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CONSENSUS AND CONTRIBUTION:
SHARED STATUS HIERARCHIES PROMOTE GROUP SUCCESS

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ABSTRACT

Recent research on status and group productivity has highlighted that status hierarchies encourage contributions to group efforts by rewarding contributors with enhanced status. However, that and other work has typically assumed that status hierarchies are widely agreed-upon among group members. Here we challenge this assumption, proposing that groups vary in their level of hierarchical consensus and that when groups fail to achieve high agreement, the status rewards motivating contributions are attenuated, undermining group performance. Results of two studies of task groups support our claims. We observed that status disagreements were quite common, particularly those in which two group members both viewed themselves as higher in status than the other, and that more dominant individuals were most likely to engage in these types of disagreements. Further, we found that such status disagreements led to diminished group performance and that this effect was driven by reduced contributions from the group members involved. These findings suggest that status consensus can vary substantially across groups, and that groups that are able to successfully coalesce around agreed-upon status hierarchies benefit from increased contributions and performance.

CONSENSUS AND CONTRIBUTION:

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INTRODUCTION

A well-established sociological literature views status hierarchies as systems of inequality that foster disadvantage and discrimination for individuals of lower rank (e.g., Berger et al. 1977; Marmot 2004). In recent years, however, many scholars have argued that status hierarchies can also have positive effects for group members by promoting group productivity (e.g., Magee and Galinsky 2008). Because individuals generally value improved status (Ellis 1994), and group members tend to accord status to those perceived to be the highest contributing members (Hardy and Van Vugt 2006; Willer 2009b), hierarchies can serve to motivate group members to contribute more to group efforts (Huo, Binning, & Molina 2010; Willer 2009a). Indeed, this function of status hierarchies may help to explain why they emerge so quickly and appear to be ubiquitous in human groups (Bales, Mills, and Roseborough 1951; Gould 2003).

But critical to this functional view of status hierarchies is the assumption that they are widely agreed-upon. To date, researchers have generally assumed, implicitly or explicitly, that status hierarchies are formed cooperatively and consensually, with group members holding a collectively shared perception of who is high versus low in status (e.g., Bales et al. 1951; Berger, Cohen, and Zelditch 1972; Ridgeway 1984). However, there are reasons to believe that groups may vary in the extent to which they are able to achieve such consensus hierarchies. First, there is inherent ambiguity and uncertainty associated with assessing individuals' competence and status (e.g., Anderson & Kilduff, 2009b). Second, high status entails a number of psychological,

material, and social benefits (Ellis 1994), suggesting that individuals may be reluctant to set aside their self-interest and acquiesce to status hierarchies that may limit their standing.

In this paper, we call into question the assumption of consensus, instead proposing that groups vary in the extent to which they are able to form agreed-upon hierarchies, and that status consensus is critical for the theorized benefits of hierarchy. Groups experiencing disagreement over members' relative status may fail to adequately motivate contribution to the group, thus hurting group performance. We examine three specific types of status disagreements that could threaten consensus and disrupt group functioning. Further, we investigate the origins of hierarchical disagreement by examining the role that dominant individuals can play in undermining consensus. Our research suggests a view of social organization wherein consensus over the status hierarchy is an important, but uncertain, antecedent to successful group functioning. While some groups successfully come to agreement on status hierarchies and are able to effectively motivate contributions to the group, elsewhere individuals fail to agree on relative standing, and this disagreement undermines the promise of status rewards that encourages collective efforts by group members.

THEORY

Status and Hierarchical Consensus

We define status as an individual's relative standing in a group based on prestige, honor, and deference (Berger et al. 1972). Whereas sociologists have traditionally viewed status inequality primarily as a source of discrimination, recent theory and research shows that status hierarchies also serve an important role in motivating individuals' contributions to group efforts (Halevy, Chou, and Galinsky 2011; Halevy et al 2012; Magee and Galinsky 2008; Willer 2009b).

Substantial research from sociology (Willer 2009b; Simpson and Willer 2008), economics (Andreoni and Petrie 2004), biology (Milinski et al. 2002a; Zahavi and Zahavi 1997), psychology (Hardy and Van Vugt 2006; Barclay 2004, Flynn et al. 2006), and anthropology (Chagnon 1988, Lemonnier 1996, Smith and Bird 2000, Price 2003) has linked individuals' group-oriented behavior to improved reputation. For example, research on status and collective action finds that individuals who make contributions to group efforts earn a diversity of social and material benefits for their prosocial acts, including improved status in the eyes of other group members (Hardy and Van Vugt 2006; Willer 2009b). The receipt of status gains for past collective efforts has also been linked to the development of affectively laden, pro-group sentiments like identification and solidarity (Willer 2009b). These processes highlight the functional side of status hierarchies, whereby status serves as a sort of social glue, facilitating group productivity by encouraging group members to contribute to collective efforts.

Fundamental to most research on status is the assumption that *consensus* status hierarchies typically emerge spontaneously in groups (e.g., Berger et al. 1977). By consensus hierarchies, we mean hierarchies in which group members agree in their perceptions of the relative status standing of individuals within the group. Early research on status in groups assessed it via patterns of communication associated with rank, and found relatively stable inequalities between members in the initiation and reception of conversation 'acts,' suggesting generally high levels of status consensus (Bales et al. 1951). However, when explicitly measured, status consensus was found to vary across groups, and was discussed as a potentially important determinant of group functioning (Heinicke and Bales, 1953). Since that early work, however, theories of status organization have generally depicted hierarchies as widely agreed upon, with little room for divergent views among individual members (Berger et al. 1972;

Ridgeway 1987). Group members are thought to evaluate one another in terms of their current, or expected future, contributions to the group, and higher status is collectively allocated to those expected to make more valuable contributions. The implicit assumption is that individual group members will come to common and shared assessments of one another, and thus achieve a consensus hierarchy.

