UPS AND DOWNS: THE AFFECTIVE CONSEQUENCES OF POWER IN DIFFERENT CONTEXTS

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Stefan Leach
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DECLARATION

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ABSTRACT

Power dictates the allocation of, and access to, valued resources. It is perhaps not surprising then that people have a ‘will’ or ‘lust’ for power (Nietzsche, 1924; Russel, 1938), and believe that power is exciting and powerlessness depressing (Mondillon et al., 2005). The Approach-Inhibition Theory of Power echoes this belief, suggesting that high power brings positive mood and low power negative mood (Keltner, Gruenfeld, & Anderson, 2003). However, empirical data on power and mood is mixed. Inducing feelings of power sometimes elevates mood (e.g., Galinsky, Gruenfeld, & Magee, 2003), but other times does not (e.g., Berdahl & Martorana, 2006), suggesting that the relationship between power and mood may be more complex than initially thought.

The Situated Model of Power argues that the relationship between power and mood is dependent on the context (Guinote, 2007a). In this view, power attunes people to the current situation, elevating mood in positive contexts and depressing mood in negative contexts. This implies that power increases variability in mood between contexts of opposing valence (negative vs. positive; Guinote, 2007a), and is consistent with the fact that power increases variability in thought and behaviour (Guinote, Judd, & Brauer, 2002).

Five studies, informed by the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) Models of Power, looked at the impact of high and low power on self-reports, and physiological indices, of mood at baseline and in contexts of differing valence (negative vs. positive). A meta-analysis revealed that across studies (N = 1046) high power elevated, and low power depressed mood at baseline/in neutral and in positive contexts. However, neither high nor low power predicted mood in negative contexts. Furthermore, high power increased, and low power decreased variability in mood across contexts (although the former effect was marginally significant). Results reconcile disparate findings and are discussed in relation to theoretical models of power.

CHAPTER 1: POWER

1.1. Overview

Chapter 1 provides a broad overview of the literature on power. The first section presents a brief historical synopsis before discussing definitions of power. Next, prominent empirical work on power is considered. Lastly, theories of power are introduced, including the Power as Control, Approach-Inhibition, Social Distance, Situated and Disinhibition Models of Power.

1.2. A Historical Perspective

Interest in power can be traced back to time in antiquity. Greek philosophers documented their intuitions regarding the psychological effects of power. For example, Sophocles states: “Tyranny is in many things happy—especially in its being possible for it to do and say what it wishes” (Penner, 1991, p. 149). Interest in power is also evident in the Renaissance, where prominent thinkers explored the moral implications of power and powerlessness. Machiavelli (1532/2011) argued power-holders ought to be brutal and coercive when necessary. Similar aphorisms can be found in modern philosophy. Nietzsche (1924) thought that a person’s position of power motivated him to hold different (and oftentimes illegitimate) moral values, and that replacing these values with one’s own was the mark of a strong-willed individual. Inspired by Nietzsche’s genealogical approach, Foucault (1980) analysed the role of power in various social institutions (e.g., prison system, home), establishing the concept of power within everyday life. Indeed, there is now a sense that power is pervasive (Guinote & Vescio, 2010), arising in most relationships, between parents and children, teachers and students, line-managers and employees, and policemen and citizens. Some scholars have even argued that power is a fundamental ‘law’ of social dynamics (Russel, 1938), suggesting that power is a ubiquitous and central psychological construct.

The intellectual radicalism of the 1960’s sparked a scientific interest in the psychology of power. Empirical work began with attempts to account for the bases of social power (French & Raven, 1959), outline the motivation to power (Winter, 1988), and to integrate the concepts of ‘authority’ and ‘legitimacy’ under the umbrella of power and dependence (Emerson, 1962). Later work asked the question: “Does power corrupt?”. Kipnis (1972) observed that power was associated with greater use of harsh negotiation tactics and less appreciation for subordinates. However, following the now infamous ‘obedience’

(Milgram, 1963) and ‘prison’ studies (Haney, Banks, & Zimbardo, 1973), interest in power waned in favour of concepts such as *legitimacy*, *conformity*, *authority* and *social identity*.

