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When Low Power Meets Status:

Powerlessness Triggers Behavioral Inhibition Only Under Low Status

Mianlin Deng

East China Normal University

Ana Guinote

University College London and Nova School of Business and Economics

Lijuan Cui

East China Normal University

Author Note

Mianlin Deng, The School of Psychology and Cognitive Science, East China Normal University. Ana Guinote, Division of Psychology and Language Science, University College London; Leadership Knowledge Center, Nova School of Business and Economics. LijuanCui, The School of Psychology and Cognitive Science, East China Normal University.

Please address correspondence to Dr. LijuanCui. The School of Psychology and Cognitive Science, East China Normal University, 3663 Zhongshan Road N., Shanghai, China; 200062. Phone: +86-21-62232912. Fax: +86-21-62233433

Email: ljcui@psy.ecnu.edu.cn

WHEN LOW POWER MEETS LOW STATUS

Abstract

It has been argued that powerlessness activates the behavioral inhibition system (BIS, Keltner, Gruenfeld, & Anderson, 2003). Here we investigated the interactive effects of powerlessness and status – driven by actual or perceived competence – on the BIS. In Experiments 1 and 2 only powerless participants who were or feared being seen as incompetent self-reported behavioral avoidance towards power holders. Similarly, in Experiment 3 only those who were powerless and incompetent showed BIS-related emotion, action and negotiation strategies. Moreover, in Experiment 4 the effects of incompetence on avoidant behavior among powerless individuals were mediated by BIS activation, seen in measures of frontal hemisphere asymmetry. These findings support the notion that having low status on dimensions relevant to powerless roles activates the BIS, whereas higher status levels are a buffer against lack of power.

Keywords: powerlessness, status, competence, behavioral inhibition, behavioral approach

Amy, a nine-year old pupil, obtained high marks in a math exam and received praise from her teacher. When working on math problems in a group, she volunteers to be the group's leader, and is acclaimed by the group. John, an assistant estate agent, is shy and his achievements have gone largely unnoticed by his boss. He is not given a promotion and feels pessimistic about his prospects in the company.

These examples show that the outcomes of people in ordinary powerless positions depend on whether they meet desired standards and expectations regarding their competence and value. Yet little is known about the interactive effects of low power and people's competence, prestige and reputation (e.g., their status; see Anderson, Hildreth, & Howland, 2015; Gregg, Mahadevan, & Sedikides, 2017; Ridgeway & Erickson, 2000). This article investigates the joint effects of powerlessness and status on people's emotions, motivation and action orientation.

A great deal of research of the last 14 years has argued that powerlessness activates the behavior inhibition system (BIS; Keltner, Gruenfeld, & Anderson, 2003). The BIS is characterized by negative affect, vigilance, and inhibition of ongoing behavior (Gray & McNaughton, 2000). Here we posit that BIS activation among powerless people depends on their status on powerlessness-relevant dimensions. By being or appearing to be competent and likable, powerless people can successfully meet the aims of powerless roles. These individuals will attain high reputation and prestige in the eyes of their superiors (e.g., they will enjoy high status). Consequently, they can expect opportunities and rewards. In contrast, by performing poorly or appearing incompetent, powerless people will be evaluated negatively by their

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This is for our special issue

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superiors (they will have low status). This in turn can be followed by threats and punishments, and should activate the BIS. In summary, we propose that powerlessness activates the BIS only when individuals have low status in powerlessness-related domains.

Powerlessness and Behavioral Inhibition

Gray (see 1994, for a review) proposed two systems that concern the ways individuals respond to the environment: the behavioral approach system (BAS) and the behavioral inhibition system (BIS). The BAS is sensitive to rewards and incentives and is associated with positive emotions such as hope and happiness. It initiates approach-related behaviors to attain desired rewards and experiences. In contrast, the BIS is sensitive to threats and punishments and is related to negative emotions, particularly anxiety and fear. It triggers avoidance and withdrawal behaviors. Neurological research has revealed that the BAS and the BIS are linked to asymmetric prefrontal cortical activations. The left prefrontal cortex is the substrate of the BAS, whereas the right prefrontal cortex is the substrate of the BIS (e.g., Harmon-Jones, Lueck, Fearn, & Harmon-Jones, 2006; Sutton & Davidson, 1997).

The BAS and the BIS can be activated by a number of experiences and contexts, of which having or lacking power are examples. Power refers to the ability to control the resources and outcomes of others by administering punishments and rewards (e.g., Fiske, 1993; French & Raven, 1959; Galinsky, Gruenfeld, & Magee, 2003). Keltner et al.'s (2003) approach-inhibition theory posits that possessing power is associated with resource-rich environments and freedom, thus activating the BAS. Power activates a

specific type of approach associated with wanting and seeking goals rather than seeking rewards (hedonic tone) (Guinote, 2017).

Conversely, the approach-inhibition theory posits that being powerless is related to dependency, constraints, and exposure to potential threats and punishments. Being powerless thus activates the BIS (Keltner et al., 2003; Guinote, 2017). Many studies have provided support for this notion. For example, individuals assigned to a powerless condition are less optimistic about the future and are more risk-averse compared to their powerful counterparts (Anderson & Galinsky, 2006; Maner, Gailliot, Butz, & Peruche, 2007). People in a powerless position are less likely to take action, and pursue goals less effectively than powerful people (Galinsky et al., 2003; Guinote, 2007a; Schmid, Kleiman, & Amodio, 2015). During negotiations, powerless negotiators concede more and make the first offer less frequently than powerful ones (Magee, Galinsky, & Gruenfeld, 2007; Kleef, Dreu, Pietroni, & Manstead, 2006). During social interactions, powerless people talk less (Guinote, Judd, & Brauer, 2002), communicate with more hedges and hesitations (Holtgraves & Lasky, 1999; Guinote, 2017), and display fewer nonverbal behaviors (e.g., facial expressions and hand/arm gestures; Hall, Coats, & LeBeau, 2005) than powerful people. The powerless keep their social distance (Dean, Willis, & Hewitt, 1975), and avoid direct eye contact (Gobel, Kim, & Richardson, 2015; Weick, McCall, & Blascovich, 2017). Powerless people deal with the adversity stemming from their disadvantaged positions by seeking support in groups, acting homogeneously (Guinote et al., 2002), and valuing group norms (Guinote & Lammers, 2016).

Neural evidence consistently indicates that experiences of submission are associated with enhanced activity of right-frontal areas that regulate inhibition-related behaviors (Boksem, Smolders, & Cremer, 2012; Demaree, Everhart, Youngstrom, & Harrison, 2005). This association is also manifested in behavioral measures, such as the line bisection task showing that being powerless triggers activation of the right hemisphere, consequently inducing an attentional bias to left spaces (Wilkinson, Guinote, Weick, Molinari, & Graham, 2010).

Status and Power

Power asymmetries are ubiquitous (Fiske, 1993, 2010; Magee & Galinsky, 2008) and intertwined with symbolic evaluative dimensions that convey status and give meaning or justify social relations. Status is primarily rooted in others' evaluations and dependent on conferral from others (e.g., Berger, Rosenholtz, & Zelditch, 1980; Gould, 2002; Guinote, Cotzia, Sandhu, & Siwa, 2015). From a functionalist point of view (Berger, Cohen, & Zelditch, 1972), people voluntarily confer high status to those who can provide high social value, in particular, those who are competent and can help achieve collective goals (Anderson et al., 2015).

Status can be conferred on the basis of multiple factors, of which competence is generally the most important (e.g., Anderson, John, Keltner, & Kring, 2001; Cheng, Tracy, & Henrich, 2010; Cuddy, Fiske, & Glick, 2008; Fiske, Cuddy, Glick, & Xu, 2002). According to the stereotype content model (Fiske et al., 2002), people can infer a person's status from perceptions of that person's competence (see also Cuddy et al., 2008; Fiske, Cuddy, & Glick, 2007). Shared status ideologies, such as beliefs in

meritocracy, also posit that people can improve their social ranking (in other words, their status) by working hard and being competent (Major et al., 2002; Son, Bobocel, & Zanna, 2002). Status is therefore regarded as the social reward for performing competently (Chapais,2015; Durante, Capozza, & Fiske, 2010; Magee & Galinsky, 2008).

Powerless individuals are therefore particularly subject to appraisals about their abilities and performance by power holders (e.g., Fiske, 1993; Galinsky et al., 2003; French & Raven, 1959). This occurs because power is relational, and powerless roles, such as being a student or an employee, are embedded in responsibilities and duties monitored by power holders.

Competence-related status can impact the powerlessness-inhibition relationship for two reasons. Firstly, lack of power is associated with uncertainty and uncontrollability (Anderson & Galinsky, 2006; Rucker & Galinsky, 2008). It has been argued that evaluative feedback about one's competence boosts a sense of certainty (Ashford, Blatt, & VandeWalle, 2003; Ashford & Cumming, 1983, 1985). This then can orient powerless individuals towards approach (when evaluative feedback is positive) or inhibition (when evaluative feedback is negative). Secondly, status can serve as a go/no-go signal for action. High competence-related status acts as a go signal for action, as actions have been appropriate. Conversely, low competence-related status suggests that one's course of action are not appropriate, and operates as a no-go signal.

One question that arises is whether competence-related low status per se

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Mianlin: Thanks for the suggestion. I agree with it.

