mob violence, football hooliganism, wartime atrocities, and tendencies for groups to be more destructive and antagonistic than identified individuals. Individual identification of group members reduces these antisocial behaviors.

What matters is thus the relationship of the individual to the group, not the mere fact of anonymity or structure of the individual self. When individuals participate in the group as autonomous individuals who contribute to the group and are responsible to it, groups benefit. Systems bring gains but only if members play their distinctive, complementary roles. Individual selfishness is often an obstacle to effective group functioning, and so the group either finds ways to restrain selfishness (e.g., with moral punishment) or to harness selfishness to the group goals. Indeed, the tortuous history of deindividuation research led to the conclusion that it is not an individual state of mind but a group phenomenon, involving submerging individual identity into the group (Postmes & Spears, 1998). It is not the self acting on its own to exploit the group but rather the self participating in the group as a differentiated yet cooperative member that yields the best results.

Many of these findings reflect the individual’s desire for social approval and acceptance — and
hence the group’s ability to exert moral control over individual members by putting pressure for proper behavior. Publicly identified persons work hard in the expectation of being favorably evaluated by group members. Unfortunately, however, those same desires and pressures can undermine independent thought and therefore degrade the quality of group information processing, yielding poor judgments, bias, and bad decisions. As we proposed in the introduction, information processing is best served by having each individual think and conclude as an autonomous, independent self and then contribute as such to the group discussion. Even arguing different sides of an issue is often valuable. We cited evidence that groups benefit from dissent, even in cases in which no member initially supports the best decision — because arguing helps all relevant facts to be aired, so that the group can come round to the best answer.

The group uses individually identified, differentiated selves as a tool for controlling behavior. The group works best if it makes many individual members do what they are supposed to do. It accomplishes this in part with rewards and punishments, but those depend on accountability and selfhood. With appropriate rewards and punishments, the group can increase effort and improve the moral quality of behavior. But it can also suppress independent thought, thereby degrading the informational quality of the group’s knowledge base and decision processes.

To be sure, not all manifestations of differentiation are beneficial. Narcissism, in particular, may produce ill effects insofar as people overvalue themselves and feel entitled to exploit others (e.g., Twenge & Campbell, 2003). There also are cases in which anxiety over evaluation can inhibit participation in group and reduce overall performance (e.g., Camacho & Paulus, 1995). And excessive diversity in groups, especially diversity of ethnicity or background, can hamper communication, reduce cohesiveness, and otherwise impair performance (Mannix & Neale, 2005). It is possible to regard such instances as too much of a good thing or as irrelevant to the basic point that groups mostly benefit from differentiated selves. Due to space constraints, this manuscript sought to make the case for the view that differentiation of identity is useful, rather than to survey all findings, and so we have not dealt with every possible counterexample. We think that even if differentiation is not invariably helpful to groups, it is helpful far more often than not, which is sufficient for our argument that one basic function of the human self is to facilitate group processes.

3.1. Implications for Self Theory
The view that groups benefit from differentiated selves offers a possible basis for theory about the functional origins of human selfhood. If our view is correct, human selfhood emerged not out of some peculiar inner dynamic such as motivational or brain processes (though those presumably mediated the emergence of human selfhood) but as a vital adaptation to capitalize on the immense potential advantages of group life and group action. Indeed, some analyses have concluded that the very survival of the species depended on the development of advanced social systems (i.e., with division of labor and economic trade) based on differentiated selves (Horan, Bulte, & Shogren, 2005). With their large bodies and brains, individual Neanderthals would have competed effectively against individual humans — but Neanderthals were unable to match the human gift for developing social systems. Collectively they were unable to compete with modern humans’ Cro-Magnon ancestors, and they lost out and became extinct.

One perennial puzzle in self theory is why human selfhood is so much more advanced and
complex than what has been observed in any other species. Our findings suggest that a major part of the answer lies in the usefulness of differentiated selves for human groups — especially large ones. Larger groups permit more complex and thus more differentiated systems than small ones, so role identities can be more specialized. (Hence many selves are labeled with names that refer to occupational roles; e.g., Shoemaker, Smith, Baumeister, Tailor). Even shared aspects of identity may gain complexity as groups expand. As Moffett (2013) explained, humans and a few insects are the only species that have cooperative groups larger than about 150 members with strict boundaries. (Large grazing herds have casual boundaries, such that animals can move from one herd to another without much ado.) The insects accomplish this without highly differentiated selves: An ant can apparently not recognize a particular other ant, though it can distinguish between an ant from its own versus a rival colony. Humans, however, build their large groups with differentiated individual identities, which permit much more complex systems to emerge.

We assume that groups using complex social systems had competitive advantages over groups lacking such systems. Systems are made up of roles, and so it was adaptive for human selves to become able to perform these roles. Insofar as the human self evolved to facilitate cultural groups, it had to acquire the capability to operate in such systems. In other words, human selfhood has to furnish players for the differentiated roles that populate such systems.

Recent efforts to understand the essential nature of human selfhood have struggled to locate it, despite mountains of data about various concepts and processes of the self. The lack of any specific brain seat for the self has led some to speculate that the self is an illusion or fiction (Metzinger, 2009), a view echoed on other conceptual grounds by some social psychologists (Swann & Burhmester, 2012), who define it as a functional fiction. Self-concepts do indeed often contain liberal doses of fiction, but the flexible capacity to perform real roles in complex real groups may be a vital basis for genuine selfhood.

Thus, our review offers another way to ground self theory. Complex social systems depend on differentiated identities and in fact benefit most from a high level of differentiation. The human brain may not be organized with a central, controlling “self” in it, but it learns to operate a self within the social system. The present evidence indicates that human groups derive advantages from having differentiated selves. One may therefore speculate that human minds evolved the capacity to capitalize on those advantages. Individuals would have benefited by joining groups composed of members with differentiated selves because these would likely have outperformed less differentiated groups. Survival and reproduction could thus have benefited from developing the capacity to participate in groups with differentiated selves. In this view, the self is not fiction — it is a reality, albeit a social one, that an individual physical body learns, acquires, and becomes.

Our findings also suggest which aspects of selfhood are most conducive to effective group functioning. Agentic control of effort, autonomous thought and judgment, and moral responsibility were all repeatedly found to benefit group outcomes. If the human self did partly evolve to facilitate human group processes, those three aspects would likely have been central.

3.2. Implications for Group Theory
Our analysis offers one resolution to the seeming contradiction in the literature on groups. Two distinguished traditions of empirical research have documented at length how groups are
sometimes much more and better than the sums of their individual members — but are other times much less and worse. Differentiated selfhood provides one vital conceptual key to account for what enables the positive outcomes, and its absence (submerging individuality in the group) helps explain many negative ones.