A renewed interest in power emerged some decades later with an influential paper on power and stereotyping (Fiske, 1993). A socio-cognitive approach to power arose, in which the psychological concomitants of power took centre stage. Scholars began to document the effects of power in numerous domains, including: social perception (Fiske & Dépret, 1996), cognition (P. K. Smith & Trope, 2006), behaviour (Galinsky et al., 2003), motivation (Guinote, 2007c), subjective experiences (Weick & Guinote, 2008) and health (Scheepers, de Wit, Ellemers, & Sassenberg, 2012). As such, power is now a pervasive concept across social psychology, referenced in relation to both intrapersonal (e.g., impression formation, motivation, action and health) and interpersonal (e.g., morality, legitimacy, leadership and ideology) phenomena (Guinote & Vescio, 2010).

1.3. Definitions

In the broadest sense, power can be thought of as “the production of intended effects” (Russel, 1938, p. 18). This encompasses the ability to control others (i.e., allocate rewards and punishments) and the ability to control the self and the environment (i.e., determine personally relevant rewards and punishments). A similar distinction is made between *power over* and *power to* (Overbeck & Park, 2001). *Power over* (or social power) refers to control or domination of others. *Power to* (or personal power) refers to an individual’s personal ability to bring about intended outcomes (see Lammers, Stoker, Rink, & Galinsky, 2016; van Dijke & Popper, 2006), and is closely related to the constructs of autonomy (Deci & Ryan, 2010), competence (White, 1959) and self-efficacy (Bandura, 1982). It is important to note that although social and personal power are conceptually distinct, they should not be thought of as orthogonal. For example, gaining access to rewards valued by others (i.e., an increase in social power) does not necessarily increase personal power, but being subject to another person’s will is typically detrimental to personal power (for a review see Leach, Weick, & Lammers, 2017). The following work is largely concerned with social power.

Social power is relational. An individual’s power is not solely a function their own capacities (Emerson, 1962; French & Raven, 1959), but is a function of their relative capacities compared to others (Guinote & Vescio, 2010). The relational nature of power is present in numerous definitions of power (Thibaut & Kelley, 1959). Russell states: “A has more power than B, if A achieves many intended effects and B only a few” (Russel, 1938, p. 35). In this view, power is defined based on its’ relative capacity to bring about desired effects. However, such a view may fail to capture instances in which an individual has power but chooses not to exert it.

Shifting the focus to sources of power (potential or actual), French and Raven (1959) identify six bases of power. *Legitimacy* refers to the belief that an actor has the right to exercise power. *Expertise* is the belief that an actor possesses special knowledge or competence. *Reference* refers to an individual's sense that he or she identifies, or desires to identify, with a superordinate. Lastly, *rewards* and *coercion* are the most prototypical operationalisations of power, and are based on the belief that an actor has the ability to control rewards and punishments, respectively. These bases, in turn, provide individuals with the potential to withhold or administer valued resources; which can be physical (e.g., pain, pleasure), material (e.g., money, food) or social (e.g., affection, verbal abuse; see Fiske, 2010). In keeping with this, many researchers have defined social power as asymmetric control over valued resources or outcomes (Anderson & Berdahl, 2002; Fiske & Dépret, 1996; Keltner et al., 2003; Magee & Galinsky, 2008). Kipnis (1976) defines power as access to resources needed by others, and Fiske and Dépret (1996) define power as asymmetrical control over another person's outcomes.

Although the aforementioned definitions outline the structural bases of power, psychological research has largely concerned itself with explaining the mental processes associated with power. Here, power is a mediating psychological construct. Rucker and Galinsky (2017, p. 26) define power as a "psychological state or mindset of feeling powerful". In this view, psychological science plays a central role in understanding power. Crucial pieces of work include: delineating the Sense of Power as a psychological trait and examining its correlates (e.g., feelings of control, optimism; Anderson, John, & Keltner, 2012), and probing the downstream effects of activating feelings of power and powerlessness (e.g., Galinsky et al., 2003).