Within this framework, disagreements between group members over relative status are assumed to be uncommon (e.g., Ridgeway 1984). But while there tends to be significant agreement in status perceptions (e.g., Anderson and Kilduff 2009b), there is rarely perfect consensus (e.g., Heinicke and Bales 1953; Zaccaro, Kenny, & Foti 1991). This is likely due to the fact that assessing one's group members' relative levels of competence and expected contributions is an imprecise process. Certain status characteristics, such as gender or age, are easily observable – but for consensus to occur, we must assume that group members have uniform perceptions of the competence and value associated with these characteristics. Such uniformity in evaluation may occur for characteristics with long-standing associations with social status (e.g., social class), but it may not occur for other characteristics around for which there exists less agreement regarding merit (e.g., interpersonal warmth or undergraduate major). Other cues to competence and value – including behavioral indicators such as fluent speech or steady eye contact (e.g., Ridgeway 1987) – may be even more ambiguous and open to interpretation. Furthermore, performance and success may not be clearly and objectively defined for all tasks, and any disagreement about the skills or characteristics most predictive of task competence will also work against consensus forming. All together, there are a number of reasons for why group members may not all perceive a given individual's level of status equivalently within a given group.

Beyond the inherent ambiguity associated with evaluating certain types of status characteristics and the individuals that hold them, status consensus may also be threatened by individuals who are reluctant to accede to the group's status hierarchy. High status in groups is associated with a host of benefits for individuals, including greater influence, access to scarce resources, social support, physical health, and life span (Bales et al. 1951; Barkow 1975; Ellis 1994; Leary, Cottrell, and Phillips 2001; Ridgeway and Walker 1995). Given these many benefits provided by high status, group members may be unwilling to embrace a consensus hierarchy, opting instead to try to claim higher status for themselves. In turn, this is likely to lead to disagreements surrounding who is higher versus lower in status. Overall, based on the above analysis, we propose that groups can vary in the extent to which they experience consensus in the status hierarchy. Further, as we discuss below, we believe that this variation has significant consequences for group success.

It is worth noting research on the legitimacy of status hierarchies, or the extent to which hierarchies are seen by group members as consistent with broader norms, values, and beliefs (e.g., Berger et al. 1998; Johnson, Dowd, and Ridgeway 2006; Ridgeway & Berger, 1986). It is likely that status consensus and hierarchical legitimacy are correlated, with groups exhibiting higher consensus around status hierarchies that are perceived as appropriate and consistent with common social practice. However, it is important also to distinguish the concepts of consensus and legitimacy. Status hierarchies may be seen as legitimate and consistent with social convention, while group members privately disagree about where individuals stand (Johnson, Dowd, and Ridgeway 2006). Likewise, consensus could emerge around who stands where in a group, without a strong sense that the hierarchy is backed by, or consistent with, widespread cultural beliefs regarding merit. In the present research, we focus on consensus in status

perceptions, rather than on perceptions of legitimacy.

Consensus, Contributions, and Group Performance

We argue that status consensus is an important factor in determining group performance. Specifically, consensus may be critical for status hierarchies to effectively promote contributions to group efforts – disagreement over the group's status hierarchy will cause the motivating function of the hierarchy will break down. In groups lacking hierarchical consensus, the link between contributions and status becomes less clear, and group members can no longer reliably expect costly contributions to group efforts to lead to enhanced status. Similarly, individuals who do not receive levels of deference and respect proportional to what they feel their contributions merit will be less motivated to make further contributions. However, where status consensus is high, individuals will be more likely to give to the group as their contributions will be met with the anticipated level of regard from fellow group members; further, each individual member will experience the level of status that he or she expects and feels is deserved, also helping to maintain motivation to contribute to the group. In turn, these higher levels of contribution to group efforts should lead groups to be more productive, generating benefits for all members.

Some recent research provides indirect support for our theoretical reasoning regarding the benefits of status consensus – and conversely, the downsides of status disagreement. Research on dominance complementarity finds that people are more comfortable and satisfied with interaction partners who complement, rather than mimic, their levels of dominance behavior (Tiedens and Fragale 2003; Tiedens, Unzueta and Young 2007). This is consistent with the idea that achieving agreement around which members rank relatively higher or lower in status facilitates cooperation and cohesion. Further, a recent study found that groups of students who

reported engaging in behaviors related to conflict over status – such as forming intragroup coalitions, trying to assert dominance, and disagreeing about the relative value of members' contributions – performed worse than groups that avoided status conflict (Bendersky and Hays 2011). Lastly, a recent study of teams of stock analysts found that teams made up of a high proportion of externally high-status individuals suffered from decreased performance, consistent with our claims regarding the consequences of low hierarchical consensus (Groysberg, Polzer, and Elfenbein 2011). Here we extend these studies by directly measuring status consensus versus disagreement and its relationship with group performance. Further, we examine why consensus may help group outcomes by testing the functionalist arguments discussed above: namely, that higher hierarchical consensus leads to greater group member contributions.

Types of Status Disagreement

Within groups, there may exist various sorts of disagreements related to status ordering. In order to systematically study hierarchical consensus, we develop a typology of forms of disagreement. Broadly speaking, there are three ways in which pairs of group members might disagree over hierarchical rankings within the group. We focus on pairs of group members because this allows us to cleanly distinguish between these three types of disagreement, which may have differing consequences, as we discuss below.