We reiterate that differentiated selfhood is not the opposite of identification with the group. Shared group identity promotes cohesion and various prosocial behaviors. The benefits of role differentiation may often combine with the enthusiastic embrace of shared identity for best results, as in a sports team with strong team spirit plus highly differentiated task roles. Identifying with the group can in principle be based on a highly personal, individual decision or could be a matter of losing identity into the group (e.g., Swann et al., 2013). Our findings also broadly fit the heuristic division of the group formation process into two steps, in which the first builds a shared identity and the second differentiates roles. Shared identity may be quite helpful, especially at first, but in the long run and perhaps in larger, more impersonal groups, differentiation becomes vital for effective group functioning.

3.3. Conclusion
Sometimes groups are much more than the sum of their parts, sometimes much less. Individually identified separate selfhood is one key difference. Most of the bad effects of groups (e.g., social loafing, collective resource depletion) come when the individual self is lost or forgotten as identity is submerged in the group. When group members blend together, responsibility is lost, enabling extreme and antisocial behaviors. Then the group is less or worse than the sum of its individuals. In contrast, when members are accountable and responsible, and they fill different roles in interacting systems (family, the local economy, division of labor and specialized expertise), then the system gain can make the group more than the sum of its parts.

The very definition of group invokes some sameness: The members all belong to the same group and presumably share some goals, values, and identity. In practice, moreover, many groups push for sameness on many dimensions. In order to thrive, however, groups may need to go beyond the sameness of their members and capitalize on differences. Shared social identity is useful, but lack of individual identification can be costly. Differentiated selves and accountable individuality provide keys to the immense success of human groups.
Groups Need Selves

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http://www.jstor.org/stable/1724745


Groups Need Selves

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Paul Bloom, Editor, BBS
Yale University

Ref.: Ms. No. BBS-D-14-00289
Are Groups More or Less than the Sum of their Members? The Moderating Role of Individual Identification
Behavioral and Brain Sciences

Dear Paul,

Herewith we resubmit our manuscript as noted above. We are grateful for the positive feedback and for the many helpful suggestions toward improving the paper.

We conducted the revision thinking we had to keep to the 12,000 word limit, so we were quite careful and focused our efforts on the most important points. When you replied to my email and said it was permissible to get a bit longer in the revision, we went back and addressed some of the minor points too. This is only slightly over the basic limit.

Below we attach a copy of your decision letter and the reviews. Our responses to each point in the reviews are described in that document.

Thanks again, and we hope you find this revision much improved.

Yours,

Roy F. Baumeister
Dear Roy,

I now have four expert reviews of your paper, co-authored with Sarah Ainsworth and Kathleen Vohs, and have carefully read it myself.

The reviews are appended to the end of this letter. As you will see, there is no consensus among the reviewers. Two of them are very positive, with only minor comments; one is quite negative, and a fourth is positive but has some substantial suggestions for how to improve the manuscript.

Although I am sympathetic to the concerns raised by the reviewers, my own overall assessment of your submission is favorable -- in many regards this is a perfect paper for BBS: engaging, theoretically rich, controversial, and on a fascinating topic. And so I would like to invite you to revise the manuscript. Any successful revision will have to address the concerns raised by the reviewers, which include, among other things, suggestions about other research that should be discussed, and concerns about the organization of your paper (which really does need quite a bit of rethinking).

If you decide to revise the work, please submit a list of changes or a rebuttal against each point which is being raised when you submit the revised manuscript.

Your revision is due by January 23, 2015

To submit a revision, go to http://bbs.edmgr.com/ and log in as an Author. You will see a menu item call Submission Needing Revision. You will find your submission record there.

Of course, let me know if you have any questions or concerns.

all best,

Paul Bloom
Editor
Behavioral and Brain Sciences

Reviewers' comments:

Reviewer #1:
This is a fine article. It meets all key criteria for BBS. The article (1) proposes an
innovative heuristic framework that promises to reconcile a large and divergent body of evidence, (2) offers a compelling and masterful review of the literature that pays homage to the framework by reconciling this literature, (3) cuts across disciplines, and (4) is generative.

I left out one additional key criterion of a BBS article: its openness to peer commentary. This article is as inviting of commentary as any. For starters, it does not (and cannot) review the literature comprehensively, and so an expert might be able to present a study or a set of studies as an exception to their framework (as the authors point out). Also, the article does not (and cannot) cover all medium-level theories that are relevant to the model. As an example, the fusion hypothesis (Swann & colleagues) and the tripartite model (Sedikides & colleagues) would offer accounts (discrepant? complementary?) of the "individual identification" idea. Relatedly, the article (and its authors) are commendably open to perspectives that might be seen (but I believe are not) as antagonistic. For example, if researchers from a social identity theory or self-categorization theory tradition wish to engage in turf protection, they will have the opportunity to do so.

RESPONSE: Thanks! We hope to get commentaries by the authors mentioned here (Swann; Sedikides; and social identity advocates).

I had a few substantive issues to raise. Perhaps the issues are more suited as commentaries, and perhaps there is no room to address them in the main article, but I will briefly raise them anyway.
1. The authors argue that the first step in their framework emphasizes share common identity in which the individual (or the individual self) is subsumed by the group. It may be so. But where do group goals come from if not from the individual? Isn't the individual self crucially implicated in group formation and the formation (naturally or artificially) of a group identity?

RESPONSE: This is a basic point and we needed at least a caveat to address this. We added a paragraph at the start of the Theory section (1) to acknowledge that speaking of group goals apart from individual goals is a figure of speech to capture the factual phenomena that groups can confer benefits to individuals only if individuals contribute, which goes against short-term selfish individual motivations.

2. The evolutionary argument is interesting and plausible, but it would also need to account for developmental processes. Why does the individual self emerge at the age of 2?

RESPONSE: This is a deep question but would take another paper. Plus there is the slight problem that none of us knows even how to make a comprehensive answer to that. A priori, given that the self is valuable but complex, it would make sense for it to emerge as early as possible — but it might take time for the nascent brain to figure out what the social system is like and how to participate in it. Actually it is probably way too simple to suggest that the self emerges at 2. One-year-olds know their name, gender,
family, and so forth, so some parts are there earlier. Meanwhile, the agentic self may not be fully ripe till much later, which is why legal systems generally withhold full legal rights and responsibilities for the first couple decades of life.

3. The authors could elaborate a bit (space permitting) on research findings consistent with their framework. For example, members abandon their groups, and groups change or dissolve, when groups (e.g., political parties) cease to serve member interests.