Importantly, the psychological sense of power cannot be equated with objective differences in control over resources. The latter is often assumed to give rise to the former (Fiske & Dépret, 1996; Keltner et al., 2003; Magee & Galinsky, 2008), and proxies of resource-control (e.g., socio-economic status, job-role, income) predict feelings of power

(Anderson et al., 2012; P. K. Smith & Hofmann, 2016). Moreover, a common way of instilling a sense of power is to manipulate the allocation of resources (e.g., Guinote, 2007c). However, perceived and actual power diverge in every-day life more often than assumed (P. K. Smith & Hofmann, 2016), and can interact to produce unique patterns of behaviour (P. K. Smith & Magee, 2015), suggesting consideration must be given to both structural and psychological forms of power.

Before continuing, it is important to distinguish power from other related constructs, such as status, leadership and social dominance orientation. *Status* is the evaluation of an individual's attributes, producing differences in respect. Respect generally dictates the allocation of resources within groups, and is therefore related to power (French & Raven, 1959; Magee & Galinsky, 2008). However, it is possible to have power without status (e.g., tax collectors), and status without power (e.g., 'underdogs'), and the two constructs often lead to dissociable outcomes (see P. K. Smith & Magee, 2015). *Leadership* primarily describes the processes by which a group member promotes engagement towards a collective goal (Chemers, 2001). Although status and power can influence leaders' success they are not required, and are independent of leadership (Bass & Stogdill, 1990). *Social Dominance Orientation* is an ideological belief system (Pratto, Sidanius, Stallworth, & Malle, 1994) associated with an individual's tendency to prefer and endorse hierarchical social structures. Although such an orientation predisposes people to attain positions of power (Pratto, Stallworth, Sidanius, & Siers, 1997), it is independent of power. Indeed, power-holders can exhibit behaviours oriented towards increasing equality (Chen, Lee-Chai, & Bargh, 2001).

The next section will discuss the empirical study of power; how individuals come to hold positions of high and low power, and how this impacts on behaviour and cognition.

1.4. Empirical Review

The review of the empirical work begins with a discussion of how power is acquired, afforded and communicated. Later sections explore the effects of power on cognition and behaviour. That is, how do power-holders think and act, and how does this differ from those who are powerless?

Acquisition and Identification

People like the feeling of power and are motivated to attain it. Groos (1901, p. 82) described this as a feeling of "joy in being a cause". Subsequent research has established the psychological importance of feelings of control (Deci & Ryan, 2002). However, group dynamics dictate that only a subset of members are afforded control and power. What governs who attains power and who does not? Those who are afforded power differ on multiple dimensions compared to those who do not. They possess different physiological characteristics (Sapolsky, 2005), negotiate social interactions differently (e.g., Anderson, John, Keltner, & Kring, 2001), and are typically members of different groups (e.g., Schmid Mast, 2004). The coming section will explore the role of these factors in how power is acquired and identified.

Different neuroendocrine profiles predict attainment of power. Testosterone levels predict striving-for and attaining power. Testosterone increases in anticipation of competition, spikes in response to victory and drops as a result of defeat (Booth, Shelley, Mazur, Tharp, & Kittok, 1989). Testosterone also increases dominant behaviours; for example expressions of anger and willingness to confront a sexual competitor (Anderson & Kilduff, 2009; Archer, 2006; Dabbs, de La Rue, & Williams, 1990). Similar physiological markers predict the likelihood for people to persist in the face of obstacles (Andrew & Rogers, 1972), suggesting that chronically low levels of testosterone may make it difficult to attain positions of power.

Cortisol, on the other hand, is an indicator of perceived threat and anxiety. Although spikes in cortisol promote short-term adaptive responses to threats, chronically elevated cortisol is maladaptive (Sapolsky, 2005). For example, those who have chronically high levels of cortisol score lower on indices of self-esteem and are more likely to respond to social situations in a maladaptive way (i.e., overly sensitive to threat; Dickerson, Gruenewald, & Kemeny, 2004; Gruenewald, Kemeny, Aziz, & Fahey, 2004). As attaining power in most hierarchical structures requires effectively responding to threats (Sapolsky, 2005), it is likely that high levels of cortisol undermine these attempts. Research looking at the interactive effects of testosterone and cortisol supports this. High levels of testosterone only predict effective attainment of power when accompanied with low levels of cortisol (Mehta & Josephs, 2010). Thus, particular neuroendocrine profiles (i.e., high testosterone and low cortisol) promote patterns of thought and behaviour that facilitate the attainment of power.