1) *Upward disagreement* occurs when two group members both believe that they rank above the other in a group's status hierarchy
2) *Downward disagreement* occurs when two group members both believe that they rank below the other in a group's hierarchy

3) *Third-party disagreement* occurs when two group members disagree about the relative position of one of the other group members (who is uninvolved in the disagreement)

In the studies that follow we develop measures of each of these forms of disagreement in order to test our claims regarding status consensus, contributions, and group productivity. The small body of research that has examined topics relating to status disagreement (Bendersky and Hays 2011; Porath, Overbeck, and Pearson 2008) has not considered these different forms of status disagreement or their relative consequences, either lumping them together or implicitly focusing on only one type. However, these different forms of disagreement may vary both in their frequency and their effects on group functioning – thus, we analyze them separately. Consistent with the idea that individuals may be reluctant to accept low-status positions, we anticipate that upward disagreements will be more common than downward disagreements. Furthermore, upward disagreement, and to a lesser extent third-party disagreement, would seem to present the greatest threat to group success. Both of these forms of disagreement should attenuate the link between contributions and status. Further, upward disagreements in particular involve group members directly denying one-another the status and prestige each expects. As discussed above, such a denial of expected prestige is likely to reduce members' motivation to contribute to the group; indeed, prior research indicates that feelings of disrespect and disrespectful treatment lead to reduced group commitment and contributions (Miller 2001). By contrast, downward disagreements should present little threat to group productivity, as the experience of being treated as higher in status than one expects is not likely to negatively affect one's motivation to contribute.

Dominant Individuals as a Threat to Status Consensus

A variety of factors may threaten the emergence and maintenance of status consensus, including intragroup conflict, identity cleavages, heterogeneous values, divergent cultural backgrounds, and limited or ineffective communication among group members. Here we explore the role that dominant individuals play in disrupting status consensus. While past research has studied what levels of status dominant individuals tend to achieve (Ridgeway 1987; Anderson and Kilduff 2009b), research has not yet explored the role that dominant individuals play in determining groups' levels of status consensus. We believe that such individuals may pose an obstacle to status consensus. Research suggests that dominant individuals are particularly driven to attain status over others, more forceful in their pursuit of it, and more reluctant to accept low status positions (Brown & Miller, 2000; Jackson 1984; Ridgeway, 1987). As a result, these individuals may attempt to claim higher status positions than others feel they deserve, and they may be particularly unwilling to acquiesce to consensus status hierarchies, particularly if these hierarchies place them at low or moderate levels of status. Thus, we predict that groups containing more dominant individuals will suffer from greater status disagreement, and in particular, from an increased frequency in upward disagreements.

EMPICIAL OVERVIEW

We tested our theoretical claims in two studies of informal, face-to-face task groups, the first a study of short-term groups interacting in a controlled setting, the other a field study of student groups interacting across several weeks on a class project. In both studies, we examined the frequency of the three types of status disagreement and their relationships with group

productivity. In Study 2, we also measured group members' contributions to the group to more fully test our theoretical model, as well as the role dominant individuals may play in promoting status disagreement.

In this research, we hope to make several theoretical contributions. First, we build upon prevailing theories of status by examining status consensus as a factor that can vary and is linked to group success. Second, we extend functionalist theories of status hierarchy by examining the role that status consensus plays in promoting contribution to the group. Third, we present a new typology of three different types of status disagreement and investigate the relative frequency and consequences of each. Fourth, we examine a key factor in determining groups' levels of status consensus by exploring the role of dominant individuals in driving status disagreement.

STUDY 1

Participants

Participants were 132 undergraduate students (84 female, 48 male; M_{age} = 20.4 years, *SD* = 1.2) at a West Coast university placed into 33 four-person same-sex groups. In assembling these groups, we ensured that members did not know each other, in order to avoid any effects of preexisting relationships.

Procedure

Each participant arrived at the lab separately and was led to his or her own individual room. Participants were given a set of instructions describing the upcoming group task, which involved generating a proposal for a new web-based company – specifically, choosing a name and product or service, and then briefly outlining the company's goals, business strategies and initial

marketing approach. Participants were given five minutes to read over this information, and informed that the group with the best proposal would receive a $400 prize. This was determined by scores given by two independent judges, as described below. Participants were then led to the "group room," where they worked together for 45 minutes and completed a post-task survey, from which our measure of status disagreement was drawn. At the end of the session, participants were paid for their participation; after all sessions were completed, the researchers awarded the highest performing group $400.

Measures

Status Disagreement. Following the group task, participants were asked to rank all members of the group, including themselves, in terms of their status. To make this as concrete and understandable as possible for participants, we asked them to rank how much each group member "led the group (made decisions, coordinated group activities, and motivated the group)," with one being the highest rank and four being the lowest. Although leadership and status can be viewed as conceptually distinct, they are highly correlated in small, informal task-focused groups such as those we study (Heinicke and Bales 1953; Berger et al. 1972), and studies of status processes have similarly employed leadership rankings as a measure of status (e.g., Heinicke and Bales 1953).

By collecting these round-robin rankings in which every group member ranked every other, we were then able to calculate rates of each of the three types of status disagreement for each group. Pairs of group members who thought that they outranked each other were coded as being in *upward disagreements*. For example, an upward disagreement existed if member A believed that she ranked higher than member B, whereas member B believed that she ranked

higher than member A. Conversely, pairs of group members who thought they each under-ranked the other were coded as being in *downward disagreements*. Finally, a pair of group members was coded as being in a *third-party disagreement* if they disagreed over the relative status of the other two group members – for example, if member A thought that member C outranked member D, but member B thought that D outranked C.

To measure the amount of upward, downward, and third-party disagreement within groups, we simply summed up the total number of each type of disagreement within each group and divided by the number of possible disagreements (six per group for each form of disagreement). The resulting measures represent the proportion of dyads that were in upward, downward, and third-party disagreements in a given group.

Group performance. Two independent judges, blind to our hypotheses and research questions, individually evaluated all group proposals. Specifically, they scored groups' work in terms of "quality and thoroughness," on a scale from zero to 30 points. The judges' grades were highly intercorrelated, α = .91, and thus were averaged to form an aggregate score (M = 24.9, SD = 4.2). Thus, our measures of status disagreement and group performance were collected via quite different methods – status disagreement was identified from participants' perceptions of the status hierarchy, whereas performance was based on independent judges' assessments of groups' written proposals.