**RESPONSE:** Thank you! We have elaborated some additional findings consistent with our framework, as indicated throughout this document. However, we did not tackle issues of when members leave groups, or groups change, according to changes in how groups serve members. We did add the acknowledgement (see point 1 above) that groups essentially serve member interests and thus in an important sense do not have goals that are not also held by members. Reviewing the literatures on group dissolution and membership turnover would however require new sections. It was nice of the reviewer to give us the "space permitting" opt-out, as space is the constraint on this. This too might be something that commentaries could elaborate.

Reviewer #2: This is an excellent paper that I support for publication. I know that the authors noted that their review can't be comprehensive, but I did think of three papers that should really be included in some form or another. Each aligns with the authors' view, but adds a different dimension of support. First, Marilyn Brewer's work on optimal distinctiveness is highly relevant, as it focuses on the tension between group and individual identities:


**RESPONSE:** Thank you! We had actually included a long salute to Brewer's optimal distinctiveness theory in our original version, but a reviewer told us that we had misunderstood her theory and it was quite irrelevant to what we were arguing. Since then we have noticed various other sources interpret her work the way we had, and so we appreciate the opportunity to restore it. We condensed our treatment for space reasons, but those ideas were an important forerunner and deserve to be acknowledged, alongside the one crucial difference from our theory. (Specifically, she spoke of competing desires for belonging and separating, with differentiation serving the latter; whereas to us, being different is a strategy for the former, because unique skills increase one's appeal to the group.)

Second, Amy Edmondson's work on psychological safety offers another example of how empowered individuals lead to better group function:


**RESPONSE:** This is a very thought-provoking article, but it was mainly concerned with issues of safety (as in feeling safe so as to take risks), and we did not see any easy way
to connect it with our argument. Perhaps I am just having a spell of being dense (it would not be the first). If you do accept our paper, it might be good to have this reviewer or Dr. Edmondson contribute a commentary that could elaborate this point.

And finally, some recent research goes beyond the Surowiecki book to offer better and more insightful data on when and why crowds are wise:

**RESPONSE:** Thank you, this was a great paper! We revised our coverage of sports betting on this basis, as well as adding the key points they delineated as contributing to the wisdom of crowds effect. (See “Wise groups,” section 2.2.6.)

Reviewer #3: BBS-D-14-00289 "Groups need Selves"

This paper presents a putatively novel framework for understanding when and why groups perform better or worse than the sum of its members. It argues that differentiation of selves is a crucial moderator, and heuristically decomposes group work as, first, emphasizing common identity and promotion of emotional bonds and, second, role differentiation and individual responsibility. The authors selectively review empirical evidence that appears to support their two-step framework.

In various places concepts are not fully developed, more recent (> 2000) literatures on group performance and decision making are largely ignored, and the two-step framework is obviously too simple. For starters, it is interesting to see that no reference is given to the classic Forming-Storming-Norming-Performing-Adjourning framework of group formation and performance, which provides a theoretical backbone to the current thinking.

**RESPONSE:** Thanks for bringing this up! We have added a reference to this work. It does help make the sequence of steps argument stronger and better rooted in literature.

  Relatedly, there is important work on optimal distinctiveness theory by Marilynn Brewer, which raises quite similar points as those made here.

**RESPONSE:** As noted above, we have reinstated our mention of Brewer’s theory, including the important similarities and one crucial difference.

Finally, a theory on group work - especially one that seeks to understand when and why groups outperform their members or not - would benefit from a careful analysis of group task structure (e.g., the classic work by Steiner on additive, conjunctive and disjunctive tasks; but also the work on task interdependence by Hackman, Wageman and others,
distinguishing between pooled, sequential, simultaneous interdependence of work). In short, there is an extensive literature on group work addressing the very same questions as those pursued here, and to quite some extent these literatures advanced beyond the heuristic framework offered here. The theoretical advance made here needs to be honed.

RESPONSE: Yes, we discussed that work among ourselves but eventually decided it was not essential to our argument. It would take quite a bit of extra space to include this, and mindful of the word count, we think it won’t fit. This might be something that a commentator could elaborate. It doesn’t present a problem to our analysis, just elaborates the complexity of the theory in some places. The key point is that for some tasks, systematic interaction is not needed. Sequential or simultaneous does not matter, however: both an assembly line (sequential) and a football team (simultaneous) require cooperative, systematically organized interactions, and success depends on each person doing his or her unique part.

The structure of the paper is not ideal. Many sections are numbered consecutively yet can be better organized as sub-sections (e.g., section 11 is overarching, section 12 is sub-level, section 13 - 15 appear to be sub-sub sections).

RESPONSE: Yes, sorry! We belatedly realized that we had numbered the headers wrong. We trust this version has been numbered more competently.

Specific Comments.

1. p. 8 first para. System gain, elsewhere referred to as group efficiency, not only depends on a system that fosters performing complementary roles. Such depends, first and foremost, also on the task structure (per Steiner, 1972). P. 8 second para. It seems that the paper now is about a system, not about groups or group performance in general. The definitions given here suggest systems are a special form of task groups. Some elaboration here would be useful.

RESPONSE: Again (see comments on other review), this just means that system gain is greater with some kinds of tasks than others. It seems excessive to say that type of task is the "first and foremost" cause. The argument that people evolved selves so as to participate in complex group performances can be valid even if people still do some things alone, or in groups in which there is no system gain.

2. p. 8/9 The authors propose that identification/fitting in precedes differentiation/standing out, in that sequence. This seems unnecessary - one may identify precisely because it allows one to differentiate, as much as one may identify because it allows one to "disappear" in the group. Also, if sequences exist, these are most likely recursive and non-linear.
**RESPONSE:** Good point! We have revised how we express these things. The exception that the reviewer suggests is intriguing, though we know of no data. Nonetheless, we would hate to give the impression that the steps have a rigid, invariable sequence. This discussion of sequential steps should already be improved now that we have alluded to the "Storming /Norming etc" framework the reviewer suggested above. We made various small changes throughout the paper to tone down the insistence on a rigid sequence.

3. p. 9. There is a well-developed literature on team composition and diversity, suggesting that some types of diversity (expertise, information, skills) helps whereas other types of diversity (ethnicity, age) are less conducive to group performance. The paper seems to be limited to the former (p. 9, second para: "being different may become an important strategy in service of belonging: A group cannot afford to lose a member who performs a unique function for the group"). But here again, the issue is whether the group task benefits from unique skills, information, expertise et cetera. In an additive structure, for example, this is not an issue of much concern.

**RESPONSE:** Unique skills are not important in an additive structure, but differentiated selves are useful for moral responsibility, including ensuring that members contribute effort, time, and/or other resources to the group effort.

4. Large Groups. The authors discuss theory and evidence that does not pertain to groups, but to large masses of people (as soldiers in combat). There is interesting work on the "social brain hypothesis" by Dunbar and others. There is a large literature in social psychology about what is a group. Many larger social systems can be decomposed in smaller groups - the question is what the current analysis pertains to - an army, a regiment, a combat unit?