The propensity to engage socially predicts attainment of power. Observing group dynamics suggests that extraverted and open personality styles are associated with power. In one study, Savin-Williams (1977) observed that more socially-dynamic and outgoing children were most likely to adopt leadership positions at a summer camp. Keltner and colleagues (1998) found a similar pattern of results when looking at peer-ratings of power and social openness in fraternity members. Members rated as more dynamic, open and playful in their teasing were rated as having greater power. Analogous traits are represented in the Big Five framework as extroversion (e.g., energetic, happy, outgoing), and arguably the inverse, neuroticism (e.g., inhibited, anxious, agitated; John & Srivastava, 1999). As would be expected, extraversion positively predicts, and neuroticism negatively predicts peer-ratings of power (Keltner, Gruenfeld, Galinsky, & Kraus, 2010). Similar relationships are found in formal settings and non-student samples (Judge, Bono, Ilies, & Gerhardt, 2002)

In practice, power covaries with assertive social behaviour. Dominance is associated with open and expanded postures (Tiedens & Fragale, 2002), maintaining eye-contact (Dovidio & Ellyson, 1985) and having a lower-pitched voice (Carney, Hall, & LeBeau, 2005). Moreover, assertive and sophisticated verbal communication (Areni & Sparks, 2005; Bradac, Bowers, & Courtright, 1979; Crosby & Nyquist, 1975) is associated with power. In one study low status was associated with more hedges, hesitations, and tag questions, than was high status (Blankenship & Holtgraves, 2005). Power-holders are also more likely to influence others by giving advice, which can further elevate their feelings of power (Schaerer, Tost, Huang, Gino, & Larrick, 2018). Wakslak, Smith and Han (2014) showed that people who used abstract language were thought to possess higher power than those who used concrete language. Lastly, laughter likely conveys power. Oveis and colleagues (2013) found that high-status individuals laughed in a more disinhibited manor, whilst low-status individuals laughed in a more inhibited manor. Therefore, it seems likely that the acquisition of power co-varies with the ability to engage in social life in an active, dynamic and assertive fashion.

The need for control differs from person to person, providing a potential explanation of power differences in terms of variations in personality. People who are highly motivated to attain power often make themselves visible to others and take more risks (McClelland & Watson, 1973). Likewise, leaders who have a high need for power are more likely to cope with group-related stress (Fodor & Smith, 1982), and take steps to keep their subordinates at bay (Fodor & Riordan, 1995). Moreover, implicit measures of power-motivation (*n* Power) predict testosterone and dominant behaviours (Rivers & Josephs, 2010; Schultheiss, 2013), suggesting that motivational differences in the desire for power play an important role in predicting who will attain positions of power.

Recent research has begun to highlight the importance of understanding people's expectations regarding the use and acquisition of power (Hu, Rucker, & Galinsky, 2016; Rucker, Hu, & Galinsky, 2014). Expectation States Theory (Berger, Cohen, & Zelditch, 1972) and Social Role Theory (Eagly, Wood, & Diekman, 2000) argue that certain characteristics are associated with the attainment of power (Berger et al., 1972). For example, people implicitly associate women with egalitarian structures, and men with hierarchical structures (Schmid Mast, 2004). Similar expectations may, in turn, account for the fact that particular demographic groups are more likely to attain positions of power (e.g., men vis-à-vis women). For example, women are generally underrepresented in leadership positions (Stacey & Connell, 1988), and this difference is even more prominent for top power positions (e.g., CEO level; Adams, Gupta, Haughton, & Leeth, 2007). Thus, beliefs and expectations about power, and those who typically possess it, may shape the processes by which people come to attain of power.

In keeping with the above, people pick-up on cues that communicate power; for example, superficial characteristics such as height, age and physical attractiveness (for review see Keltner et al., 2010). Judgements of power are also surprisingly accurate (Anderson et al., 2001; Dunning, Leuenberger, & Sherman, 1995). Anderson and colleagues (2001) asked students living in the same dormitory to rate their peers on power after knowing them for two weeks and then after four and nine months. Ratings made in the first two weeks were highly predictive of subsequent ratings (r = .60), especially for men (r = .80). People can even judge power-related traits from relatively impoverished stimuli (for review see Ambady & Rosenthal, 1992). Judgements of status made from 60 second video clips of behaviour predict (r = .30) objective measures of status (e.g., income, education) suggesting people can quickly and reliably pickup on cues that communicate power (Kraus & Keltner, 2009). This is corroborated by neuroimaging data suggesting that people can differentiate between nonverbal cues signalling power (i.e., averted gaze vs. directed gaze) in as little as 33 milliseconds (Insel & Fernald, 2004). All in all, the findings speak to the perceptual salience and importance of power in everyday life.