Commented [P5]: I agree, it is better to drop 'secondly' and to delete this or add among the previous argument

activates the BIS. Past research has shown that negative feedback regarding one's skills and performance can lead to inhibition-related states, such as negative affect (e.g., anxiety, tension) and vigilant cognition. Crucially, most paradigms used in this field convey feedback via authority figures (e.g., see Alvero, Bucklin, & Austin, 2001; Ashford & Tsui, 1991, for reviews; Cianci, Klein, & Seijts, 2010; Normand, Autin, & Croizet, 2015; Seibt & Foster, 2004). Hence, these studies involve power asymmetries and feedback is consequential, therefore activating the BIS. The BIS is a system that aims at removing the organism from threats and punishments (Gray & McNaughton, 2000). If negative feedback is received outside power relations and is inconsequential, it may not activate the BIS. Nevertheless, given the lack of clarity regarding the role of power in past research on feedback, we did not have hypotheses regarding the impact of feedback independently of power.

In summary, we hypothesize that powerlessness and potential or actual incompetence in powerlessness-related domains jointly activate the BIS, whereas powerlessness per se may not trigger the BIS.

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Mianlin: Hi Ms. Guinote. The first two papers we cite are reviews

Commented [P7]: Ms. Guinote: If you agree with this, we need to check that this is well represented in the studies.

Mianlin: Do you mean we need to check the main effect of status across the four studies? In Experiments 1, 2 and 3, the main effect of status was not significant; however, in Experiment 4, the main effect was significant.

Commented [P8]: NO, I meant whether there are inconsistencies in past research about whether feedback affects BIS or not (or correlates of BIS; if so we could cite a couple of references (although our reference list is a bit too long, so feel free to drop what is not essential

Overview of the Research

Four experiments examined the interactive effects of competence-related status and powerlessness on behavioral inhibition. We operationalized status in terms of evaluative feedback about people's potential or actual competence (e.g., ability and performance evaluations, for similar operationalizations, see Anderson, Willer, Kilduff, & Brown, 2012; Guinote et al., 2015).

Powerlessness and status were orthogonally manipulated in two ways. One

manipulation was a variant of the recall task created by Galinsky et al. (2003). Participants were asked to recall an event in which they were either powerless (powerless condition) or not (control condition), and received either positive (high status) or negative (low status) feedback about their performance (Experiments 1 and 3). In the second manipulation, status was assigned via false feedback regarding participants' task-related skills assessed with a variant of the minimal group paradigm (Tajfel, Flament, Billig, & Bundy, 1971; Scheepers, Spears, Doosje, & Manstead, 2006), prior to enacting a powerless (vs. control) role (Experiments 2 and 4).

Experiment 1 tested the effects of powerlessness and status on self-reported BIS in the context of power relations, and optimism. Experiment 2 used eye-tracking to examine avoidant eye contact with a target (power holder vs. control). Experiment 3 sought to replicate these effects on several correlates of BAS/BIS activation: emotion, action initiation, and the propensity to negotiate. Experiment 4 investigated the joint effects of powerlessness and status on frontal hemisphere asymmetry, typically associated with BAS/BIS activation, as well as on social distance to a target (power holder vs. control). In this experiment we also tested the mediating role of BIS activation on social distance.

Experiment 1

Experiment 1 sought to provide initial evidence for the interactive effects of powerlessness and status on BIS activation in the context of power relations and reduced optimism. Optimism is a correlate of behavioral approach and is reduced among individuals with a low sense of power (Anderson & Galinsky, 2006).

Powerlessness was operationalized as the relative susceptibility to be controlled and influenced by a person with high standing (power holder vs. mentor). Status was operationalized in terms of positive or negative evaluative feedback from that person. Power and status were manipulated with a past recall task adapted from Galinsky et al. (2003). BIS activation and optimism were assessed with self-report measures. Given that BIS is associated with negative mood, and that mood per se is related to BIS (Brinol, Petty, Valle, Rucker, & Becerra, 2007; Fredrickson, 1998; Schwarz, 2000), mood was also assessed in this experiment. We hypothesized that compared to control participants, powerless participants would report enhanced behavioral inhibition (e.g., worries, inhibition of ongoing behavior, avoidance) in the context of power relations and decreased optimism, but only when feedback was negative and not when it was positive.

Methods

Participants and design. G*Power 3.1 indicated~~s~~ that for a 2 x 3 between-participant design with enough power (1 - β = .85) to detect a large effect size of f = .40, we would need 30 participants per cell ~~(N = 180)~~. ~~Given a lack of prior information on effect size, w~~We set therefore a priori sample size of 180. ~~This provided us with enough power (1 – β = .85) to detect a large effect of f = .40~~. 174 students (17% male, 83% female; M_{age} = 21.52, SD = 5.89) recruited from the University College London Psychology Subject Pool participated in the experiment in exchange for course credits (the sample was slightly smaller than planned due to recruitment difficulties). The experiment had a 2 (power: powerless vs. control) x 3

Commented [P9]: Is it OK now? it was confusing I thought

Commented [P10]: **Ms. Guinote:** Do you think we can say this given that we don't have information? on what basis? maybe we can say.

Mianlin: Thanks for addressing this. I used G*Power to determine a priori sample size of 180.
In G*Power, we set some parameters at first, including 1-β and effect size. A tutorial indicates that for 1-β, we usually set a value above 0.8; for effect size, we usually set as f=0.25 (medium effect size) or f=0.40 (large effect size). Then, G*Power shows how many participants we would need.

I also find several recent papers published in Social Cognition (e.g., Lammers et al., 2017; Walker et al., 2016) used the same procedure to determine the priori sample size.

(status: high vs. control vs. low) between-participant design.

Procedure. The study was conducted online using Qualtrics software (https://uclpsych.eu.qualtrics.com). Participants were informed that the study included two parts, with one part investigating memory for past experiences and the other exploring predictions for future events.

Manipulation. Power and status were manipulated jointly. Participants wrote an essay about a past event in which someone either had power (powerless condition) or did not have power (power control condition) over them, and the participant either received positive (high status condition), negative (low status condition), or did not receive any (status control condition) evaluative feedback in the event. Specifically, participants in the *powerless conditions* read the following instructions:

Powerless and high status condition. "Please recall and describe an incident during which someone had power over you in a task. By power, we mean a situation in which someone had control over your ability to get something you wanted, or was in a position to evaluate you. In the task, you received positive feedback, that is, you did a good job or achieved a good performance. That deed or accomplishment met the expectations of the powerful person. Please describe the incident: what happened, how you felt, etc."

Powerless and low status condition. The instructions were the same as the powerless high status condition, with the exception that participants read: "... In the task, you received negative feedback, that is, you did not do very well; you had a poor performance. That deed or accomplishment failed to meet the

expectations of the powerful person..."

Powerless and status control condition. Participants received the same initial instructions as indicated above, but we omitted any references to feedback.

In the *power control conditions*, participants recalled an incident in which they had a mentor in a task. He or she acted like a guide, introducing the task and giving them important information, but did not evaluate them or have power over them.

Measures. To verify that the power manipulation was effective, participants indicated how much they felt in charge during the task described in the past event on a scale ranging from 1 (*not at all*) to 9 (*very much*). To verify that the status manipulation was effective, they indicated how successfully they felt that they had completed the task described in the past event on a scale ranging from 1 (*not at all*) to 9 (*very much*). In the status control conditions, the status manipulation check question was placed at the end of the whole experiment to rule out participants' awareness about the potential role of feedback while completing the self-report questionnaires. Moreover, we added a question asking participants to indicate whether they had received any evaluative feedback in the event.

To examine an alternative account that the effects of status and power on inhibition are solely driven by mood, participants reported their mood on four scales ranging from 1 (*very bad*; *very sad*; *very discontent*; *very tense*) to 7 (*very good*; *very happy*; *very content*; *very relaxed*) (Weick & Guinote, 2008).

Participants subsequently completed an adapted version of the behavioral inhibition system (BIS) scale (Carver & White, 1994) that includes seven items to

Commented [P11]: **Ms. Guinote:** APA style, is this in capital? I think not.

Mianlin: Thanks for correction.

measure dispositional inhibition sensitivity. The items were adapted to assess participants' worries and avoidance tendencies within the context of power relations. For example: "I worry about making mistakes when I meet with the (powerful) person" (1 = *strongly disagree* to 9 = *strongly agree*).

Next, participants estimated their likelihood of experiencing different future events on Weinstein's (1980, see also Lerner and Keltner, 2001) 24-item optimism scale. An example of an item is: "I will have a heart attack before the age of 50" (1 = *very much less likely* to 8 = *very much more likely*). Finally, participants indicated their gender, age and ethnic background. On completion, they were thanked and debriefed.

Results and Discussion

Manipulation check. 2 (power: powerless vs. control) x 3 (status: high vs. control vs. low) between-participant ANOVAs were conducted on the manipulation checks. The power manipulation was effective. There was a main effect of power on participants' feelings of being in charge, $F_{(1, 168)} = 12.86$, $p < .001$, $\eta_p^2 = .07$. Powerless participants ($M = 4.49$, $SD = 2.46$) felt less in charge in the recalled event than participants in the power control condition ($M = 5.76$, $SD = 2.20$). The main effect of power was not qualified by a power x status interaction, $F_{(2, 168)} = .18$, $p = .833$, $\eta_p^2 = .00$. The main effect of status was also not significant, $F_{(2, 168)} = 2.35$, $p = .098$, $\eta_p^2 = .03$ (high status participants: $M = 5.62$, $SD = 2.62$; low status participants: $M = 4.69$, $SD = 2.33$; and status control participants: $M = 5.07$, $SD = 2.22$).