**RESPONSE:** We have included a special subsection in the theory section to discuss the particular issues with large groups. In social psychology studies, groups tend to be small, even dyads or triads. But a corporation is also an important form of group. As the Moffett work indicates, there are particular challenges that accompany working toward common goals with people you may not know or recognize (as in a large corporation).

6. Commons Dilemma. The evidence cited here, and other evidence, strongly suggests that for cooperation in social dilemmas, people need to identify with the group and they need to understand their contribution matters. Nowhere in these studies has it been shown that identification comes first; it seems both factors help, but why is there a sequence necessary? Perhaps earlier in the paper, this idea needs to be much better explained.

**RESPONSE:** We have reduced our assertions that the steps have an invariate sequence.

8. Social Loafing. This can be integrated in the section on social dilemmas, as both are
about free-riding and what can be done about it (e.g., increasing identification). Also, there is a larger literature on (altruistic, third party) punishment in social dilemmas, mainly in sociology (Yamagishi) and economics (Fehr & Gachter) that reveals much about why such punishment works.

**RESPONSE:** The reviewer is right that these have some similarities. But we retained the distinctions as currently observed in the field. Still, note that the evidence section was extensively reorganized.

11. Thinking in groups. The authors could consult integrative frameworks by Hinsz et al. (Psych Bull 1997) and DeDreu et al (Pers Soc Psych Rev 2008). Especially the latter framework is relevant to the current review on the role of accountability (and when and why it provides "system gain") in information task, brainstorming, et cetera.

**RESPONSE:** Thank you, these were helpful. Both of them invoked the Brewer formulation in which being different was linked to wanting to separate from the group, confirming the view that this has been the standard assumption — which our central thesis disputes. Apart from that, both papers were excellent and we have cited them at several points.

18. Conformity. There is (abundant) work on conformity, and minority dissent, published after 1955 (the most recent reference in this paper), and this section really needs to be developed. For example, there is some highly relevant work on newcomers, socialization, and their impact on innovation in teams.

**RESPONSE:** Conformity was not a big part of the review, and so we did not want to expand our coverage by very much, given its relatively minor importance. Possibly someone would like to develop these issues in a commentary. We do cover some work on newcomers to teams and how different forms of socialization into the group have different effects, though this is not covered under conformity (see section 2.1.3). Nonetheless, we have added some references regarding minority dissent and minority influence (see below). We also added a reference to a very recent (2014) paper showing that individual resistance to conformity pressures can improve the group’s accuracy.

**Reviewer #4:** The broad question whether groups are more or less than the sum of their members has indeed been long debated - and is an important topic. In this paper, the authors make a case for the importance of "differentiation of selves" for high group functioning, i.e. group members behaving as autonomous and independent individuals. Doing so, the authors offer a theoretical model that integrates seemingly contradictory research findings on group performance. It offers - as suited for readers of Behavioural and Brain Sciences - a "big picture" perspective, integrates different research traditions and definitively provides not only food for thought, but also the possibility for commentary from different perspectives. I find the authors general idea of differentiation
of selves as crucial moderator in group functioning compelling, and I also think that research of the self can benefit from a more "social perspective" and research on groups from considering the proposed moderator.

I have two concerns. The first is related to the proposed sequentiality of steps 1 and 2 and the second to the structure of the paper.

1) Sequentially of steps 1 and 2:
The authors advocate two steps that advance group functioning. In the first step, cohesiveness is of high priority for the group and, therefore, a shared social identity beneficial for group functioning. In the second step, differentiation of selves increases functioning. I welcome the authors' attempt to integrate the seemingly contradictory findings they report (some revealing the importance of cohesiveness for group performance, others the importance of differentiation), and I think proposing two steps to do so makes sense. However, I am less convinced by the suggested sequentiality of the two steps. The authors argue that although both steps can "occur at any point, we think there should generally be a sequence" (p. 8). Step 2 following step 1 in the process of group formation makes sense intuitively and the theoretical rational given by the authors is convincing (p. 7-9). However, I do not find the empirical evidence the authors discuss for this sequence strong or convincing (throughout the whole "Review of Evidence" section, but particularly on p. 33-37). To make a clear empirical case for such a sequence, one would need studies that, ideally, compare groups in their different life cycles and find that cohesion and differentiation are beneficial at different points in the cycle. Or, at least, we would a discussion of differences in findings from lab vs. field research, comparing ad hoc-groups to longer established work-groups. However, the authors report mainly findings from group studies using ad-hoc groups in the lab, where no conclusions about sequentiality can be made. One (but, as far as I can see, the only) exception is the Lorinkova et al. (2013) study described on p. 36. Here, some empirical evidence for this proposed sequence is given. In my view, proposing this sequence but not giving convincing evidence for it unnecessarily undermines the quality of the paper. I can see three ways to deal with this problem: the authors could (a) report more empirical evidence for this sequence, (b) allow more clearly for the possibility of both steps being not sequential but alternating or parallel, their expression also depending on different aspects than group life cycle, and/or (c) relate their arguments more strongly to work on group formation (touched upon on p. 45).

RESPONSE: Fair enough. We agree that the evidence does not support strong assertions about a rigid or invariate sequence of the two steps. We have revised those assertions. Essentially we have followed the reviewer’s (b) suggestion. It does seem that some groups could perform well, at least for a while, with the first step (strong group identity) without much of the second step (role differentiation). Role differentiation without group identity would presumably be rarer, as there would not even really be a group. But in the long run, and especially as groups become larger and larger, the group identification step becomes less compelling, whereas differentiation becomes more important.
2) Structure of the paper:
In my view the paper is not very well-structured, and in strong need of greater clarity. (Something is wrong with regards to consecutive numbering of headlines, but this is not what I am talking about here.) The structure of the third part of the paper (p. 37-46), the discussion, is clear: Headline "discussion", followed by the sub-headlines "implications for self theory", "implications for group theory", and "conclusion". Consequently, the presentation of arguments in the discussion is easy to follow. This is very different for the second part, "review of evidence" (p. 13-37). It starts out with the description of a group task or situation ("commons dilemma and other social dilemmas"), moves on to two phenomena in group interaction ("social facilitation", "social loafing"), then presents two aspects which we might classify as strategies that can be employed ("division of labor", "accountability" - with accountability being highly relevant for "thinking in groups", which is to follow later, though), and then moves from to the over-category of "thinking in groups". Within the "thinking in groups" headline, we first have two tasks ("pooling information", "brainstorming"), then a collection of phenomena ("groupthink", "loafing, diffusion, evaluation" - with loafing being redundant to the above headline "social loafing", "wise groups"). After the "conclusion" for "thinking in groups", there is "conformity" as another phenomenon on the same level of organisation as "thinking in groups" and, finally, the "evidence for two complimentary steps" as a separate headline, even though the two separate steps have been discussed throughout all previous sections of the paper. This structure is not only confusing, but also leads to information being repeated and/or being reported separately where a coherent discussion would be helpful (e.g., social loafing and social facilitation on p. 17-21 and p. 29-30 or accountability on p.24-26 and p.28). Wouldn't it make sense to clearly structure the paper with regards to phenomena (e.g. social facilitation, social loafing etc.) that happen in different tasks (e.g. commons dilemma, decision making groups) and discuss which strategies (e.g. accountability) influence the group's functioning and how this is related to differentiation? Another possibility would be to structure with regards to the two types of tasks that the authors introduce on p. 9: product achievement and information use. (In general, the two theoretical parts of the paper seem far stronger than the review of evidence to me. But this may well be a problem of the structure.)