RESULTS

Frequency of Status Disagreement

We first examined the frequency of the three types of status disagreement within these groups. Upward disagreements were the most common, with 27 of 33 (82%) groups containing at least

one upward disagreement. Further, the mean level of our measure of upward disagreement across groups was .23 (*SD* = .17), indicating that 23% of all dyads were involved in upward disagreements. Third-party disagreements were the next most common, occurring in 23 (70%) groups; *M* = .17 (*SD* = .14), indicating that 17% of dyads disagreed over the relative standing of the other two group members. Downward disagreements, by contrast, were quite rare, occurring in only five groups (15%) and 3% of dyads (*SD* = .08). Thus, consistent with our prediction, disagreements over higher rank were more common than third party disagreements and much more common than disagreements over lower rank. The three types of status disagreement were not significantly correlated with one another (*r* [31] = -.09, *p* = .61 between upward and downward disagreement; *r* [31] = .18, *p* = .33 between upward and third party disagreement; and *r* [31] = .23, *p* = .19 between downward and third party disagreement).

Status Disagreement and Group Performance

To test our main hypothesis that greater hierarchical consensus is associated with greater group performance, we independently regressed group performance on each of our three measures of status disagreement. The results from these analyses are displayed in Table 1. As seen in Model 1, in a univariate regression analysis, we found that the rate of upward disagreements within groups was negatively related to the level of group performance, β = -.34, *t* (31) = -2.05, *p* = .05; all reported tests are two-tailed. Thus, groups with a higher frequency of pairs of members disagreeing over who was higher in status – i.e., where both members believed they outranked the other – tended to perform worse on the group task. R^2 was equal to 0.12, indicating that 12% of the variance in groups' performance was captured by our measure of upward disagreement. In contrast, in separate regressions (Models 2 and 3), neither downward disagreement nor third-

party disagreement was significantly related to group performance. Similarly, in Model 4, a full model in which we included all three measures of disagreement simultaneously, upward disagreement remained significantly and negatively related to group performance (β = -.40, t (29) = -2.36, p = .03) but neither downward disagreement nor third-party disagreement was significant.[1] There were no significant interactions between status disagreement and gender composition of the groups, suggesting that status disagreement operates similarly in both groups comprised of men or women. We also ran exploratory models that included interactions between the different types of status disagreement, but none of these interactions were significant.

[Table 1 about here]

DISCUSSION

In Study 1, we found that upward status disagreements were most common, followed by third-party status disagreements, occurring in 23% and 17% of dyads, respectively. By contrast, downward disagreements were quite rare; occurring in only 3% of dyads. We also found that the more group members engaged in upward status disagreements, the worse their groups performed. By contrast, downward disagreements were either non-significantly or marginally related to performance depending on the model, and third-party status disagreements were not significantly related to group performance. This provides support for our main hypothesis that status consensus is beneficial for group productivity and that status disagreements are detrimental, with upward disagreements being uniquely harmful. That upward disagreement was detrimental to groups is consistent with a functionalist theoretical model in which contributions earn individuals

1 We also ran a model in which we used measures of status disagreement that were weighted by the magnitude of disagreement; for example, an upward disagreement in which A ranked himself as 1 and B as 4, and B ranked himself as 2 and A as 4 would be given a weight of 2.5, the average discrepancy between rankings. Results of these alternate analyses were substantively identical to those presented here.

enhanced status; group members who are not given the status and respect they expect will contribute less to the group in turn, thereby hurting performance.

STUDY 2

Study 2 aimed to extend the findings of Study 1 in several ways. First, the laboratory setting used in Study 1 provided some advantages in terms of control, such assembling groups with no prior history. But it was important to test whether similar effects would occur in real task groups working together for a longer period of time. Thus in Study 2 we examined groups of students in a non-laboratory setting as they worked on a class project over the course of 10 weeks. Second, due to the cross-sectional nature of Study 1, it was possible that poor performance drove status disagreement rather than the other way around. In Study 2, therefore, we employed a longitudinal design, measuring status disagreement early on in the groups' activities, and performance at the end, after groups had completed the project. Third, in Study 2 we measured group members' contributions, which are proposed as the key mechanism for why consensus is critical to group productivity. Fourth, we assessed the role that dominant individuals play in promoting status disagreements. Given that status consensus appears to be important for group functioning, it is worthwhile to explore the factors that may cause status disagreements to arise, in particular, upward disagreements. Finally, we studied groups that were of mixed gender, and also collected measures of ethnicity and major, to test whether the effects of status disagreement existed independent of diversity on these characteristics.

Participants

Participants were undergraduate students enrolled at a West Coast university. As part of a class project, they worked in groups of four to six students; only groups providing complete status ranking and peer-rated behavior data were included in our analyses. The final sample size was 268 individuals (145 males, 123 females) across 57 groups (average group size = 4.7). Participants were 21.4 years old on average (*SD* = 1.95). 57.6% of participants identified as Asian or Asian-American ethnicity, 31.7% were Caucasian, 4.6% were Latino or Hispanic, 3.4% were Middle Eastern, 1.5% were African American, and 1.1 % indicated 'other'. 55.2% of participants were majoring in business; the rest came from a wide variety of majors.

Procedure

Participants were randomly assigned to groups in which they worked together for 10 weeks on a project involving analysis of a real-world organization. Approximately one week after groups were formed, participants completed a brief online survey (*Time 1 Survey*) that included our measures of status disagreement and status ambitions. Nine weeks later, immediately before handing in the group project, participants completed a second online survey (*Time 2 Survey*). On this survey, participants rated the group's performance and each other's contribution behavior.