The status manipulation was also effective: Status affected participants' feelings of being successful, $F_{(2, 168)} = 48.27$, $p < .001$, $\eta_p^2 = .37$. Specifically, participants in the high status condition ($M = 7.55$, $SD = 1.90$) felt more successful than participants in the low status condition ($M = 4.19$, $SD = 1.98$), $t_{(114)} = 9.33$, $p < .001$, $d = 1.73$; and the status control condition ($M = 6.83$, $SD = 1.91$), $t_{(114)} = 2.05$, $p = .043$, $d = .38$. The low status and control conditions also differed, $t_{(114)} = -7.30$, $p < .001$, $d = 1.36$. The main effect of status was not qualified by the power x status interaction, $F_{(2, 168)} = .00$, $p = .998$, $\eta_p^2 = .00$. The main effect of power was not significant, $F_{(1, 168)} = 1.47$, $p = .227$, $\eta_p^2 = .01$ (powerless participants: $M = 6.01$, $SD = 2.55$; power control participants: $M = 6.37$, $SD = 2.25$).

Inhibition. The BIS items were averaged into a single score ($\alpha = .73$, $M = 5.36$, $SD = 1.43$). The 2 (power: powerless vs. control) x 3 (status: high vs. control vs. low) yielded a main effect of power, $F_{(1, 168)} = 5.65$, $p = .019$, $\eta_p^2 = .03$, indicating that powerless participants ($M = 5.61$, $SD = 1.49$) exhibited stronger BIS activation compared to participants in the power control condition ($M = 5.11$, $SD = 1.32$). The main effect of status was not significant, $F_{(2, 168)} = 1.69$, $p = .188$, $\eta_p^2 = .02$ (high status participants: $M = 5.12$, $SD = 1.57$; low status participants: $M = 5.59$, $SD = 1.32$; status control participants: $M = 5.38$, $SD = 1.36$). However, the expected interaction between power and status was marginal, $F_{(2, 168)} = 2.55$, $p = .081$, $\eta_p^2 = .03$.

We predicted that lack of power would trigger BIS activation if participants had low status – that is, they did not meet power holders' expectations and feedback regarding their competence was poor. This should not occur under the high status and

Commented [P12]: Ms. Guinote: Sorry for the confusions but in this case the measure is explicitly about inhibition, so it is better to call inhibition, even though it is in the presence of the power holder.
Mianlin: Thanks for this.

Commented [P13]: Ms. Guinote: there is not a status manipulation check for control, isn't it?

Mianlin: Sorry for my mistake in previous writing. There is a status manipulation check for statuc control group. Participants indicated whether they had received any feedback in the task described in the past event. Moreover, they indicated how successfully they felt that they had completed the task described in the event (the same status manipulation question for other status conditions). These two questions were placed at the end of the whole study.

control conditions. Consistent with the hypotheses, simple comparisons showed that when status was low, powerless participants ($M = 6.17$, $SD = 1.15$) were more worried and avoidant of power holders compared to participants in the power control condition ($M = 5.01$, $SD = 1.24$), $t_{(56)} = 3.69$, $p = .001$, $d = .97$. In contrast, when status was high, there were no differences between powerless and control participants (powerless participants: $M = 5.14$, $SD = 1.77$; power control participants: $M = 5.09$, $SD = 1.37$), $t_{(56)} = .11$, $p = .916$, $d = .03$. In the status control condition, participants also did not differ in self-reported BIS, regardless of their power condition (powerless participants: $M = 5.53$, $SD = 1.34$; power control participants: $M = 5.23$, $SD = 1.38$), $t_{(56)} = .84$, $p = .404$, $d = .22$.

Furthermore, when participants were powerless, status impacted self-reported BIS significantly, $F_{(2, 84)} = 3.74$, $p = .028$, $\eta_p^2 = .08$. Participants in the low status condition displayed stronger BIS tendencies compared to participants in the high status condition, $t_{(56)} = 2.62$, $p = .011$, $d = .69$; and the status control condition, $t_{(56)} = 1.94$, $p = .058$, $d = .51$. The latter two conditions did not differ, $t_{(56)} = -.95$, $p = .344$, $d = .25$. In contrast, for participants in the power control condition, status did not affect their BIS tendencies, $F_{(2, 84)} = .21$, $p = .815$, $\eta_p^2 = .01$. These results are consistent with the notion that power and competence jointly affect BIS activation in the context of power relations. Evaluative feedback about task-related competence from a powerful person activated a BIS state within power relations, presumably because of possible prospect. This was not the case when feedback was given by a supervisor who did not have power.

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Mianlin: I changed all the terms.

Optimism. Ratings on the 24 optimism items were averaged into a single index (α = .82, M = 5.34, SD = .81) and subjected to analyses of variance. The main effect of power was not significant, $F_{(1, 168)} = 1.27$, $p = .261$, $\eta_p^2 = .01$ (powerless participants: $M = 5.41$, $SD = .85$; power control participants: $M = 5.26$, $SD = .77$). The main effect of status was also not significant, $F_{(2, 168)} = 1.04$, $p = .357$, $\eta_p^2 = .01$ (high status participants: $M = 5.45$, $SD = .94$; low status participants: $M = 5.23$, $SD = .78$; and status control participants: $M = 5.33$, $SD = .71$). The two-way interaction between power and status was not significant either, $F_{(2, 168)} = .73$, $p = .485$, $\eta_p^2 = .01$.

Mood. Scores on the four mood items were averaged into a single index (α = .88, M = 4.54, SD = 1.21). The 2 (power: powerless vs. control) x 3 (status: high vs. control vs. low) between-participant ANOVA yielded a main effect of power, $F_{(1, 168)} = 6.93$, $p = .009$, $\eta_p^2 = .04$, indicating that powerless participants ($M = 4.31$, $SD = 1.29$) experienced more negative mood than participants in the power control condition ($M = 4.77$, $SD = 1.09$). The main effect of status was also significant, $F_{(2, 168)} = 7.03$, $p = .001$, $\eta_p^2 = .08$. Participants in the low status condition ($M = 4.07$, $SD = 1.06$) experienced more negative mood than participants in the high status condition ($M = 4.79$, $SD = 1.24$), $t_{(114)} = -3.35$, $p = .001$, $d = .62$; and the status control condition ($M = 4.75$, $SD = 1.22$), $t_{(114)} = -3.21$, $p = .002$, $d = .60$. The high status and control conditions did not differ, $t_{(114)} = .15$, $p = .880$, $d = .03$. The power x status interaction was not significant, $F_{(2, 168)} = .18$, $p = .832$, $\eta_p^2 = .00$. This ruled out the proposition that the joint effects of power and status on behavioral inhibition were driven by the mood.

Commented [P15]: **Ms. Guinote:** Mianlin, we could adopt this for the whole paper (or high power participants: ...). It is more common. If you wish you can change.
Mianlin: Thanks. I changed all of them.

Summary

Together, the results of Experiment 1 provide some support for our hypothesis that the effects of powerlessness on inhibition are modulated by competence-related status. Powerless individuals were inhibition-activated only when the other person possessed high power and conferred low status on them (via negative feedback). Moreover, status did not affect inhibition independently of power. Low status individuals were inhibited when low status was conferred by a person with power, and not when it was conferred by a person in a high standing position in relation to the participant but who lacked power (a mentor). However, no effects were found for a correlate of BIS – reduced optimism. A possible reason for this result relates to the measurement scale. The 24-item optimism scale may be too long for detecting effects at the state level. We found that some items of the scale (e.g., "I will contract a sexually transmitted disease", "I will have a intellectually gifted child") were constantly rated as less or more likely to happen in the future regardless of a participant's power or status condition.

In Experiment 1, status was conveyed through evaluative feedback and power was manipulated via susceptibility to being controlled and influenced by a high standing person. In order to minimize status differences between the power conditions, both the power holder and the mentor (power control condition) were in a high standing position in relation to the participant. Indeed the manipulation check suggests that power did not affect status. Nevertheless, the roles of the power holder and the mentor could have varied in aspects other than the exercise of control and

Commented [P16]: Ms. Guinote: I have a bit of an issue with the interpretation we had here because the scale has been used before.

Mianlin: In the action letter, Dr. Sedikides asked us to discuss why we didn't find any effects for optimism. He proposed a possible reason for this -- the Weinstein's 24-item scale is too long to detect effects at the state level. I agree with that and put it here.

In previous study on power and optimism using this scale (Anderson & Galinsky, 2006, Study 1), the authors didn't use the full scale and only used 15 items of the scale.

Do you think we could keep this sentences? Thank you.

Commented [P17]: What is the mean of results? Are they too optimistic or not? I have a problem with his suggestion because it worked before. It may be better to talk about cultural specificity (such as ceiling effect or so) – if the means suggest this in comparison to other countries.

influence. To address this issue, in the next experiment power and status were manipulated independently, and the target persons varied only in the amount of power at their disposal.