Also, in the first part of the paper, "theory" (p. 6-12), after the (very clear) presentation of the "two complementary steps", it appears somewhat random that (after "forestalling potential misunderstandings"), "large groups" are discussed. To me, it is unclear why "large groups" is a separate section to "two complementary steps" as both sections' purpose seems to be to emphasise that differentiation is important, also because humans form large groups.

I think the paper could benefit tremendously from not only more informative headlines, but also from being re-structured so redundancies to be removed and readers can follow more easily.

RESPONSE: Thanks for these suggestions. Reviewers 3 and 4 and the editor all called for reorganization, and not just regarding the numbering (which we have fixed, we hope,
as it was also off). We considered your suggestions and discussed the matter at some length among ourselves. The “Review of Evidence” section has been completely restructured. The overarching headings now correspond to the theoretically important thrusts of the paper: first group performance, then the informational processes, which are the two main categories (and which use differentiation in different ways, as noted in the theory: anonymity shields the person from group control, freeing the individual to slack off [bad] but also to think independently [good]). Then come two other issues for the theory, a section on prosocial/antisocial behavior (which extends the group control argument) and a section on the two complementary steps (which extends that aspect of the theory). This should be much more logical and easier for readers to follow than the previous one.

Within those overarching sections, we kept the headings referring to phenomena studied by groups researchers. We did have to move a bunch of stuff around. The previous sequence was based on a logical unfolding, so one could refer back to material covered earlier. (Though that was perhaps what reviewer 4 disliked.) Nonetheless, readers will probably expect some explicit reference to the standard terminology in these lines of research. Subsuming these categories under the conceptual ones seems to us a good way to resolve the illogical organization problems from the previous draft while retaining some of the benefits of that section.

3) Some further comments:
"Pooling information for group discussion": The authors refer to Lu et al.’s (2012) meta-analysis on hidden profiles (p.27). The effects that larger groups show a larger bias towards shared information has been explicitly linked to social loafing (not only to "presumably the greater submerging of the individual self in the group"), which fits the authors' argument. Another aspect that might be of interest in this regard: it has been shown in information pooling research that a need to be understood (which can be seen as related to step 1 of the authors’ model, emphasising the need for cohesion and belonging) motivates biased information exchange in ad-hoc dyads (Faulmüller, Mojzisch, Kerschreiter, & Schulz-Hardt, 2012; PSPB). These results can be seen as evidence how a human motive related to step 1 potentially can harm group functioning.

RESPONSE: The Faulmüller paper was quite thought-provoking, but its advocacy of the motive to be understood really brings in a different set of issues. We did not find a way to incorporate this without adding a fair amount of additional discussion, so we did not include it. It’s a tangential point.

"Brainstorming": The sentence "Quite possibly, the lower output in the group setting reflects social loafing or some other reduction of effort that attends loss of individual evaluation" (p. 28) is somewhat misleading, as individual evaluation has been discussed as harmful for performance in brainstorming groups (touched upon on p. 42). Hence, it might be better than about "some other reduction?" to directly speak about the dispensability effect (Kerr & Bruun, 1983; JPSP).

RESPONSE: This was a small point but we did revise the sentence to invoke
dispensability. Social loafing has been invoked as one cause of brainstorming deficits, so we retained that, but dispensability could be potent as well.

In the section on "conformity" (p. 18-19), even though the general argument is there, the argument could be made even stronger by explicitly mentioning the term "minority influence" as an illustrative case where individuals who differentiate themselves from a cohesive group can help bringing about innovation and higher group performance.

**RESPONSE:** Thank you, this was a great addition. This really fits well with the case we have sought to make, especially the finding that minority influence works by stimulating more careful processing by the majority, so it can benefit the decision even if the minority’s viewpoint is flawed. We have cited this work at several points.

"Wise groups" (p. 30): Again, I think in this section the authors might even make an a little bit stronger point by including further empirical evidence. Research from a more mathematical / modelling perspective shows that even though groups can make accurate judgements compared to individuals by simply using means or medians, this is true only for some tasks and also such estimations show strong biases. When individuals differentiate themselves from the masses, e.g. by being particularly confident, this improves judgement quality (see, for example, De Polavieja & Madirolas, 2014).

**RESPONSE:** Thanks for this too! We actually incorporated this into the “conformity” section rather than the “wise groups” section, but the point is the same. This also helped add some new references to the conformity section, which Reviewer 3 complained about.
Reviewers' comments:

Reviewer #1:
This is a fine article. It meets all key criteria for BBS. The article (1) proposes an innovative heuristic framework that promises to reconcile a large and divergent body of evidence, (2) offers a compelling and masterful review of the literature that pays homage to the framework by reconciling this literature, (3) cuts across disciplines,; and (4) is generative.

I left out one additional key criterion of a BBS article: its openness to peer commentary. This article is as inviting of commentary as any. For starters, it does not (and cannot) review the literature comprehensively, and so an expert might be able to present a study or a set of studies as an exception to their framework (as the authors point out). Also, the article does not (and cannot) cover all medium-level theories that are relevant to the model. As an example, the fusion hypothesis (Swann & colleagues) and the tripartite model (Sedikides & colleagues) would offer accounts (discrepant? complementary?) of the "individual identification" idea. Relatively, the article (and its authors) are commendably open to perspectives that might be seen (but I believe are not) as antagonistic. For example, if researchers from a social identity theory or self-categorization theory tradition wish to engage in turf protection, they will have the opportunity to do so.

RESPONSE: Thanks! We hope to get commentaries by the authors mentioned here (Swann; Sedikides; and social identity advocates).

I had a few substantive issues to raise. Perhaps the issues are more suited as commentaries, and perhaps there is no room to address them in the main article, but I will briefly raise them anyway.
1. The authors argue that the first step in their framework emphasizes share common identity in which the individual (or the individual self) is subsumed by the group. It may be so. But where do group goals come from if not from the individual? Isn't the individual self crucially implicated in group formation and the formation (naturally or artificially) of a group identity?