Time 1 Measures

Status disagreement. One week after the groups had been formed, participants ranked each member of their group, including themselves, in terms of who they expected to "lead the group (make decisions, coordinate group activities, and motivate the group)" over the course of the semester. At this stage, groups had met once in class on the day of group formation, and had also been required to hold at least one 'kickoff' meeting outside of class. Past research suggests that

individuals' perceptions of their group's hierarchy form early in the group's history (Bales et al. 1951; Kalma 1991); thus, we felt that this was sufficient time for group members to form impressions of relative status rankings. Our measures of upward and downward status disagreement were identical to those used in Study 1. Our measure of third-party disagreement was identical to that used in Study 1 for four-person groups, but had to be expanded to accommodate groups that varied in size. In larger groups, for example, a given pair of group members could disagree over the relative rank of multiple other pairs of group members (specifically, three pairs of members in five person groups, and six pairs of members in six person groups). Thus, for each dyad in these larger groups, instead of coding them as either in third-party disagreement or not, we measured the proportion of third party disagreement across all other pairs of group members, ranging from 0 to 1.

We also created measures of status disagreement at the individual-level, to capture the extent to which certain group members were engaged in status disagreements. These were equal to the number of upward, downward, or third-party disagreements that an individual was involved in, divided by the maximum number of disagreements that person could have been involved in (e.g., for upward disagreement, the number of other group members).

Self-reported trait dominance. We measured individual differences in trait dominance via the dominance subscale of the Personality Research Form (Jackson 1984), a widely used and well-validated measure of dominance tendencies (Ashour and England 1972; Brown and Miller 2000; Buss and Craik 1980; Knudson and Golding 1974; Slatcher, Mehta, and Josephs 2011). This scale consists of 16 true-or-false items ($\alpha = .76$) such as "I try to control others rather than

permit them to control me," "The ability to be a leader is very important to me," and "I am not very insistent in an argument" (reverse-scored). The mean score was 11.51 (*SD* = 3.17).[2]

Time 2 Measures

Group performance. Participants rated the extent to which they believed their group had performed well on the project with two items: "Compared to other teams our team was more effective," and "I was satisfied with my team's performance," on a scale from 1 ("*Strongly disagree*") to 7 ("*Strongly agree*"). The items were highly correlated, r (264) = .75, $p < .001$ and thus combined into an aggregate measure of perceived performance. There was also substantial agreement among group members concerning group performance – the median r_{wg} coefficient, a measure of within-group agreement (James, Demaree, and Wolf 1984; Van Kleef, Homan, Beersma, and van Knippenberg 2010), was .71. Thus, we were justified in creating of an aggregate measure of group performance using the mean of group members' responses (James 1982; George and James 1993). Finally, a Hierarchical Linear Model-based ANOVA indicated that there was significant between-groups variation on this measure, ICC(1) = .23, χ^2 (56) = 134.2, $p < .001$, allowing for the meaningful investigation of group-level predictors (Hofmann 1997; Hofmann, Griffin, and Gavin 2000).

Peer-ratings of contributions. To assess the extent to which individuals contributed to the group's activities, we had participants rate their teammates on three items, using a scale from 1 ("*Strongly disagree*") to 7 ("*Strongly agree*"): "Contributed a great deal of work," "Put forth a lot of effort," and "Took initiative in completing group assignments." We used the Social Relations

2 We also collected participants' grade point averages (GPA) at Time 1, to assess task competence and motivation. None of our results were meaningfully changed by the inclusion of GPA (average GPA, in group-level analyses) as a control variable.

Model (SRM; Kenny & La Voie 1984) to assess the extent the level of inter-rater agreement. Each of these items exhibited significant *relative target variance* (*M*s = .41, .34, and .29, respectively), thus indicating significant consensus among group members as to who contributed more to the group (Kenny 1994; Kenny et al. 1994). Furthermore, these items were highly correlated with one another, α = .96, so they were combined to form an aggregate measure of each individual's contribution to the group.

RESULTS

Given the nested nature of our data – contributions and performance were collected at the individual-level and individuals were nested within groups – we used Hierarchical Linear Modeling (HLM) to conduct our analyses. HLM is well suited for such datasets because it accounts for the interdependence of individuals within the same group, and it also allows for analysis of variance both within and between-groups (Hofmann 1997). To implement these analyses, we used the software package HLM 6.08 (Raudenbush, Bryk, and Congdon 2008).

Frequency of Status Disagreements

We again began by examining the frequency of status disagreement. All 57 course groups had at least one upward disagreement, and the mean value for upward disagreement across groups was *M* = .40 (*SD* = .19), indicating that 40% of dyads were in upward disagreements. Third-party disagreements were also common, existing in 52 of 57 groups (91%). The mean for our measure of third-party disagreement was equal to .25 (*SD* = .17), indicating that dyads, on average, disagreed over the relative status of members in 25% of other dyads. By contrast, downward disagreements were again much less common, occurring in 19 of 57 groups (33%) and in only

5% of dyads (*SD* = .09). Upward disagreement was negatively correlated with downward disagreement, r (56) = -.38, p = .003, and uncorrelated with third-party disagreement, r (56) = -.03, p = .83. Downward and third-party disagreement were not correlated, r (56) = .07, p = .61.

Status Disagreement and Individuals' Contributions

Next, we investigated whether hierarchical disagreement predicted reduced contributions by individuals. We ran a set of *Random Coefficient Regression Models* in HLM (Hofmann 1997; Hofmann et al. 2000) with individual contributions as the outcome variable and individual-level measures of status disagreement as Level-1 (individual-level) predictors, displayed in Table 2.[3] As seen in Model 1, individuals' involvement in upward disagreements was significantly and negatively related to their peer-rated contribution to the group, β = -.22, t (266) = -3.52, p = .001. Therefore, individuals who were engaged in more upward disagreements at Time 1 were rated as contributing less to the group's activities at Time 2, relative to their fellow group members. However, as seen in Models 2 and 3, neither individual-level downward disagreement nor individual-level third-party disagreement predicted contributions. These results were replicated in a full model (Model 4) in which upward disagreement was significant (β = - .17, t (264) = -3.41, p = .001) but downward disagreement and third-party disagreement were not.[4]

[Table 2 about here]

3 Following Hofmann & Gavin (1998), we centered all Level-1 predictors around their grand means. Analyses were also run using group-mean centering with no meaningful differences in results.