Experiment 2

Experiment 2 was conducted in a different culture (China) and aimed to inspect the generalizability of the effects of power and status. Status was manipulated independently of power relations. Specifically, ~~S~~status was manipulated with an adaption of the minimal group paradigm (Tajfel et al., 1971): Participants firstly completed an alleged pre-test and then received rigged feedback about their performance. Power was manipulated through the susceptibility of being controlled by a target person. All targets were leaders with equal status. However, some of the leaders had power in the task, whereas others were not. A behavioral rather than a self-report measure was utilized to assess inhibition. It was examined in the context of interpersonal relations with eye-tracking methodology. Specifically, participants' eye gaze to the leaders were tracked. Eye gaze reveals ~~behavioral~~ motivation and cognitive processing and ~~is by and~~unfolds by and large automatically (Kleinke, 1986; Rothkirch, Madipakkam, Rehn, Sterzer, 2015). Decreased gaze to other people's eyes is associated with behaviour inhibition ~~orientation~~ (e.g., autism, anxiety; Howell, Zibulsky, Srivastav, & Weeks, 2016; Klin, Jones, Schultz, Volkmar, & Cohen, 2002; Speer, Cook, Mcmahon, & Clark, 2007; Schneier, Rodebaugh, Blanco, Lewin, & Liebowitz; 2011). Here, ~~W~~we hypothesized that powerless participants under low status would avoid eye contact with powerful leaders. In contrast, high status should

Commented [P18]: Ms. Guinote: I would add a sentence or two about eye gaze and BIS.
Mianlin: Thanks. I added a sentence and several references. I also changed the order of the sentences in this paragraph. Do you think is OK?

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not avoid powerful leaders. ~~Experiment 2 used a different method to manipulate status and power separately. Behavioralinhibition among powerless individuals was examined in the context of interpersonal relations with eye-tracking methodology. Status was manipulated with an adaption of the minimal group paradigm (Tajfel et al., 1971): Participants firstly completed an alleged pre-test and received rigged feedback about their performance. Power was manipulated through the susceptibility of being controlled by a target person. All targets were leaders with equal status. However, some of the leaders had power in the task, whereas others were not.~~The ~~leader gave instructions about the task blockand informed participants about his or her role. This was used as an opportunity to convey information about power. Participants' eye movements towards the leaders were tracked. We hypothesized that powerless participants under low status would avoid eye contact with powerful leaders. In contrast, high status should not avoid powerful leaders.~~

Methods

Participants and design. The sample size of previous eye tracking research exploring visual attention to faces in interpersonal contexts has often ranged from 25–30 participants per cell (e.g., Foulsham, Cheng, Tracy, Henrich, & Kingstone, 2010; Gobel et al, 2015; Kawakami et al., 2014). On the basis of this informal convention, we thus set a priori sample size of 30 per cell (N = 60). 64 students (41% male, 59% female; M_{age} = 21.39, *SD* = 3.56) from East China Normal University took part in this experiment in return for￥30 payment (4 additional participants were recruited in expectation of technical problems during the recording of the eye tracking). They all

had normal or corrected-to-normal vision. Six of the participants were excluded because of the poor quality of the recordings, leaving 58 participants for the analyses. The experiment had a 2 (power: powerless vs. control) x 2 (status: high vs. low) mixed factor design, with power as a within-participant factor.

Apparatus. Participants sat approximately 70 cm in front of a 17-inch TFT monitor, and their eye movements were recorded by a Tobii T120 eye tracker integrated into the monitor. The eye tracker sampled gaze position at a rate of 120 samples per second, with an accuracy of approximately 0.5 degrees.

Procedure. Participants were informed that they would complete a visual reasoning task on a computer, and that an eye tracker would record their eye-movements during the task.

Status manipulation. Before the task, participants completed a visual reasoning pre-test. The pre-test consisted of nine Mensa puzzles. Participants were informed that they all took the same pre-test, but (unknown to them) the difficulty of the pre-test was rigged. Half of the participants were randomly assigned to solve easy puzzles and the other half to solve difficult ones.[1] This could manipulate participants' actual performance during the pre-test. On completion, they received feedback about their task performance. Participants in the easy puzzle condition were told that they had successfully solved more puzzles than the average and that their performance was

[1] Two coders rated each puzzle for its difficulty on a scale ranging from 1 (*very easy*) to 5 (*very difficult*). The rating reliability was high ($r = .86$, $p < .001$). Puzzles from the difficult pre-test ($M = 4.06$, $SD = .95$) were scored as more difficult than the puzzles from the easy pre-test ($M = 2.78$, $SD = 1.42$), $t_{(16)} = 2.25$, $p = .039$, $d = 1.06$.

therefore excellent (high status condition). In contrast, participants in the difficult puzzle condition were told that they had solved fewer puzzles than the average and thus had not performed well (low status condition).

After the pre-test, to verify that the status manipulation was effective, participants rated how successfully they thought they had completed the pre-test and how good they were at visual reasoning on scales ranging from 1 (*not at all*) to 5 (*very much*). Then, they indicated their mood on a scale ranging from 1 (*very sad*) to 5 (*very happy*) (Weick & Guinote, 2008).

Power manipulation. Participants then worked on the visual reasoning task. They were informed that the task was similar to the pre-test, except that an eye-tracker would record how they solved the visual reasoning items. The task included four blocks and four leaders. Each block started with a 18 seconds video-clip in which a leader introduced the task block.[2] Participants first watched the video then solved two visual reasoning items. The power of the participants varied across blocks. In two powerless blocks, the task leaders (powerful leaders) said that a video camera would record the behavior of the participants during the task block, and that they would check the video recording as well as the eye-movements recording later and evaluate the participants' performance. In two power control blocks, the leaders did not

[2] Four video-clips of graduates (two male, two female; M_{age} = 26.00, *SD* = 2.31) were used. In each video-clip, a graduate acted as a leader of the following task, introducing the task while looking directly into the camera with a neutral facial expression. The video-clips were filmed with a white background and depleted of objects and events that might distract the attention of the participants. The video-clip resolution was 720 x 408 pixels, presented at the center of the computer screen.

exercise power, they just introduced the task and said they would not evaluate the participants' performance afterwards. The order of the powerless and control blocks was counterbalanced between participants. Half of the participants completed two powerless blocks first, and the other half completed two control blocks first. For each two the same power blocks, there was a same-gender and an opposite-gender leader respectively. The order of their presence was also counterbalanced between participants.

Eye-movements recording. Unknown to participants, the eye-tracker only recorded their gazing behaviors when they watched the video-clips of the leaders. Subsequently, participants filled in a short questionnaire about their gender, age, and ethnic background. Finally, they were thanked and debriefed.

Results and Discussion

Manipulation check of status. The two items correlated with each other, $\alpha = .85$; $r_{(58)} = .74$, $p < .001$, and were thus averaged to form a single measure ($M = 3.09$, $SD = .94$). Participants in the high status condition rated their performance in the visual reasoning pre-test better ($M = 3.48$, $SD = .91$) than participants in the low status condition ($M = 2.71$, $SD = .81$), $t_{(56)} = 3.43$, $p = .001$, $d = .90$. The manipulation of status was thus successful.

Eye movements. Past research suggests that the eyes and mouth are the most common face regions that draw the attention of observers, and that ratio of total gaze duration to these two areas varies according to different people and situations (Gobel et al., 2015; Klin et al., 2002; Kingstone, 2009). Inhibition-oriented individuals gaze

less at other's eyes and look more at mouth region (Klin et al., 2002). ~~There are, however, differences in ratios of total fixation duration to these two areas across different situations (Klin, Jones, Schultz, Volkmar, & Cohen, 2002; Kingstone, 2009).~~ Following a standard procedure used by Gobel et al. (2015), we quantified the attention given to the eyes and mouth of the leaders in the video-clips by defining regions of interest (ROI) for each leader's eyes and mouth respectively. Figure 2 exemplifies a scene image used for coding ROIs. The eye and mouth regions were rectangles. The sizes of the rectangles were kept constant for each leader. Sometimes the leader made slight movements within a video-clip, but the ROIs were large enough to encompass the leader's eye and mouth areas (e.g., the eyebrows, the corners of the mouth) throughout the whole clip. The amount of time that participants gazed at the eye and mouth regions for each leader was recorded. For every participant, we calculated the proportion of the gaze duration to the eye region in the total gaze duration to the eye and mouth regions for each leader. A large proportion meant the participant looked more at the leader's eyes, whereas a small proportion meant the participant looked less at the leader's eyes. Then, we calculated participants' mean proportions of the gaze duration to the eye region in the total gaze duration to the eye and mouth regions for the powerful and non-powerful leaders, separately.

To examine participants' gaze patterns, a 2 (status: high vs. low) x 2 (power:

Commented [P20]: Ms. Guinote: we need to spell out how this informs about BIS. I would include this in the intro of this study.
Mianlin: Thanks. I made some minor changes in the intro of this study.

Commented [P21]: Ms. Guinote: Isn't there other work on BIS and eye gaze? I ask because I have the impression that this is not for BIS, but if you don't have other that is fine.
Mianlin: I added several references in the intro of this study.

powerless vs. control) mixed-design ANOVA was conducted,[3] with power as a within-participant factor. The predicted interaction between status and power was significant, $F_{(1, 56)} = 22.25$, $p < .001$, $\eta_p^2 = .28$ (see Figure 3). Specifically, when status was low, participants looked less at the eyes of the powerful leaders ($M = .42$, $SD = .33$) compared to the eyes of the non-powerful leaders ($M = .56$, $SD = .32$), $t_{(28)} = -3.65$, $p = .001$, $d = .44$. In contrast, when status was high, participants looked more at the eyes of the powerful leaders ($M = .62$, $SD = .34$) than the eyes of the non-powerful leaders ($M = .53$, $SD = .37$), $t_{(28)} = 2.99$, $p = .006$, $d = .26$. Separate simple comparisons were also conducted for the two power conditions. In the powerless condition, low status participants looked less at the eyes of the powerful leaders than did high status participants, $t_{(56)} = -2.30$, $p = .025$, $d = .60$. Whereas, in the power control condition, the gazing behavior towards the non-powerful leaders did not depend on participants' status, $t_{(56)} = -.37$, $p = .710$, $d = .10$.