RESPONSE: This is a basic point and we needed at least a caveat to address this. We added a paragraph at the start of the Theory section (1) to acknowledge that speaking of group goals apart from individual goals is a figure of speech to capture the factual phenomena that groups can confer benefits to individuals only if individuals contribute, which goes against short-term selfish individual motivations.

2. The evolutionary argument is interesting and plausible, but it would also need to account for developmental processes. Why does the individual self emerge at the age of 2?

RESPONSE: This is a deep question but would take another paper. Plus there is the
slight problem that none of us knows even how to make a comprehensive answer to that. A priori, given that the self is valuable but complex, it would make sense for it to emerge as early as possible — but it might take time for the nascent brain to figure out what the social system is like and how to participate in it. Actually it is probably way too simple to suggest that the self emerges at 2. One-year-olds know their name, gender, family, and so forth, so some parts are there earlier. Meanwhile, the agentic self may not be fully ripe till much later, which is why legal systems generally withhold full legal rights and responsibilities for the first couple decades of life.

3. The authors could elaborate a bit (space permitting) on research findings consistent with their framework. For example, members abandon their groups, and groups change or dissolve, when groups (e.g., political parties) cease to serve member interests.

**RESPONSE:** Thank you! We have elaborated some additional findings consistent with our framework, as indicated throughout this document. However, we did not tackle issues of when members leave groups, or groups change, according to changes in how groups serve members. We did add the acknowledgement (see point 1 above) that groups essentially serve member interests and thus in an important sense do not have goals that are not also held by members. Reviewing the literatures on group dissolution and membership turnover would however require new sections. It was nice of the reviewer to give us the “space permitting” opt-out, as space is the constraint on this. This too might be something that commentaries could elaborate.

Reviewer #2: This is an excellent paper that I support for publication. I know that the authors noted that their review can't be comprehensive, but I did think of three papers that should really be included in some form or another. Each aligns with the authors' view, but adds a different dimension of support.

First, Marilynn Brewer's work on optimal distinctiveness is highly relevant, as it focuses on the tension between group and individual identities:


**RESPONSE:** Thank you! We had actually included a long salute to Brewer's optimal distinctiveness theory in our original version, but a reviewer told us that we had misunderstood her theory and it was quite irrelevant to what we were arguing. Since then we have noticed various other sources interpret her work the way we had, and so we appreciate the opportunity to restore it. We condensed our treatment for space reasons, but those ideas were an important forerunner and deserve to be acknowledged, alongside the one crucial difference from our theory. (Specifically, she spoke of competing desires for belonging and separating, with differentiation serving the latter; whereas to us, being different is a strategy for the former, because unique skills increase one’s appeal to the group.)

Second, Amy Edmondson's work on psychological safety offers another example of how empowered individuals lead to better group function:

RESPONSE: This is a very thought-provoking article, but it was mainly concerned with issues of safety (as in feeling safe so as to take risks), and we did not see any easy way to connect it with our argument. Perhaps I am just having a spell of being dense (it would not be the first). If you do accept our paper, it might be good to have this reviewer or Dr. Edmondson contribute a commentary that could elaborate this point.

And finally, some recent research goes beyond the Surowiecki book to offer better and more insightful data on when and why crowds are wise:

RESPONSE: Thank you, this was a great paper! We revised our coverage of sports betting on this basis, as well as adding the key points they delineated as contributing to the wisdom of crowds effect. (See “Wise groups,” section 2.2.6.)

Reviewer #3: BBS-D-14-00289 "Groups need Selves"

This paper presents a putatively novel framework for understanding when and why groups perform better or worse than the sum of its members. It argues that differentiation of selves is a crucial moderator, and heuristically decomposes group work as, first, emphasizing common identity and promotion of emotional bonds and, second, role differentiation and individual responsibility. The authors selectively review empirical evidence that appears to support their two-step framework.

In various places concepts are not fully developed, more recent (> 2000) literatures on group performance and decision making are largely ignored, and the two-step framework is obviously too simple. For starters, it is interesting to see that no reference is given to the classic Forming-Storming-Norming-Performing-Adjourning framework of group formation and performance, which provides a theoretical backbone to the current thinking.

RESPONSE: Thanks for bringing this up! We have added a reference to this work. It does help make the sequence of steps argument stronger and better rooted in literature.

Relatedly, there is important work on optimal distinctiveness theory by Marilynn Brewer, which raises quite similar points as those made here.

RESPONSE: As noted above, we have reinstated our mention of Brewer's theory, including the important similarities and one crucial difference.
Finally, a theory on group work - especially one that seeks to understand when and why groups outperform their members or not - would benefit from a careful analysis of group task structure (e.g., the classic work by Steiner on additive, conjunctive and disjunctive tasks; but also the work on task interdependence by Hackman, Wageman and others, distinguishing between pooled, sequential, simultaneous interdependence of work). In short, there is an extensive literature on group work addressing the very same questions as those pursued here, and to quite some extent these literatures advanced beyond the heuristic framework offered here. The theoretical advance made here needs to be honed.

RESPONSE: Yes, we discussed that work among ourselves but eventually decided it was not essential to our argument. It would take quite a bit of extra space to include this, and mindful of the word count, we think it won’t fit. This might be something that a commentator could elaborate. It doesn’t present a problem to our analysis, just elaborates the complexity of the theory in some places. The key point is that for some tasks, systematic interaction is not needed. Sequential or simultaneous does not matter, however: both an assembly line (sequential) and a football team (simultaneous) require cooperative, systematically organized interactions, and success depends on each person doing his or her unique part.

The structure of the paper is not ideal. Many sections are numbered consecutively yet can be better organized as sub-sections (e.g., section 11 is overarching, section 12 is sub-level, section 13 - 15 appear to be sub-sub sections).

RESPONSE: Yes, sorry! We belatedly realized that we had numbered the headers wrong. We trust this version has been numbered more competently.

Specific Comments.

1. p. 8 first para. System gain, elsewhere referred to as group efficiency, not only depends on a system that fosters performing complementary roles. Such depends, first and foremost, also on the task structure (per Steiner, 1972). P. 8 second para. It seems that the paper now is about a system, not about groups or group performance in general. The definitions given here suggest systems are a special form of task groups. Some elaboration here would be useful.

RESPONSE: Again (see comments on other review), this just means that system gain is greater with some kinds of tasks than others. It seems excessive to say that type of task is the “first and foremost” cause. The argument that people evolved selves so as to participate in complex group performances can be valid even if people still do some things alone, or in groups in which there is no system gain.
2. p. 8/9  The authors propose that identification/fitting in precedes differentiation/standing out, in that sequence. This seems unnecessary - one may identify precisely because it allows one to differentiate, as much as one may identify because it allows one to "disappear" in the group. Also, if sequences exist, these are most likely recursive and non-linear.