4 As in Study 1, we also ran all models with measures of status disagreement that were weighted by the magnitude of disagreement, and achieved substantively identical results.

Group-level Status Disagreement, Contributions, and Performance

We next explored the group-level consequences of status disagreement, with a series of Hierarchical Linear Models using contributions or group performance as the outcome variable and upward, downward and third-party status disagreement as Level-2 (group-level) predictor variables. These types of model are called *Intercepts-as-outcomes* models and assess the extent to which between-group variance in the outcome variable is related to group-level predictor variables (Hofmann 1997; Hofmann et al. 2000). First, we looked to see if groups that experienced greater status disagreement received fewer contributions from members on average. As displayed in Model 1 of Table 3, we observed a negative relationship between upward disagreement and average contributions, $\beta = -.36$, t (53) = -2.53, $p = .01$, whereas downward and third-party disagreement were not significantly related to contributions. Thus, the more upward disagreements within a group, the fewer contributions it received from its members.

Next, we examined the relationship between status disagreement and group performance. As shown in Model 2 of Table 3, and consistent with Study 1, group performance was negatively related to the frequency of upward disagreements, $\beta = -.42$, t (53) = -3.12, $p = .003$. However, neither downward disagreement nor third-party disagreement was significantly related to group performance. To assess the magnitude of the effect of upward disagreement on group performance, we compared the between-groups variance from a univariate model with upward disagreement as the only predictor variable to the between-groups variance from the null model used to obtain ICC values, as described by Hofmann et al. (2000). This produced an estimated R^2 of .31, indicating that the amount of upward disagreement within groups at Time 1 accounted for 31% of the between-groups variance in reported group performance at Time 2, nine weeks later. It is worth noting that our measure of upward disagreement was constructed via dyadic

comparisons of participants' rankings of the status hierarchy, whereas the items used to measure group performance were collected nine weeks later and based on a simple rating scale; therefore, this finding is not due to common response tendencies.[5]

As in Study 1, we also ran models that included interaction terms between the types of status disagreement, but none of these interactions approached statistical significance. In addition, as a final check on the robustness of our findings, we ran models of average contribution and group performance while controlling for diversity in gender, ethnicity, and major, as well as the size of the group. From the perspective of status characteristics theory, greater diversity in diffuse and observable characteristics such as ethnicity and major might make it easier for a group to come to consensus around its hierarchy – as members might be more readily differentiated from each other. On the other hand, prior research indicates that diversity in occupational background and race can be associated with increased levels of group conflict and reduced task performance (Pelled et al., 1999) and that diversity in race and gender can predict lower levels of cooperation among team members (Chatman & Flynn, 2001). In any case, it was important to see if the effects of upward status disagreements persisted when controlling for these factors. Diversity in group members' gender, ethnicity, and major was measured using Blau's (1977) heterogeneity index for categorical variables, $D = 1 - \Sigma(p_i^2)$, where p_i is the proportion of group members in the ith category. This is a commonly used measure of

5 We also sought to rule out a potential alternative explanation for the negative relationship between upward disagreement and performance. It is possible that individuals involved in higher numbers of upward disagreements rated their groups as performing poorly due to the unpleasant nature of upward disagreement rather than accurately reporting group performance. To address this, we investigated whether these individuals perceived group performance differently than teammates involved in lower numbers of upward disagreements. We ran a model of perceived performance on individual-level upward disagreement, and found that involvement in upward disagreements was not significantly related to individual perceptions of group performance, t (266) = -1.18, p = .24 despite substantial statistical power. Thus, group members involved in higher numbers of upward disagreements did not perceive their group's performance significantly differently than members who were involved in fewer upward disagreements, helping to rule out this alternative explanation.

diversity on categorical variables (e.g., Sacco & Schmitt, 2005; Swann, Kwan, Polzer, & Milton, 2003). As seen in models 3 and 4 of Table 4, the negative relationships between upward disagreement and group contributions (β = -.36, *t* (49) = - 2.50, *p* = .016) and performance (β = -.43, *t* (49) = -3.22, *p* = .002) were robust to the inclusion of these controls. The only control variable that seemed to matter was diversity in major, which was marginally negatively related to group contributions (β = -.22, *t* (49) = -1.69, *p* = .097) and significantly negatively related to group performance (β = -.27, *t* (49) = -2.24, *p* = .03).

[Table 3 about here]

We then examined whether group contributions mediated the relationship between upward disagreement and group performance. As described above, we have established that upward disagreement within groups was negatively related to group performance and average group contributions, and we also found that average group contributions were significantly related to group performance, β = .69, *t* (55) = 7.06, *p* < .001. In Model 5, we ran a Hierarchical Linear Model of group performance with status disagreement and contributions entered simultaneously (Kenny, Kashy, and Bolger 1998). In this model, contributions to the group significantly predicted performance (β = .63, *t* (52) = 6.38, *p* < .001), whereas the effect of upward disagreement was reduced to non-significance. Further, a Sobel test indicated that the indirect effect of upward disagreement on performance via contributions to the group was significant (*z* = 2.35, *p* = .02), indicating that contributions to the group significantly mediated the negative relationship between upward disagreement and perceived group performance. These relationships are displayed graphically in Figure 1.[6]

6 This same pattern of mediation exists if models are run with control variables included.

[Figure 1 about here]

Predicting Status Disagreement

Lastly, we investigated whether individuals' levels of dominance predicted their frequency of status disagreements. Individuals higher in dominance engaged in more upward disagreements (β = .14, *t* (251) = 2.19, *p* = .03), consistent with our prediction. However, parallel models showed that there was no significant relationship between dominance and involvement in downward (β = -.04, *t* (251) = -.67, *p* = .50) or third-party disagreements (β = .04, *t* (251) = .70, *p* = .49). We obtained similar results at the group-level. Mean levels of dominance in groups was significantly and positively predictive of upward disagreement (β = .32, *t* (55) = 2.49, *p* = .02), indicating that groups with more dominant members experienced greater upward disagreement. However, there was no significant relationship between average dominance and the frequency of downward disagreement (β = -.21, *t* (55) = -1.61, *p* = .11) or third-party disagreement (β = -.03, *t* (55) = -.22, *p* = .83) in groups.