In sum, people differ on multiple dimensions that predict the likelihood of attaining power. Important factors include: physiological correlates of aggression and anxiety, the propensity to engage socially, and membership in groups that are assumed to possess power. People largely agree on the social cues which afford power, and are quick and reliable at detecting them, suggesting that power is salient feature of every-day life. The next section explores how those in power think and behave differently to those in without power.

Social Perception and Morality

Power-holders are less dependent on others, and because of this are often thought to be less interested in them. Accordingly, those in power engage in less effortful forms of social perception, relying on preconceived social categories and forming more stereotypical impressions than those who do not possess power (Goodwin, Gubin, Fiske, & Yzerbyt, 2000; Richeson & Ambady, 2003; Vescio, Gervais, Snyder, & Hoover, 2005). Power also makes it less likely for people to take another's perspective. In one study, participants primed with high (vs. low) power were more likely to draw the letter "E" on their forehead from their perspective, as opposed to the observer's perspective ("E" vs. "Ǝ"; Galinsky, Magee, Ena Inesi, & Gruenfeld, 2006). In a similar vein, power-holders are less proficient at identifying emotions from facial expressions and speech (Galinsky et al., 2006; Uskul, Paulmann, & Weick, 2016; but see Schmid Mast et al., 2009). This tendency can also be seen when recording cortical motor responses associated with viewing other people's actions (i.e., mirror-neuron activation; Rizzolatti & Craighero, 2004). High power participants show less motor resonance when viewing others' actions than low power participants (Hogeveen, Inzlicht, & Obhi, 2014). Similar effects are evident in social negotiations. Those in power ask less diagnostic information about their counterparts, than do those who lack power (de Dreu & Van Kleef, 2004). Taken together, the results suggest that power often results in a heuristic and self-centred style of social perception.

It is easy to imagine how control over resources (i.e., being powerful) coupled with a heuristic and self-centred orientation might lead to less than desirable moral outcomes (e.g., Kipnis, 1972). Recent observations suggest that power-holders perceive those around them in morally undesirable ways. For example, power-holders are more prone to objectify (Gruenfeld, Inesi, Magee, & Galinsky, 2008) and dehumanise (Gwinn, Judd, & Park, 2013; Lammers & Stapel, 2011) others, and engage in unethical behaviour, such as infidelity (Lammers & Maner, 2016; Trautmann, van de Kuilen, & Zeckhauser, 2013) and cheating (Yap, Wazlawek, Lucas, Cuddy, & Carney, 2013). Other research has investigated how power affects responses to suffering and distress. In one study, participants were asked to share an emotional story with a partner. Participants with a high sense of power were less fazed by their partners distress, when hearing their story, compared to participants with a low sense of power (Van Kleef et al., 2008). Power-holders are also more likely to judge others' harshly, which can lead to moral hypocrisy (Lammers & Stapel, 2009). That is, power-holders will judge others severely for performing transgressions that they themselves are guilty of (Lammers, Stapel, & Galinsky, 2010). Thus, power can have particularly pernicious effects on interpersonal behaviour.

However, power does not *always* promote questionable behaviour. As power reduces constraints it allows for a more genuine expression of one's desires and values, potentially leading to pro-social outcomes. When motivated, power-holders stereotype less (Overbeck & Park, 2001), and are more likely to correctly identify emotions in other people (Côté et al., 2011). Power can also lead to altruistic behaviour in people with a strong moral identity (i.e., people who hold their moral values as central to their identity; DeCelles, DeRue, Margolis, &

Ceranic, 2012) and in people who are primed to act pro-socially (DeMarree, Briñol, & Petty, 2014). Similarly, power does not increases sexual harassment in those who are not predisposed to such behaviour (Bargh, Raymond, Pryor, & Strack, 1995). Power also leads to more charitable giving in people who have a more collectivist orientation (versus individualistic; Chen et al., 2001), suggesting that the pernicious effects of power are overcome when power-holders are motivated to be prosocial.