RESPONSE: Good point! We have revised how we express these things. The exception that the reviewer suggests is intriguing, though we know of no data. Nonetheless, we would hate to give the impression that the steps have a rigid, invariable sequence. This discussion of sequential steps should already be improved now that we have alluded to the “Storming /Norming etc” framework the reviewer suggested above. We made various small changes throughout the paper to tone down the insistence on a rigid sequence.

3. p. 9. There is a well-developed literature on team composition and diversity, suggesting that some types of diversity (expertise, information, skills) helps whereas other types of diversity (ethnicity, age) are less conducive to group performance. The paper seems to be limited to the former (p. 9, second para: "being different may become an important strategy in service of belonging: A group cannot afford to lose a member who performs a unique function for the group"). But here again, the issue is whether the group task benefits from unique skills, information, expertise et cetera. In an additive structure, for example, this is not an issue of much concern.

RESPONSE: Unique skills are not important in an additive structure, but differentiated selves are useful for moral responsibility, including ensuring that members contribute effort, time, and/or other resources to the group effort.

4. Large Groups. The authors discuss theory and evidence that does not pertain to groups, but to large masses of people (as soldiers in combat). There is interesting work on the "social brain hypothesis" by Dunbar and others. There is a large literature in social psychology about what is a group. Many larger social systems can be decomposed in smaller groups - the question is what the current analysis pertains to - an army, a regiment, a combat unit?

RESPONSE: We have included a special subsection in the theory section to discuss the particular issues with large groups. In social psychology studies, groups tend to be small, even dyads or triads. But a corporation is also an important form of group. As the Moffett work indicates, there are particular challenges that accompany working toward common goals with people you may not know or recognize (as in a large corporation).

6. Commons Dilemma. The evidence cited here, and other evidence, strongly suggests that for cooperation in social dilemmas, people need to identify with the group and they need to understand their contribution matters. Nowhere in these studies has it been shown that identification comes first; it seems both factors help, but why is there a sequence necessary? Perhaps earlier in the paper, this idea needs to be much better explained.
RESPONSE: We have reduced our assertions that the steps have an invariate sequence.

8. Social Loafing. This can be integrated in the section on social dilemmas, as both are about free-riding and what can be done about it (e.g., increasing identification). Also, there is a larger literature on (altruistic, third party) punishment in social dilemmas, mainly in sociology (Yamagishi) and economics (Fehr & Gachter) that reveals much about why such punishment works.

RESPONSE: The reviewer is right that these have some similarities. But we retained the distinctions as currently observed in the field. Still, note that the evidence section was extensively reorganized.

11. Thinking in groups. The authors could consult integrative frameworks by Hinsz et al. (Psych Bull 1997) and DeDreu et al (Pers Soc Psych Rev 2008). Especially the latter framework is relevant to the current review on the role of accountability (and when and why it provides "system gain") in information task, brainstorming, et cetera.

RESPONSE: Thank you, these were helpful. Both of them invoked the Brewer formulation in which being different was linked to wanting to separate from the group, confirming the view that this has been the standard assumption — which our central thesis disputes. Apart from that, both papers were excellent and we have cited them at several points.

18. Conformity. There is (abundant) work on conformity, and minority dissent, published after 1955 (the most recent reference in this paper), and this section really needs to be developed. For example, there is some highly relevant work on newcomers, socialization, and their impact on innovation in teams.

RESPONSE: Conformity was not a big part of the review, and so we did not want to expand our coverage by very much, given its relatively minor importance. Possibly someone would like to develop these issues in a commentary. We do cover some work on newcomers to teams and how different forms of socialization into the group have different effects, though this is not covered under conformity (see section 2.1.3). Nonetheless, we have added some references regarding minority dissent and minority influence (see below). We also added a reference to a very recent (2014) paper showing that individual resistance to conformity pressures can improve the group’s accuracy.

Reviewer #4: The broad question whether groups are more or less than the sum of their members has indeed been long debated - and is an important topic. In this paper, the authors make a case for the importance of "differentiation of selves" for high group functioning, i.e. group members behaving as autonomous and independent individuals.
Doing so, the authors offer a theoretical model that integrates seemingly contradictory research findings on group performance. It offers - as suited for readers of Behavioural and Brain Sciences - a "big picture" perspective, integrates different research traditions and definitively provides not only food for thought, but also the possibility for commentary from different perspectives. I find the authors general idea of differentiation of selves as crucial moderator in group functioning compelling, and I also think that research of the self can benefit from a more "social perspective" and research on groups from considering the proposed moderator.

I have two concerns. The first is related to the proposed sequentiality of steps 1 and 2 and the second to the structure of the paper.

1) Sequentiality of steps 1 and 2:
The authors advocate two steps that advance group functioning. In the first step, cohesiveness is of high priority for the group and, therefore, a shared social identity beneficial for group functioning. In the second step, differentiation of selves increases functioning. I welcome the authors' attempt to integrate the seemingly contradictory findings they report (some revealing the importance of cohesiveness for group performance, others the importance of differentiation), and I think proposing two steps to do so makes sense. However, I am less convinced by the suggested sequentiality of the two steps. The authors argue that although both steps can "occur at any point, we think there should generally be a sequence" (p. 8). Step 2 following step 1 in the process of group formation makes sense intuitively and the theoretical rational given by the authors is convincing (p. 7-9). However, I do not find the empirical evidence the authors discuss for this sequence strong or convincing (throughout the whole "Review of Evidence" section, but particularly on p. 33-37). To make a clear empirical case for such a sequence, one would need studies that, ideally, compare groups in their different life cycles and find that cohesion and differentiation are beneficial at different points in the cycle. Or, at least, we would a discussion of differences in findings from lab vs. field research, comparing ad hoc-groups to longer established work-groups. However, the authors report mainly findings from group studies using ad-hoc groups in the lab, where no conclusions about sequentiality can be made. One (but, as far as I can see, the only) exception is the Lorinkova et al. (2013) study described on p. 36. Here, some empirical evidence for this proposed sequence is given. In my view, proposing this sequence but not giving convincing evidence for it unnecessarily undermines the quality of the paper. I can see three ways to deal with this problem: the authors could (a) report more empirical evidence for this sequence, (b) allow more clearly for the possibility of both steps being not sequential but alternating or parallel, their expression also depending on different aspects than group life cycle, and/or (c) relate their arguments more strongly to work on group formation (touched upon on p. 45).