DISCUSSION

Study 2 moved outside of a laboratory setting to examine the relationship between status consensus and group productivity in real-world student groups working together for a period of 10 weeks. Despite important differences in the study procedures, our results were consistent with Study 1, while also providing further support for our theoretical model. First, we found upward disagreement to be quite common: upward disagreement existed in 40% of dyads. Third-party disagreement was also fairly common; however, as in Study 1, downward disagreement occurred much more infrequently. Second, we again observed that upward

disagreement was negatively related to group productivity, whereas downward and third-party disagreement did not predict performance. Third, we found that the negative effect of upward disagreement on group productivity was driven by individuals' reduced contributions to the group, consistent with our claim that status consensus promotes group productivity by encouraging contributions from group members. Finally, we found evidence for the role of dominant individuals in threatening status consensus by promoting upward disagreements. Together, these findings are consistent with our hypotheses and support the idea that status consensus, particularly mutual agreement over higher standing, is vital to group performance.

Do Upward Disagreements Affect Members not Directly Involved?

Study 2 also shed some greater light on how status disagreements serve to reduce group contributions. Conceptually, a lack of status consensus could reduce group contributions in two broad ways: 1) by obfuscating the link between contributions and status within the group, thus reducing group members' incentive to contribute; or 2) by creating more direct feelings of disrespect between group members, leading group members to feel underappreciated and react by withdrawing contributions from the group (Miller, 2001). Although these processes are not mutually exclusive, both of our studies, in identifying upward disagreement but not third-party disagreement as a significant predictor of group performance, suggest that the latter may be a more accurate representation of why a lack of status consensus can be harmful. Our individual-level analyses in Study 2 provide further evidence for this idea. We found that individuals' level of involvement in upward disagreement negatively predicted their own level of contribution to the group. This suggests that it is the actual experience of being in an upward disagreement – that is, being in a situation in which someone you see as lower in status believes that they

outrank you – that is demotivating, rather than just the existence of upward disagreement within the group more generally.

To test this directly, we conducted a *contextual* analysis of individual contributions, following the procedure recommended by Kenny et al. (2002) for small groups data. Specifically, we ran a Hierarchical Linear Model of individuals' contributions using two Level-1 predictor variables: the focal individual's level of upward disagreement, as well as the amount of upward disagreement in the group that did not involve the focal individual. Individuals' involvement in upward disagreements again negatively predicted their contributions, $\beta = -.22$, $t(265) = -3.53$, $p < .001$; however, the amount of upward disagreement within the group that did not involve the focal individual was not a significant predictor of contributions, $\beta = -.02$, $t(265) = -.36$, $p = .72$. Therefore, we have no evidence of a contextual effect, in that the effects of upward disagreements did not extend to group members not involved in them. Thus it seems that there is something specifically demotivating about being engaged in a "head-to-head" upward disagreement with another group member – a situation that is apt to generate feelings of disrespect and underappreciation – although future work should delve deeper into these underlying mechanisms.

GENERAL DISCUSSION

Consensus has typically been assumed in sociological and social psychological research of status hierarchies to date, thus receiving little attention from researchers. In this paper, we challenged this assumption by conducting a systematic exploration of different types of status disagreement and their consequences for group success. Across two studies, one that involved groups of strangers working together on a laboratory task and another that involved groups of students

working on a semester-long class project, we found that status consensus was far from a given. Consensus varied substantially from group to group, with certain types of disagreement over the status hierarchy being quite common. Furthermore, we observed that status consensus can have substantial implications for group success, and that more dominant group members' were more likely to engage in status disagreements.

In particular, our findings consistently pointed to one type of status disagreement that was both widespread and consequential for group productivity. Upward disagreements, situations in which two group members both believed they outranked one another, were quite common, and had significant negative consequences for group performance. Study 2 shed light on why this occurred – groups experiencing greater numbers of upward disagreements had a harder time motivating contributions from their members, which is consistent with functionalist accounts of the effects of consensus status hierarchies.

These findings make a number of contributions to our understanding of status hierarchies and group functioning. First, they suggest that the process of hierarchy formation is less consensual and cooperative than previously thought, implying that existing models of status organization may need to be revised to account for varying levels of status consensus. Indeed, according to our data, a unanimously agreed-upon status hierarchy is likely more the exception than the norm. Second, our work identifies status consensus as an important factor in group success. Prior work has shown how hierarchy can be functional for groups, motivating contributions to collective efforts among group members (e.g., Willer 2009b). Our findings here suggest that, in order for that to happen, there must be consensus surrounding the status hierarchy. Third, we have proposed a new typology of status disagreement, or the ways in which group members can fail to reach status consensus, by separately defining upward, downward,

and third-party disagreement. Our findings underscore the importance of distinguishing between these types of status disagreement, as they appear to have different consequences for contribution to group efforts and resulting group productivity. Lastly, we identified an important antecedent to the most detrimental of these types of status disagreement, upward disagreement. Dominant individuals, reluctant to yield on their desires and expectations for high status, were more likely to become involved in upward disagreements.