In sum, power can lead to a lazy and self-centred style of social perception, increasing one's reliance on pre-existing social knowledge structures, and leading to undesirable social outcomes. Similarly, power often increases immoral behaviour; however, contextual and individual differences play an important role in moderating these effects.

Motivation and Action

Power-holders inhabit different environments to their powerless peers. The powerful influence others and are in charge, whilst the powerless submit to others and take orders. As a result, those in power are likely to encounter rewards and experience greater freedom from constraints, whilst those without power are likely to encounter punishment and restrictions to freedom (Fiske, 1993; French & Raven, 1959; Keltner et al., 2003). Because of this, power and powerlessness are associated with differential patterns of (in)action and motivation.

Power motivates approach and primes action. Powerful people are more likely to engage socially (Moreland & Levine, 1989), adopt open and expansive postures, be more animated (Dovidio & Ellyson, 1982, 1985) and interrupt others while speaking (Depaulo & Friedman, 1998). This tendency is also evident in social negotiation. Power-holders engage more actively in negotiations, are more likely to present initial offers and speak more frequently than their powerless peers (Magee, Galinsky, Gruenfeld, & Wagner, 2007). Power has similar effects on motivation and action outside of social contexts. In one study, participants primed with high-power were more likely to turn off an annoying fan in their test lab (Galinsky et al., 2003). In the same set of studies, high-power participants were more likely to hit (as opposed to stand) in a game of blackjack, compared to low-power participants. Power also increases the speed with which people engage in various tasks (P. K. Smith & Bargh, 2008). In one study, priming power reduced the time it took participants to move their hand toward a stimulus, and increased the time it took for participants to move their hand away from a stimulus (Maner, Kaschak, & Jones, 2010). The general tendency for power-holders to approach and act is also reflected in greater neural activity in the left pre-frontal cortex—a correlate of approach-motivation (Boksem, Smolders, & De Cremer, 2012; see also Wilkinson, Guinote, Weick, Molinari, & Graham, 2010). In sum, power invigorates, often resulting in animated and energetic behaviour.

Power-holders are more proficient at setting and pursuing goals, ensuring their propensity for action is channelled effectively. Powerful people more quickly decide on a course of action (Guinote, 2007c), and having done so are more likely to act consistently with their goals. For example, when planning days in the summer and winter power-primed participants plan more goal-consistent activities (e.g., summer-outdoors, winter-indoors) than do low power people (Guinote, 2008). Power also increases persistent goal-striving. In one study, high-power participants persisted for longer and tried more solutions on a difficult geometric tracing puzzle (Guinote, 2007c). Power-holders are also more proficient at juggling multiple goals, whether that means pursuing each goal in serial or multi-tasking (Cai & Guinote, 2017; Schmid, Kleiman, & Amodio, 2015; Schmid, Schmid Mast, & Mast, 2015).

The propensity for power-holders to successfully set, and carry out, goals is thought to be aided by the benefits power bestows on low-level cognitive processing. For example, power improves performance on demanding cognitive tasks (e.g., stroop; Smith, Jostmann, Galinsky, & Van Dijk, 2008). The powerful are also more likely to extract the gist of the situation; detecting more patterns and categorising stimuli at a higher level, compared to low power individuals (P. K. Smith & Trope, 2006). Similarly, power-holders are more flexible in their cognitive strategies, incorporating peripheral cues when beneficial and inhibiting cues when they are detrimental to the task (Guinote, 2007b). All in all, power promotes behavioural and cognitive mechanisms fostering effective goal-pursuit.