**RESPONSE:** Fair enough. We agree that the evidence does not support strong assertions about a rigid or invariate sequence of the two steps. We have revised those assertions. Essentially we have followed the reviewer's (b) suggestion. It does seem that some groups could perform well, at least for a while, with the first step (strong
group identity) without much of the second step (role differentiation). Role differentiation without group identity would presumably be rarer, as there would not even really be a group. But in the long run, and especially as groups become larger and larger, the group identification step becomes less compelling, whereas differentiation becomes more important.

2) Structure of the paper:
In my view the paper is not very well-structured, and in strong need of greater clarity. (Something is wrong with regards to consecutive numbering of headlines, but this is not what I am talking about here.) The structure of the third part of the paper (p. 37-46), the discussion, is clear: Headline "discussion", followed by the sub-headlines "implications for self theory", "implications for group theory", and "conclusion". Consequently, the presentation of arguments in the discussion is easy to follow. This is very different for the second part, "review of evidence" (p. 13-37). It starts out with the description of a group task or situation ("commons dilemma and other social dilemmas"), moves on to two phenomena in group interaction ("social facilitation", "social loafing"), then presents two aspects which we might classify as strategies that can be employed ("division of labor", "accountability" - with accountability being highly relevant for "thinking in groups", which is
to follow later, though), and then moves from to the over-category of "thinking in groups". Within the "thinking in groups" headline, we first have two tasks ("pooling information", "brainstorming"), then a collection of phenomena ("groupthink", "loafing, diffusion, evaluation" - with loafing being redundant to the above headline "social loafing", "wise groups"). After the "conclusion" for "thinking in groups", there is "conformity" as another phenomenon on the same level of organisation as "thinking in groups" and, finally, the "evidence for two complimentary steps" as a separate headline, even though the two separate steps have been discussed throughout all previous sections of the paper. This structure is not only confusing, but also leads to information being repeated and/or being reported separately where a coherent discussion would be helpful (e.g., social loafing and social facilitation on p. 17-21 and p. 29-30 or accountability on p.24-26 and p.28). Wouldn't it make sense to clearly structure the paper with regards to phenomena (e.g. social facilitation, social loafing etc.) that happen in different tasks (e.g. commons dilemma, decision making groups) and discuss which strategies (e.g. accountability) influence the group's functioning and how this is related to differentiation? Another possibility would be to structure with regards to the two types of tasks that the authors introduce on p. 9: product achievement and information use. (In general, the two theoretical parts of the paper seem far stronger than the review of evidence to me. But this may well be a problem of the structure.)
Also, in the first part of the paper, "theory" (p. 6-12), after the (very clear) presentation of the "two complementary steps", it appears somewhat random that (after "forestalling potential misunderstandings"), "large groups" are discussed. To me, it is unclear why "large groups" is a separate section to "two complementary steps" as both sections' purpose seems to be to emphasise that differentiation is important, also because humans form large groups.
I think the paper could benefit tremendously from not only more informative headlines,
but also from being re-structured so redundancies to be removed and readers can follow more easily.

**RESPONSE:** Thanks for these suggestions. Reviewers 3 and 4 and the editor all called for reorganization, and not just regarding the numbering (which we have fixed, we hope, as it was also off). We considered your suggestions and discussed the matter at some length among ourselves. The "Review of Evidence" section has been completely restructured. The overarching headings now correspond to the theoretically important thrusts of the paper: first group performance, then the informational processes, which are the two main categories (and which use differentiation in different ways, as noted in the theory: anonymity shields the person from group control, freeing the individual to slack off [bad] but also to think independently [good]). Then come two other issues for the theory, a section on prosocial/antisocial behavior (which extends the group control argument) and a section on the two complementary steps (which extends that aspect of the theory). This should be much more logical and easier for readers to follow than the previous one. Within those overarching sections, we kept the headings referring to phenomena studied by groups researchers. We did have to move a bunch of stuff around. The previous sequence was based on a logical unfolding, so one could refer back to material covered earlier. (Though that was perhaps what reviewer 4 disliked.) Nonetheless, readers will probably expect some explicit reference to the standard terminology in these lines of research. Subsuming these categories under the conceptual ones seems to us a good way to resolve the illogical organization problems from the previous draft while retaining some of the benefits of that section.

3) Some further comments:
"Pooling information for group discussion": The authors refer to Lu et al.'s (2012) meta-analysis on hidden profiles (p.27). The effects that larger groups show a larger bias towards shared information has been explicitly linked to social loafing (not only to "presumably the greater submerging of the individual self in the group"), which fits the authors' argument. Another aspect that might be of interest in this regard: it has been shown in information pooling research that a need to be understood (which can be seen as related to step 1 of the authors' model, emphasising the need for cohesion and belonging) motivates biased information exchange in ad-hoc dyads (Faulmüller, Mojzisch, Kerschreiter, & Schulz-Hardt, 2012; PSPB). These results can be seen as evidence how a human motive related to step 1 potentially can harm group functioning.

**RESPONSE:** The Faulmüller paper was quite thought-provoking, but its advocacy of the motive to be understood really brings in a different set of issues. We did not find a way to incorporate this without adding a fair amount of additional discussion, so we did not include it. It’s a tangential point.

"Brainstorming": The sentence "Quite possibly, the lower output in the group setting reflects social loafing or some other reduction of effort that attends loss of individual evaluation" (p. 28) is somewhat misleading, as individual evaluation has been discussed
as harmful for performance in brainstorming groups (touched upon on p. 42). Hence, it might be better than about "some other reduction?" to directly speak about the dispensability effect (Kerr & Bruun, 1983; JPSP).

**RESPONSE:** This was a small point but we did revise the sentence to invoke dispensability. Social loafing has been invoked as one cause of brainstorming deficits, so we retained that, but dispensability could be potent as well.

In the section on "conformity" (p. 18-19), even though the general argument is there, the argument could be made even stronger by explicitly mentioning the term "minority influence" as an illustrative case where individuals who differentiate themselves from a cohesive group can help bringing about innovation and higher group performance.

**RESPONSE:** Thank you, this was a great addition. This really fits well with the case we have sought to make, especially the finding that minority influence works by stimulating more careful processing by the majority, so it can benefit the decision even if the minority’s viewpoint is flawed. We have cited this work at several points.

"Wise groups" (p. 30): Again, I think in this section the authors might even make an a little bit stronger point by including further empirical evidence. Research from a more mathematical / modelling perspective shows that even though groups can make accurate judgements compared to individuals by simply using means or medians, this is true only for some tasks and also such estimations show strong biases. When individuals differentiate themselves from the masses, e.g. by being particularly confident, this improves judgement quality (see, for example, De Polavieja & Madirolas, 2014).

**RESPONSE:** Thanks for this too! We actually incorporated this into the “conformity” section rather than the “wise groups” section, but the point is the same. This also helped add some new references to the conformity section, which Reviewer 3 complained about.