Taken together, these results point to status consensus as an important, and far from ubiquitous, determinant of group success. In groups where individuals are able agree upon shared status hierarchies, group members receive the relative levels of status that they expect as a result of their contributions and are thus more likely to sustain those contributions. But in other groups, members fail to coalesce on where they and their fellow group members stand. As a result individuals feel their contributions are not met with appropriate respect, and their likelihood of contributing to the group thereafter is reduced.

Limitations

The two studies presented here were designed to complement each other's strengths and weaknesses. Study 1's limitations – the transient nature of the lab setting, as well as its cross-sectional design – were addressed in Study 2 by the observation of real-world student groups over time. Study 2's main weakness – the perceptual nature of our measure of group performance – was addressed by the use of an objective performance measure in Study 1. However, there are some broad limitations of our data as a whole. First, the tasks employed in both studies were quite interdependent in nature. Status disagreement might not be as negatively related to performance among groups working on tasks that do not require group members to

work together so closely. Consistent with this, collectively-oriented task groups are often assumed to be a necessary condition to many theoretical claims about status dynamics (Berger et al. 1977; Ridgeway and Walker 1995) and certain status processes have been found to vary by the degree of task interdependence (Fragale 2006). More broadly, in addition to task interdependence, groups vary along many different dimensions, and thus it would be important to explore the generalizability of our findings in future work. It is worth noting, however, that in contrast to much research on status dynamics in groups, we studied face-to-face groups engaged in live interaction and working on tasks with substantial stakes for performance; further, we observed a similar pattern of results across short-term laboratory groups as well as longer-term course groups. Second, the samples employed in these studies were relatively homogeneous – participants were undergraduate students of similar age, and the majority were of white, Asian, or Asian-American ethnicity. The extent to which our findings generalize to other populations remains another open question for future work.

Future Directions

There are several directions related to the topic of status consensus that are worthy of future research. First, future work should further explore the role that status disagreements play in status organizing processes. For instance, is the subsequent status achieved by individual members affected by their involvement in status disagreements? Given that contribution to the group is one of the primary paths to high status (e.g., Ridgeway 1987; Willer 2009b), our findings suggest that individual status might be harmed by involvement in upward disagreements, since they tend to undermine contributions and group success. Further, how, and how frequently, are upward disagreements resolved, and what determines who ultimately ‘wins’

or achieves the higher rank? Some recent work has examined the behaviors that individuals use to pursue status (see Anderson and Kilduff 2009a for a brief review), but it would be interesting to see if certain traits or behaviors are particularly relevant to success in instances of upward disagreement.

Second, future research should consider variables that might moderate the relationships we observed. For instance, groups with more collectivistic norms or higher levels of member identification and commitment might be less prone to the pitfalls of upward disagreement, as individual members might be more willing to set aside their personal desires for the good of the group. Third, given their uniquely negative influence on group productivity, it would be worthwhile to investigate whether there are ways of diffusing upward disagreements, or at least mitigating their harmful effects. One possibility might be to explicitly outline team members' relative levels of expertise to try to reduce the likelihood of disagreements over relative status.

CONCLUSION

Motivating contributions to collective efforts is a fundamental challenge faced by groups, and past work suggests that status hierarchies may play a key role in promoting such contributions. In the current research, we observed that consensus over hierarchical rank is a critical factor in this dynamic; without agreement over the group's hierarchy, the link between contributions and enhanced prestige is attenuated, reducing group members' motivation to contribute. In particular, disagreements over higher rank appeared to disrupt the functions of hierarchy and diminish individuals' contributions to the group. Our findings suggest that groups in which members limit their status ambitions enough to coalesce around an agreed-upon hierarchy will

succeed by establishing reliable and socially valued rewards for group members' contributions to group efforts.

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FIGURE 1: Mediation of the negative relationship between upward disagreement and group performance by group contributions in Study 2.

Note: Downward disagreement and third-party disagreement have been omitted from the figure for stylistic purposes.

TABLE 1: Standardized coefficients from OLS models analyzing the effects of three types of status disagreement on group performance in Study 1

Independent Variable	Model 1 (Upward Disagreement)	Model 2 (Downward Disagreement)	Model 3 (Third-party Disagreement)	Model 4 (Full Model)
Upward Disagreement	-.345*			-.401*
Downward Disagreement		-.223		-.298
Third-party Disagreement			.021	.161
R^2	.119	.050	.000	.208
F	4.29*	1.63	.013	2.54
N	33	33	33	33

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 2: Standardized coefficients from hierarchical linear models analyzing the effects of three types of status disagreement on individual contributions in Study 2

Independent Variable	Model 1 (Upward Disagreement)	Model 2 (Downward Disagreement)	Model 3 (Third-party Disagreement)	Model 4 (Full Model)
Upward Disagreement	-.217***			-.167***
Downward Disagreement		.057		-.014
Third-party Disagreement			.079	.073
R^2	.026	.001	.003	.024
N	268	268	268	268

* $p < .05$ ** $p < .01$ *** $p < .001$

Note: R^2 estimates were obtained using the method recommended by Hofmann et al. (2000)

TABLE 3: Standardized coefficients from group-level hierarchical linear models analyzing the effects of three types of status disagreement on average contributions and group performance

Independent Variable	Model 1 (Average Contributions)	Model 2 (Group Performance)	Model 3 (Average Contributions)	Model 4 (Group Performance)	Model 5 (Group Performance)
Upward Disagreement	-.361*	-.424**	-.356*	-.428**	-.202
Downward Disagreement	-.125	.035	-.161	-.063	.114
Third-party Disagreement	.076	-.032	.044	-.036	-.077
Gender diversity			-.041	-.098	
Ethnic diversity			-.197	-.119	
Major diversity			-.221†	-.273*	
Group size			-.107	.163	
Average Contributions					.628***
R^2	.232	.259	.331	.367	.902
N	57	57	57	57	57

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

Note: R^2 estimates were obtained using the method recommended by Hofmann et al. (2000)