The aforementioned effects are likely accentuated by the tendency for the powerful to be more optimistic in their judgements. High-power people have elevated perceptions of control (Fast, Gruenfeld, Sivanathan, & Galinsky, 2009) and often underestimate the time it will take to complete tasks (Weick & Guinote, 2010). Power-holders are also more confident in their attitudes and decisions (Briñol, Rucker, Petty, Valle, & Becerra, 2007; Fast, Sivanathan, Mayer, & Galinsky, 2012; but see Durso et al., 2016), and are less likely to change their minds (Eaton, Visser, Krosnick, & Anand, 2009). Anderson and Galinsky (2006) found that power-primed people were more likely to engage in risky behaviour (e.g., unprotected sex) and more likely to divulge their interests in a negotiation; perhaps due to a tendency to underestimate the severity of losses (Inesi, 2010). Power-holders are also more likely to perceive their social environment through rose-tinted glasses. That is, powerful people often perceive ambiguous social behaviours as positive (Keltner et al., 1998), are more likely to think people like them (Anderson & Berdahl, 2002), and are less perturbed by social rejection (Kuehn, Chen, & Gordon, 2015).

Although power typically motivates action and results in more optimistic judgement, this is not always the case (for review see Deng, Zheng, & Guinote, 2018). For example, when the powerful feel ambivalent they are more likely to forgo making a decision compared to the powerless (Durso et al., 2016). In a similar vein, when social hierarchies are perceived as illegitimate and unfair (e.g., when positions are allocated via nepotism), power no longer leads to approach motivation. In two studies, Lammers et al. (2008) primed participants with a high or low power mind-set that was either legitimate or illegitimate. Only when power differences were perceived as legitimate did they lead to greater approach motivation. Similarly, power does not lead to more risky behaviour hierarchical positions are unstable (Maner, Gailliot, Butz, & Peruche, 2007). Thus, power seems to only lead to approach in situations perceived as relatively unambiguous and nonthreatening.

In sum, the powerful, compared to the powerless, enjoy a more optimistic disposition, showing greater approach motivation and goal-directed action across social and non-social contexts; however, as with social perception these effects are qualified by contextual and personality factors.

Consistency in Thought, Feeling and Behaviour

Power enhances control over the environment and reduces perceptions of constraints, promoting freedom of thought and expression (Keltner et al., 2003; Whitson et al., 2013). A likely outcome of this is greater consistency in thought, feeling and behaviour. Power-holders are more likely to act consistently with their pre-dispositions. Their moral judgements are more tightly linked to their values (Chen et al., 2001; DeCelles et al., 2012), and their chronic information processing styles (i.e., intuitive vs. deliberative) more strongly predict how they approach decision-making (Kossowska, Guinote, & Strojny, 2016). Similarly, chronically accessible interpersonal traits (e.g., rudeness, honesty) more strongly influence impression formation in the powerful compared to in the powerless (Guinote, Weick, & Cai, 2012). Lastly, self-reported personality (e.g., Big Five Personality Inventory) varies less across contexts (e.g., with parents, at work) in those who are powerful compared to those who are powerless (Kraus, Chen, & Keltner, 2011), suggesting that power-holders have more consistent self-concepts.

People in power also behave more consistently with their momentary subjective experiences. In one study, participants rated how hungry they were prior to being given the opportunity to snack. Hunger predicted snacking in those with a high sense of power, but not in those with a low sense of power (Guinote, 2010). In a similar vein, intuitive feelings are more predictive of decision-outcomes in the powerful compared to in the powerless. That is, the ease with which exemplars are brought to mind, and the experience of motor fluency, more strongly predict inter-personal and aesthetic judgements in the powerful, compared to in the powerless (Weick & Guinote, 2008; Woltin & Guinote, 2015). Power also increases the consistency between subjective experiences and explicit social behaviour. For example, facial expressions more consistently convey mood in the powerful compared to in the powerless (M. A. Hecht & LaFrance, 1998).

In sum, a lack of perceived external constraints allows the powerful to express their true thoughts and feelings more-so than their powerless counterparts. A focus on internal states, accessible constructs and subjective experiences further accentuates consistency across thought, feeling and behaviour.

Physical and Mental Health

The powerful and the powerless take differential orientations towards the world. The powerful encounter a wealth of opportunity and rewards, whilst the powerless are troubled with punishments and setbacks. Consistently encountering positive outcomes is likely to be comforting and uplifting, whilst having to constantly be on the lookout for threats is likely to take a considerable toll, increasing stress and potentially leading to undesirable long-term health outcomes.