The main effect of power was not significant, $F_{(1, 56)} = .99$, $p = .324$, $\eta_p^2 = .02$ (powerless participants: $M = .52$, $SD = .34$; power control participants: $M = .55$, $SD = .34$). The main effect of status was also not significant, $F_{(1, 56)} = .95$, $p = .334$, $\eta_p^2 = .02$(high status participants: $M = .58$, $SD = .35$; low status participants: $M = .49$, $SD = .33$).

[3] Leaders' gender neither had a main effect, $F_{(1, 56)} = .54$, $p = .466$, $\eta_p^2 = .01$; nor interacted with status, $F_{(1, 56)} = 1.21$, $p = .276$, $\eta_p^2 = .02$; or power, $F_{(1, 56)} = .51$, $p = .480$, $\eta_p^2 = .01$. Also, the three-way gender x status x power interaction was not significant, $F_{(1, 56)} = .74$, $p = .394$, $\eta_p^2 = .01$. Therefore, we combined each two conditions of the same power but different gender leaders into an overall powerful leader (powerless condition) and non-powerful leader (control condition) condition, respectively.

Mood. An independent-samples *t* test indicated that status did not affect participants' mood (high status participants: $M = 3.14$, $SD = .79$; low status participants: $M = 2.79$, $SD = .98$), $t_{(56)} = 1.48$, $p = .145$, $d = .39$. This ruled out the proposition that the effect of status on avoidant eye contact was driven by the mood.

Summary

Experiment 2 used a behavioral measure of BIS and revealed that status modulates the powerlessness-inhibition relationship in a Chinese context. When facing a powerful leader, powerless individuals who had received low status feedback for relevant abilities in the power context exhibited behavioral inhibition. They avoided direct eye contact with the powerful evaluator. In contrast, those who had obtained high status feedback displayed approach tendencies towards the powerful person.

Experiment 3

Experiments 1 and 2 focused on behavioral inhibition and avoidance of power holders. Experiment 3 was design to establish whether status and power affect BIS more broadly beyond the context of power relations. It focused on several correlates of BAS/BIS activation: affect, action orientation, and the propensity to negotiate. Past research has shown that powerlessness increases negative emotions and decreases positive emotions, action initiation and negotiation propensity (Schmid Mast, Jonas, & Hall, 2009; Galinsky et al., 2003; Magee et al., 2007).

Another aim of Experiment 3 was to investigate the effects of power and status considering a power control condition that was not hierarchical. In Experiments 1 and

2 both the powerful and control targets had a higher social standing in relation to participants, as power holders, mentors, or non-powerful leaders. This is justified because competence-related feedback is typically conveyed by people with authority. In Experiment 3 the non-powerful target was a peer of equal standing. Status was induced by performance evaluations. Specifically, power and status were manipulated with a past recall task similar to that used in Experiment 1, with some exceptions.

We hypothesized that compared to control participants, powerless participants would experience less positive emotions and more negative emotions, and show weaker motivation to act and negotiate ~~when~~ if their competence-related status was low. Conversely, when their competence-related status was high, powerless participants would not display stronger inhibition-related responses compared to those who were not powerless.

Methods

Participants and design. G*Power 3.1 indicates that for a 2 x 2 between-participant design and a medium effect size (~~.25 < *f* < .30~~ *f* = .25) with enough power (1 - β = .85), we would need ~~102 –~~146 participants; informal convention suggests 30 participants per cell (N = 120). We therefore set a priori sample size of 120–146, with a stop rule of recruiting participants for as many whole weeks as it took to exceed 120 participants. 124 students (35% male, 65% female; M_{age} = 20.69, *SD* = 3.26) from University College London took part in the experiment in exchange for course credits. The experiment had a 2 (power: powerless vs. control) x 2 (status: high vs. low) between-participant design.

Commented [P22]: **Ms. Guinote:** By the way, here and earlier you indicate that you record the number of negative/positive emotions (e.g., fewer) but I have the impression that you mean they would experience less /more negative/positive emotions.
Mianlin: Thanks for correction. I changed the sentence a little.

Commented [P23]: **Ms. Guinote:** I think this is not needed, if you followed the G*power - I would aslo indicate why you do not have a single value.

Mianlin: Thank you for the issue. I did this because I found that a paper published in Social Cognition (Walker, Smallman, Summerville, & Deska) determined its priori sample size using G*Power and informal convention together.

Commented [P24]: OK, if you think it is better we can leave

Procedure. To manipulate power and status, participants were asked to write about a past experience at school. They recalled an event in which either a teacher had power to evaluate them (powerless condition), or they worked with a partner (e.g. a classmate or a group member) who shared information with them and did not have power or control over them (power control condition), and in the event they either received positive (high status condition) or negative (low status condition) feedback about their performance.

Measures. To verify that the power and status manipulations were effective, participants indicated how much they felt in charge of the event and how successfully they felt that they had completed the task in the recalled event on two scales ranging from 1 (*not at all*) to 9 (*very much*).

To measure affect, participants completed the PANAS scale (Watson, Clark, & Tellegen, 1988), which contains 20 words describing positive or negative feelings and emotions. They reported the extent to which they felt each emotion at the present moment on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*).

To measure action initiation, participants were presented with a blackjack game scenario used by Galinsky et al. (2003). They indicated whether they would like to take a card in the blackjack game. A "yes" response reflects that the participant was approach-motivated, while a "no" response is associated with inhibition tendencies.

To measure the propensity to negotiate, participants were shown a purchase scenario of buying a new car (Magee et al., 2007), and indicated their willingness to negotiate the price on a scale from 1 (*not at all likely*) to 7 (*very likely*). Upon

completion, participants filled in questions about their demographic background and were thanked.

Results and Discussion

Manipulation check. The power manipulation was effective: A 2 (power: powerless vs. control) x 2 (status: high vs. low) between-participant ANOVA yielded a main effect of power on participants' feelings of being in charge, $F_{(1, 120)} = 6.40$, $p = .013$, $\eta_p^2 = .05$. Powerless participants ($M = 4.42$, $SD = 2.53$) felt less in charge in the event than participants in the control condition ($M = 5.48$, $SD = 2.13$). The main effect of power was not qualified by a power x status interaction, $F_{(1, 120)} = .00$, $p = 1.00$, $\eta_p^2 = .00$. The main effect of status was also not significant, $F_{(1, 120)} = 1.51$, $p = .222$, $\eta_p^2 = .01$ (high status participants: $M = 5.21$, $SD = 2.24$; low status participants: $M = 4.69$, $SD = 2.52$).

The status manipulation was also effective: The main effect of status on participants' feelings of being successful was significant, $F_{(1, 120)} = 89.10$, $p < .001$, $\eta_p^2 = .43$. High status participants ($M = 7.56$, $SD = 1.25$) felt more successful in the recalled event than low status participants ($M = 4.26$, $SD = 2.44$). The main effect of status was not qualified by the power x status interaction, $F_{(1, 120)} = .17$, $p = .679$, $\eta_p^2 = .00$. The main effect of power was also not significant, $F_{(1, 120)} = .00$, $p = .963$, $\eta_p^2 = .00$ (powerless participants: $M = 5.92$, $SD = 2.61$; control participants: $M = 5.90$, $SD = 2.50$).

Blackjack game. To test the effect of power on action initiation within each status condition, a three-way Chi-square analysis was conducted on the choice

frequency in the blackjack game. When the status of the participants was low, power did not affect their action initiation, $\chi^2_{(1)} = .58$, $p = .446$. When their status was high, power also did not impact action initiation, $\chi^2_{(1)} = 2.20$, $p = .138$. However, separate comparisons for power conditions showed a significant effect of status in the powerless condition, $\chi^2_{(1)} = 6.15$, $p = .013$. Of the participants with high status, 84% (26 of 31) initiated action (took a card) in the blackjack game, compared to 55% (17 of 31) of those with low status. In the control condition, no effect of status was found, $\chi^2_{(1)} = 3.22$, $p = .073$. Of the participants with high status, 68% (21 of 31) took a card, and 45% (14 of 31) of low status participants took a card.

Negotiation. The 2 (power: powerless vs. control) x 2 (status: high vs. low) ANOVA revealed that the expected power x status interaction was marginal, $F_{(1, 120)} = 3.89$, $p = .051$, $\eta_p^2 = .03$ (see Figure 4). Specifically, when status was low, powerless participants were less likely to negotiate ($M = 3.87$, $SD = 1.82$) than those in the control condition ($M = 4.71$, $SD = 1.40$), $t_{(60)} = 2.04$, $p = .046$, $d = .52$. In contrast, when status was high, the propensity of the participants to negotiate did not differ regardless of the power conditions (powerless participants: $M = 5.00$, $SD = 1.73$; control participants: $M = 4.65$, $SD = 1.76$), $t_{(60)} = .80$, $p = .427$, $d = .20$. Separate simple comparisons were then conducted for two power conditions. In the powerless condition, low status participants were less likely to negotiate than high status participants, $t_{(60)} = -2.50$, $p = .015$, $d = .64$. In contrast, in the control condition, the negotiation tendency of the participants did not differ, $t_{(60)} = .16$, $p = .874$, $d = .04$.

The main effect of power was not significant, $F_{(1, 120)} = .64$, $p = .426$, $\eta_p^2 = .01$

(powerless participants: $M = 4.44$, $SD = 1.85$; control participants: $M = 4.68$, $SD = 1.58$). The main effect of status was also not significant, $F_{(1, 120)} = 3.09$, $p = .081$, $\eta_p^2 = .03$ (high status participants: $M = 4.82$, $SD = 1.74$; low status participants: $M = 4.29$, $SD = 1.66$).

Affect. Items on positive and negative emotions were combined to form a single score for positive and negative affect, respectively (positive affect: $\alpha = .88$, $M = 27.73$, $SD = 7.77$; negative affect: $\alpha = .90$, $M = 19.76$, $SD = 8.13$). We conducted 2 (power: powerless vs. control) x 2 (status: high vs. low) between-participant ANOVAs. For positive affect, only the main effect of status was significant, $F_{(1, 120)} = 21.14$, $p < .001$, $\eta_p^2 = .15$, indicating that high status participants ($M = 30.73$, $SD = 7.26$) experienced more positive affect than low status participants ($M = 24.74$, $SD = 7.13$). The main effect of power was not significant, $F_{(1, 120)} = .34$, $p = .561$, $\eta_p^2 = .00$ (powerless participants: $M = 27.35$, $SD = 7.69$; control participants: $M = 28.11$, $SD = 7.90$). The power x status interaction was also not significant, $F_{(1, 120)} = .07$, $p = .795$, $\eta_p^2 = .00$.

For negative affect, the power x status interaction was significant, $F_{(1, 120)} = 5.02$, $p = .027$, $\eta_p^2 = .04$ (see Figure 5). Specifically, when status was low, powerless participants experienced more negative affect ($M = 23.42$, $SD = 7.93$) than those who were in the control condition ($M = 18.29$, $SD = 7.35$), $t_{(60)} = 2.64$, $p = .011$, $d = .67$. In contrast, when status was high, power did not influence the negative affect of the participants (powerless participants: $M = 18.03$, $SD = 8.79$; control participants: $M = 19.29$, $SD = 7.59$), $t_{(60)} = .60$, $p = .549$, $d = .15$. Separate simple comparisons were

also conducted for two power conditions. In the powerless condition, participants with low status felt more negative affect than those with high status, $t_{(60)} = 2.53$, $p = .014$, $d = .64$. In the control condition, the negative affect of the participants was not related to their status, $t_{(60)} = -.53$, $p = .600$, $d = .13$.

The main effect of power on negative effect was not significant, $F_{(1, 120)} = 1.85$, $p = .177$, $\eta_p^2 = .02$ (powerless participants: $M = 20.73$, $SD = 8.74$; control participants: $M = 18.79$, $SD = 7.43$). The main effect of status was also not significant, $F_{(1, 120)} = 2.37$, $p = .126$, $\eta_p^2 = .02$ (high status participants: $M = 18.66$, $SD = 8.17$; low status participants: $M = 20.85$, $SD = 8.01$).

Summary

Experiment 3 examined whether status driven by performance evaluations modulates the effects of powerlessness on general BIS activation. Three indicators of the BIS activation (emotion, action initiation, and the propensity to negotiate) were measured. The results partly support our hypothesis demonstrating that powerless participants showed increased negative emotions and decreased inclination to act and negotiate only when their competence-related status was low.

Inconsistent with the hypothesis, however, Experiment 3 did not find a modulating role of status in the association between powerlessness and reduced positive emotions. This might be because the power–affect relationship is unstable (see Guinote, 2017, for a review). While several studies found that powerlessness decreases positive affect (e.g., Berdahl & Martorana, 2006; Schmid Mast et al., 2009), other studies revealed a mixed or null effects of power on affect (e.g., Smith & Bargh,

2008; Weick & Guinote, 2008).

Experiment 4

The first two experiments have shown that status determines whether powerlessness leads to avoidance of power holders. Experiment 3 provided evidence for generalized BIS activation. Despite this, it remains unknown whether the avoidance of powerful figures demonstrated in Experiments 1 and 2 is associated with generalized BIS activation. To address this question, Experiment 4 assessed both measures in the same experiment. Similarly to Experiment 2, this experiment manipulated power and status separately. First, participants completed an ambiguous decision-making task individually, then received false evaluative feedback about their performance (status manipulation). Subsequently, participants were introduced to an alleged partner to work on a dyadic decision-making task, and were then assigned to a powerless or control position during the task (power manipulation). To measure the participants' activation of the BIS, we assessed the relative prefrontal hemisphere activation using a line bisection task (Robertson & Halligan, 1999; Wilkinson et al., 2010). Participants bisected horizontal lines by marking the perceived center points. Deviations to the left of the true midpoints reflect greater activation of the right hemisphere, which is associated with the BIS. Deviations to the right indicate greater activation of the left hemisphere, associated with the approach system. To assess avoidance of powerful figures, social distance was measured via sitting position (Santelli, Struthers, & Eaton, 2009). We hypothesized that participants who were in a powerless position (compared to control participants) would display a stronger

activation of the BIS and greater social distance towards the partner, but only if their status was low. Moreover, the joint effects of powerlessness and status on social distance towards the partner should be driven by BIS activation (see Figure 6).

Methods

Participants and design. The sample size criteria and stop rule of recruiting participants were identical to those used in Experiment 3. 132 participants (30% male, 70% female; M_{age} = 20.07, SD = 4.67) recruited from the University College London Psychology Subject Pool participated in the experiment for £2.5 or course credits. The experiment had a 2 (power: powerless vs. control) x 2 (status: high vs. low) between-participant design.

Procedure. Participants were told that the current experiment would comprise of two parts. In the first part, they would individually complete a decision-making task and a visual perception test. In the second part, they would work together with a partner on another similar decision-making task.

Status manipulation. In the individual decision-making task, participants completed a moon landing mission. They were asked to imagine themselves as a member of a space crew planning to rendezvous with the mother ship on the surface of the moon. There was, however, something wrong with their own ship, so they had to abandon it and transfer important items to the mother ship. Their task was to rank 15 items in terms of their importance for the crew, and to give their reasons.

Upon completion, an experimenter pretended to rate their performance with a reference answer given by NASA. Participants were then told that they had either

performed well (high status condition) or poorly (low status condition) in the task.

Power manipulation. Next, participants were given instructions for the dyadic decision-making task. In reality, all participants were assigned to play an assistant role and their partner to play a leader role. In the powerless condition, participants were told that the leader would organize the task, make the final decisions and evaluate their performance. Moreover, their payment would depend on the leader's evaluation. In the control condition, participants were told that the leader would just organize the task and make the final decisions. The leader would not evaluate their performance.

To ensure that the status manipulation was effective, participants were subsequently asked to rate how successfully they felt that they had completed the moon landing task on a scale ranging from 1 (*not at all*) to 9 (*very much*). They also reported their mood on four 7-point scales ranging from -3 (*very bad*; *very sad*; *very discontent*; *very tense*) to 3 (*very good*; *very happy*; *very content*; *very relaxed*).

BIS activation. Participants were instructed to bisect 17 black horizontal lines, which were 0.2 cm thick and measured 10.1–14.9 cm in length. All lines were presented on a sheet of A4 paper. Participants were asked to place a mark in the middle of each line.

Social distance. On completion of the line bisection task, participants were told that the dyadic task would be held in a bigger room, and they were led into a room with a waiting area consisting of a row of eight chairs. A schoolbag had been placed on either the first or the last chair (position was counterbalanced between participants). The experimenter informed participants that their partner had come

earlier and had left for a while to see his supervisor, and that the schoolbag belonged to the partner. Participants were invited to take a seat while waiting for their partner.

While waiting, participants rated how much they would be in charge, how much their partner would be in charge, how much influence they would have, and how much influence their partner would have in the upcoming task on four scales ranging from 1 (*not at all*) to 9 (*very much*). These items were used as the power manipulation check. Finally, they were debriefed and thanked.

Results and Discussion

Eight participants were excluded from the analyses because they did not believe they would work with the other person on the dyadic task (n = 6), or they were familiar with the moon landing mission and suspected the feedback (n = 2). This left a sample of 124 participants.

Manipulation check. The manipulation of status was successful: A 2 (power: powerless vs. control) x 2 (status: high vs. low) between-participant ANOVA yielded a main effect of status on participants' feelings of being successful, $F_{(1, 120)} = 202.26$, $p < .001$, $\eta_p^2 = .63$. High status participants ($M = 6.52$, $SD = 1.11$) felt more successful in the moon landing task than low status participants ($M = 2.94$, $SD = 1.64$). The main effect of status was not qualified by a power x status interaction, $F_{(1, 120)} = 1.33$, $p = .251$, $\eta_p^2 = .01$. The main effect of power was also not significant, $F_{(1, 120)} = .41$, $p = .523$, $\eta_p^2 = .00$ (powerless participants: $M = 4.65$, $SD = 2.20$; control participants: $M = 4.81$, $SD = 2.36$).

The manipulation of power was also successful: The two items measuring

participant's power were combined into one score (α = .87, $r_{(124)}$ = .78, p < .001; M = 3.99, SD = 1.46). Similarly, the two items regarding the partner's power were averaged into one score (α= .79, $r_{(124)}$ = .65, p < .001; M = 7.29, SD = .85). A 2 (power: powerless vs. control) x 2 (status: high vs. low) x 2 (target: self vs. partner) mixed-design ANOVA was conducted, with target as a within-participant factor. yielded a main effect of status. The main effect of power was significant, $F_{(1, 120)}$ = 8.20, p = .005, η_p^2 = .06, indicating that powerless participants (M = 5.45, SD = 2.28) felt that they and their partner had less average control in the upcoming dyadic task than control participants (M = 5.83, SD = 1.75). The main effect of target was also significant, $F_{(1, 120)}$ = 470.29, p < .001, η_p^2 = .80, indicating that participants felt that their partner (M = 7.29, SD = .85) had more control than themselves (M = 3.99, SD = 1.46) in the following task. Importantly, the power x target interaction was significant, $F_{(1, 120)}$ = 23.28, p < .001, η_p^2 = .16. Separate simple comparisons showed that powerless participants felt that they had less control (M = 3.44, SD = 1.30) in the upcoming task compared to control participants (M = 4.55, SD = 1.40), $t_{(122)}$ = -4.59, p < .001, d = .82. Whereas, powerless participants felt their partner had more control (M = 7.47, SD = .74) compared to control participants (M = 7.11, SD = .93), $t_{(122)}$ = 2.36, p = .020, d = .42. The main effect of status was not significant, $F_{(1, 120)}$ = 1.64, p = .203, η_p^2 = .01 (high status participants: M = 5.73, SD = 1.97; low status participants: M = 5.56, SD = 2.10). Status did not interact with power, $F_{(1, 120)}$ = .03, p = .855, η_p^2 = .00; or target, $F_{(1, 120)}$ = 1.76, p = .188, η_p^2 = .01. The three-way interaction between status, power, and target was also not significant, $F_{(1, 120)}$ = 1.02, p

Commented [m25]: **Ms. Guinote:** I would enter this in an analysis with self-other as a factor, alongside power with power. One would expect an interaction.
Mianlin: Thank you for addressing the issue. I changed the analysis.

= .316, η_p^2 = .01.

The main effect of power on participants' self perceived power was significant, $F_{(1, 120)}$ = 21.20, p < .001, η_p^2 = .15. Powerless participants (M = 3.44, SD = 1.30) reported less control and influence in the upcoming dyadic task than control participants (M = 4.55, SD = 1.40). The main effect of status was not significant, $F_{(1, 120)}$ = 2.36, p = .127, η_p^2 = .02 (M = 4.18, SD = 1.53, for high status participants; and M = 3.81, SD =1.36, for low status participants). The main effect of power was not qualified by the power x status interaction, $F_{(1, 120)}$ = .54, p = .464, η_p^2 = .00. The main effect of power on participants' feelings of their partner's power was also significant, $F_{(1, 120)}$ = 5.50, p = .021, η_p^2 = .04. Powerless participants (M = 7.47, SD = .74) felt that their partner would have more control and influence than control participants (M = 7.11, SD= .93).The main effect of status was not significant, $F_{(1, 120)}$ = .05, p = .831, η_p^2 = .00 (M = 7.27, SD = .79, for high status participants; and M = 7.31, SD =.92, for low status participants). The main effect of power was also not qualified by the power x status interaction, $F_{(1, 120)}$ = .73, p = .395, η_p^2 = .01.

BIS activation (line bisection error). The distance from the true midpoint was measured in millimeters for each line. Errors to the left were scored as negative values and errors to the right as positive values. A mean line bisection score was calculated by averaging the scores across the 17 lines. Negative values suggest relatively greater right-than-left hemispheric activation, associated with BIS activation. Whereas positive values indicate greater left-than-right hemispheric activation, associated with BAS activation.

As predicted, the power x status interaction was significant, $F_{(1, 120)} = 6.25$, $p = .014$, $\eta_p^2 = .05$ (see Figure 7). Specifically, when status was low, powerless participants ($M = -.07$, $SD = .12$) made more errors to the left than control participants ($M = .06$, $SD = .16$), $t_{(60)} = 3.77$, $p < .001$, $d = .96$. One sample t tests were then performed to determine whether the mean bisection error of each condition was different from zero. Powerless participants made more errors to the left from zero ($t_{(30)} = -3.44$, $p = .002$), whereas control participants displayed more errors to the right from zero ($t_{(30)} = 2.14$, $p = .041$). This indicated that when status was low, powerless participants were inhibition-activated whereas control participants were approach-activated. In contrast, when status was high, the bisection error did not differ regardless of the power of the participants (powerless participants: $M = .06$, $SD = .15$; control participants: $M = .05$, $SD = .22$), $t_{(60)} = .33$, $p = .743$, $d = .08$. One sample t tests revealed that powerless participants made more errors to the right from zero ($t_{(30)} = 2.28$, $p = .030$), whereas control participants' bisection errors did not differ from zero ($t_{(30)} = 1.17$, $p = .252$). This indicated that when status was high, powerless participants were approach-activated, but that control participants were not.

Separate simple comparisons were also conducted on the bisection error for the two power conditions. In the powerless condition, low status participants showed more errors to the left (BIS activation) than high status participants, $t_{(60)} = 3.91$, $p < .001$, $d = .99$. In contrast, in the control condition, no error difference was found between participants with low and high status, $t_{(60)} = .14$, $p = .771$, $d = .07$.

The main effect of status was significant, $F_{(1, 120)} = 4.09$, $p = .045$, $\eta_p^2 = .03$,

Commented [P26]: Ms. Guinote: I did not notice this pattern before, it is the first time isn't it? Interesting.

Mianlin: No, it isn't the first time in our studies to show that when status was high, powerless participants were approach-oriented. Experiment 2 aslo showed that when status was high, powerless participants were approach-oriented. Experiment 2 compared the powerless condition with the control condition. Here, we compared the powerless with the "zero". If we compared the powerless and the control, we didn't find a significant effect of power condition.

showing that high status participants (M = .05, SD = .19) produced more errors to the right than low status participants (M = - .01, SD = .15). This indicated that high status participants were more approach-motivated than low status participants. The main effect of power was marginal, $F_{(1, 120)} = 3.88$, $p = .051$, $\eta_p^2 = .03$, suggesting that powerless participants (M = - .01, SD = .15) tended to make fewer errors to the right than those in the control condition (M = .05, SD = .19). This is consistent with decreased BAS activation among powerless participants.

Social distance (sitting position). Social distance was measured as the distance in number of chairs between the participant's chair and the partner's chair.[4] It indicated approach/avoidance tendencies towards the target (power holder or control).

As predicted, the power x status interaction was significant, $F_{(1, 120)} = 8.09$, $p = .005$, $\eta_p^2 = .06$ (see Figure 8). Specifically, when status was low, powerless participants (M = 4.84, SD = .93) sat further away, showing greater social distance in relation to the target, compared to control participants (M = 3.68, SD = .70), $t_{(60)} = 5.53$, $p < .001$, $d = 1.40$. In contrast, when status was high, participants' sitting positions were not affected by their power (powerless participants: M = 3.87, SD = .92; control participants: M = 3.61, SD = .96), $t_{(60)} = 1.08$, $p = .283$, $d = .28$.

Separate simple comparisons revealed that in the powerless condition, low status participants sat further from their powerful partner's position than did high status

[4] In preliminary analyses, the main effect of the partner's schoolbag position on the seat selection of the participants was not significant, $F_{(1, 116)} = 1.16$, $p = .283$, $\eta_p^2 = .01$. This factor did not interact with power or status (Fs < 1). The three-way interaction between power, status and partner's position was also not significant ($F < 1$). We therefore collapsed this factor in the analyses.

participants, $t_{(60)} = 4.11$, $p < .001$, $d = 1.05$. In contrast, in the control condition, participants' choices of seat were not affected by their status, $t_{(60)} = .30$, $p = .763$, $d = .08$.

The main effect of status was significant, $F_{(1, 120)} = 10.56$, $p = .001$, $\eta_p^2 = .08$, showing that low status participants ($M = 4.26$, $SD = 1.01$) chose to sit further from the target person than high status participants ($M = 3.74$, $SD = .94$). The main effect of power was also significant, $F_{(1, 120)} = 19.97$, $p < .001$, $\eta_p^2 = .14$, indicating that powerless participants ($M = 4.35$, $SD = 1.04$) tended to sit further from the target compared to control participants ($M = 3.65$, $SD = .83$). Thus in this experiment both status and power per se affected social distance. However, as discussed earlier, differences reached significance when comparing the joint effects of low power and low status with those of the other conditions.

Mood. The four items were collapsed into a single score ($\alpha = .86$; $M = .64$, $SD = 1.17$). The power x status interaction was not significant, $F_{(1, 120)} = .01$, $p = .904$, $\eta_p^2 = .00$. This ruled out the proposition that the interactive effects of power and status on inhibition were driven by mood. The main effect of status was significant, $F_{(1, 120)} = 74.74$, $p < .001$, $\eta_p^2 = .38$, showing that high status participants ($M = 1.36$, $SD = .79$) felt more positive emotions than low status participants ($M = -.08$, $SD = 1.04$). The main effect of power was not significant, $F_{(1, 120)} = .17$, $p = .683$, $\eta_p^2 = .00$ (powerless participants: $M = .60$, $SD = 1.17$; control participants: $M = .67$, $SD = 1.19$).

Mediated moderation analysis. We examined whether the impact of power and status on social distance towards the target was mediated by BIS activation. We used

Model 8 of the PROCESS macro (Hayes, 2013, 2015) to test the mediated moderation model. The estimated regression coefficients are shown in Table 1. In the first step estimates (see left columns in Table 1), power significantly predicted BIS activation (mediator), $b = .13$, $SE = .04$, $p = .002$. This indicates that powerless participants were more BIS-activated than control participants. The effect of status was also significant, $b = .13$, $SE = .04$, $p = .002$, indicating that low status participants were more BIS-activated than high status participants. Importantly, the power x status interaction significantly predicted BIS activation, $b = -.15$, $SE = .06$, $p = .014$. In the second step estimates (see right columns in Table 1), BIS activation significantly predicted social distance, $b = -2.36$, $SE = .44$, $p < .001$; but the power x status interaction was reduced to non-significance, $b = .55$, $SE = .29$, $p = .062$. This indicated that the indirect effects of power and status on participants' social distance towards a target person were mediated by the BIS activation. In the third step estimates, the indirect effect of power on social distance through the BIS activation was negative and significant for the low status condition, $b = -.31$, $SE = .10$, 95% CI [-.55, -.15]; but not significant for the high status condition, $b = .04$, $SE = .12$, 95% CI [-.17, .29]. The direct effect of power on social distance was negative and significant for the low status condition, $b = -.85$, $SE = .21$, $p < .001$; but not significant for the high status condition, $b = -.30$, $SE = .20$, $p = .147$.

Summary

Consistent with the hypothesis, in Experiment 4 status not only modulated the impact of powerlessness on social distance towards power holders, but also modulated

the impact of powerlessness on the activation of the BIS. Moreover, the interactive effects of powerlessness and status on social distance towards the partner were mediated by the activation of the BIS. Specifically, lack of power triggered the BIS activation, which motivated participants to avoid powerful figures. This, however, only occurred when the powerless had low status.

General Discussion

Over a decade, research on social power has highlighted the detrimental effects of being in a powerless position for well-being, cognitive ability, and performance (e.g., Keltner et al., 2003; Guinote, 2007b; Smith & Bargh, 2008). These effects have been associated with exposure to threats and punishments, and the activation of the BIS. Despite cumulative evidence consistent with these claims (Guinote, & Lammers, 2016), anecdotal testimony would suggest that people often seek powerless positions, and that therefore being powerless may not be an aversive experience. People voluntarily enter powerless positions as students, volunteers or employees, and they satisfactorily carry out their powerless roles. In this article, we proposed that being or appearing to be (in)competent in the eyes of power holders is key to the ways powerlessness affects individuals. Four experiments consistently showed that when competence was high it acted as a buffer against powerlessness, and that powerlessness only activated the BIS when individuals lack actual or potential competence.

Using different manipulations of power and status across two different cultures, Experiments 1 and 2 found that powerless individuals with low status driven by lack

of competence showed avoidant behavior towards power holders. In contrast, those who were competent and had high status did not show this behavior. This difference did not emerge when the participants faced a target person who did not have power over them. Experiment 3 demonstrated that status affects multiple correlates of the BIS among powerless individuals. Low status induced negative emotions and decreased the tendency to act and negotiate. Conversely, high status mitigated these effects. Moreover, Experiment 4 examined the joint effects of status and powerlessness on frontal hemisphere dominance (a measure of BIS activation) and social distance during social interactions. A significant mediated moderation model showed that low (vs. high) competence-related status increased powerless people's social distance towards a power holder, and this in turn was driven by the activation of the right hemisphere, associated with the BIS.

In current studies, the effects of status, driven by competence evaluations, on behavioral orientation were therefore context-specific. Evaluations from a power holder affected individuals' behavioral orientation, presumably because of its potential consequences (e.g., exposure to rewards or punishments), whereas evaluations from a person who did not have power over the participants did not affect individuals' behavioral orientation.

The present findings show that the harmful combination of powerlessness and low status impacts people regardless of whether status differences emerge in the context of power relations, or stem from individual dispositions and skills prior to entering power relations. Crucially, power and status had context-specific effects on

BIS. Evaluations from a power holder affected individuals' behavioral orientation, presumably because of its potential consequences, whereas evaluations from a person who did not have power over the participants did not affect individuals' behavioral orientation.

The harmful dual combination of low status and powerlessness affects individuals broadly, including their motivational orientation, seen in self-reports and indicators of brain activation, as well as in daily social behavior, including their propensity to act and negotiate, and their social proximity.

Commented [P27]: Feel free to drop or summarize

Commented [m28]: Mianlin: Hi Ms. Guinote. I like these paragraphs, but do you think they are repeated as the previous paragraphs?

The Modulating Role of Status on Powerlessness-Inhibition Relationships

Why does powerlessness trigger behavioral inhibition only when powerless individuals' status is low? Status is based on others' assessments and is conferred by others (Berger et al., 1980; Gould, 2002; Magee & Galinsky, 2008). Since powerless individuals are often evaluated (Fiske, 1993; French & Raven, 1959; Galinsky et al., 2003), they are easily affected by status conferral. Low status conferral threatens the need to be socially valued (Anderson et al., 2015; Gregg et al., 2017). Powerlessness associated with low status – in particular with being incompetent – is a double challenge, thwarting an individual's natural resources for coping with adversity. The failure to meet social standards (especially the standards set by power holders) can signal that resources may be withdrawn and punishment may be exerted. This in turn may trigger BIS among powerless individuals.

An alternative hypothesis according to which the double disadvantage of powerlessness and low status could activate BIS via negative affect did not receive

support. In particular, Experiments 1, 2 and 4 have ruled out mood as an alternative explanation for the effects obtained.

The joint effects of powerlessness and status effects are consistent with indirect evidence that low status can lead to physiological threat reactions (Kishida, Yang, Quartz, Quartz, & Montague, 2012), and the findings showing self-threats, such as being negatively evaluated or compared with, induce defensive responses such as withdrawal, vigilance, and biased processing of threat-related information ~~among ordinary powerless people~~ (Ma & Han, 2009; Muller & Fayant, 2010; Jonas et al, 2014). In contrast, high status protects people's well being (Adler, Epel, Castellazzo, & Ickovics, 2000). It functions as a resource for helping the self deal effectively with the challenges of powerlessness (Sivanathan & Pettit, 2010), and can be followed by rewards.

How can we reconcile our findings with the large body of evidence favoring the link between powerlessness and inhibition? Although this question requires further investigation, it is possible that the answer lies on the impact of common experimental conditions. For instance, a common manipulation of powerlessness asks participants to recall a past event when they were powerless (Galinsky et al., 2003; Magee & Galinsky, 2008). Preliminary evidence from our laboratory shows that memory is biased towards past negative occurrences (e.g., receiving negative performance feedback from an evaluator). This bias is consistent with extant literature showing increased memory sensitivity for negative stimuli (Baumeister, Bratslavsky, Finenauer, & Vohs, 2001; Ito, Larsen, Smith, & Cacioppo, 1998). Other powerless

Commented [P29]: Ms. Guinote: were people powerless in all of these studies? Maybe give an example. I believe that there are also many examples where non-powerless people respond to low status, so this issue needs elaboration, and trying to see why.

manipulations may be associated with uncertainty. For example, when power relations are initially formed in laboratory experiments, powerless participants may feel uncertain and uncontrollable. Negative and uncertain experiences may trigger behavioral inhibition.

Limitations and Future Directions

In the present context, status was examined in relation to the potential or actual competence of individuals. This is a common operationalization of status and is highly relevant in powerless contexts (Magee & Galinsky, 2008). We interpreted that powerlessness under poor competence can signal upcoming threats and punishments. More broadly, the detrimental interactive effects of powerlessness and low status driven by poor competence may result from a double challenge to basic needs to have control over one's outcomes and to be socially valued (Cuddy et al., 2008; Fiske, 2004). The threat of lack of control and social value may deplete resources. This would lead individuals to engage in compensatory strategies to cope with these challenges. However, this issue needs further investigation. For instance, low competence may convey other psychological consequences, such as low self-esteem and vitality.

The present work examined status operationalized in terms of task-related competence in powerless contexts~~related to powerless roles~~, which implied actual or potential reputation in the eyes of the power holders (e.g., being a good subordinate). It remains to be seen if other sources of status, such as competence in domains unrelated to powerless roles, attractiveness, or social value stemming from peers,

Commented [P30]: I like it

Commented [P31]: **Ms. Guinote:** do you think we can say this for all studies?
Mianlin: How about "task-related competence in powerless contexts"?

impact powerless people in a similar way to competence. An answer to this question is important because it can help understand the dual mechanisms of powerlessness and competence-related status. Competence is unique in giving powerless people a means of control over their targets, suggesting that the effects produced might derive from an increased sense of personal control that could mitigate the lack of control stemming from being in a relational powerless position (Lammers, Stoker, Rink, & Galinsky, 2016). In contrast, if other forms of status have similar effects to task-related competence, this would suggest that other factors play a role in the modulation of BIS activation among the powerless.

Implications and Contributions

The present studies contribute to the understanding of the dynamics of powerlessness. They contribute to the growing evidence suggesting that the impact of power on approach/inhibition is context-specific. A growing body of research has illustrated critical moderators ranging from individual difference variables such as anxiety and subjective perception of power (Maner, Gailliot, Menzel, & Kunstman, 2012; Bugental & Happaney, 2000, 2004) to situational variables such as legitimacy and stability (Lammers, Galinsky, Gordijn, & Otten, 2008; Jordan, Sivanathan, & Galinsky, 2011). Our work extends these findings by showing for the first time that within a stable power structure, powerlessness does not inevitably activate the BIS.

This research also contributes to the emerging literature differentiating between the effects of distinct bases of social hierarchy. Status and power are two relevant but distinct constructs (Magee & Galinsky, 2008; Fiske, 2010). Although theorizing

highlights the importance of distinguishing between these constructs, only a small part of the empirical research has examined how they are intertwined (Blader & Chen, 2012; Blader, Shirako, & Chen, 2016; Hays & Bendersky, 2015).

Crucially, research has primarily investigated the interactive effects of status and high power, but not the effects associated with powerlessness (Anicich, Fast, Halevy, & Galinsky, 2016). Here we show that status plays a crucial role in gauging when powerlessness is more likely to be perceived as a desired means to fulfil social aims and goals, and when it signals threat.