Following tropes of primates in the wild indicates that social rank predicts cardiovascular disease, blood clots, stroke and heart attack (Sapolsky, 2005). A similar relationship between social rank and health outcomes exists in humans. Indices of social rank (e.g., income, subjective status) inversely predict cardiovascular disease (Blanchard, Sakai, McEwen, Weiss, & Blanchard, 1993; Tamashiro et al., 2007). Moreover, subjective socioeconomic status is a better predictor of health outcomes than objective socio-economic status (e.g., income) or self-reported health behaviours (e.g., alcohol consumption), suggesting that subjective perceptions of power are important predictors of stress and physical health (Adler, Epel, Castellazzo, & Ickovics, 2000). Experimental evidence observes a similar relationship. Scheepers, de Wit, Ellemers and Sassenberg (2012) found that inducing a high power mind-set resulted in adaptive cardiovascular signatures associated with challenge. Priming a low power mind-set, on the other hand, resulted in cardiovascular changes associated with threat. These signatures, if observed over longer periods of time, predict health outcomes (Sapolsky, 2005).

The effects of power may also extend to mental health. Animal studies suggest that low-status animals present with behaviours associated with depression, and that antidepressants reduce such behaviour (Elizalde et al., 2008). Longitudinal studies on humans implicate low-status as a potential cause of mental disorder (e.g., anxiety, depression; Miech, Caspi, Moffitt, Wright, & Silva, 1999). Experimental research corroborates this view. Momentary feelings of powerlessness inversely predict indices of well-being (e.g., Deci & Ryan, 2002), and there is reason to believe that if feelings of powerlessness persist over long periods of time they may manifest in chronic thinking styles associated with depression (Sheldon Cohen, Rothbart, & Phillips, 1976; Maier & Seligman, 1976; Miller & Seligman, 1975). Power also improves general evaluations of one’s life. For example, feelings of power positively predict self-esteem (Wojciszke & Struzynska-Kujalowicz, 2007) and a sense of authenticity (Kifer, Heller, Perunovic, & Galinsky, 2013), perhaps providing a buffer against potential mental health issues.

All in all, looking at the relationship between power and health suggests that lacking power is associated with substantial negative outcomes; both physical and psychological. In the next section we discuss prominent theories of power.

1.5. Theoretical Accounts

Numerous theoretical accounts of power have been proposed. The Power as Control model argues that the need for control underlies the effects of power on social perception (Fiske & Dépret, 1996). The Social Distance Theory of Power attributes the effects of power to an asymmetric experience of social dependence, wherein power is associated with greater feelings of social distance (Magee & Smith, 2013). The Behavioural Approach-Inhibition Theory of Power couches an explanation of power in terms of neurological systems associated with approach and inhibition (Keltner et al., 2003). The Situated Theory of Power suggests that power increases cognitive flexibility and focus (Guinote, 2007a), whereas the Disinhibition Model of Power argues that power reduces competition between behavioural response options (Hirsh, Galinsky, & Zhong, 2011). These theories are discussed in-depth below with reference to relevant predictions regarding the links between power, cognition and behaviour. A discussion of the relevant links between power and mood is introduced in Chapter 2.

Power as Control Model of Power

Susan Fiske and Eric Dépret (1996) present a framework for understanding the relationship between power and stereotyping. In this view, power affects how attention is allocated to social stimuli, resulting in more (or less) stereotyping. As a high sense of control is associated with predictability, those with power default to attentional neglect and rely on pre-existing social categories. On the other hand, as a low sense of control is associated with uncertainty, those without power attempt to seek diagnostic information and focus on salient social information. This tendency is further accentuated by a motivation to maintain (and restore) control. As stereotypes solidify and justify social stratification (e.g., Fiske, 1993), those with a high sense of control are motivated to stereotype, whilst those with a low sense of power are motivated to individuate.

Results have proven largely consistent with this reasoning. Inducing high power results a more top-down heuristic style of social perception whereas inducing low power is associated with more bottom-up effortful social perception (Fiske, 1993; Goodwin et al., 2000; Guinote, Willis, & Martellotta, 2010; Vescio et al., 2005). For example, elevating participants' sense of control leads them to pay greater attention to (i.e., spend more time looking at) stereotypic attributes when assessing internship applications (Goodwin et al., 2000). Other studies have found that participants with high power show greater facilitation of positive words following white faces compared to participants with low power (Guinote & Phillips, 2010), suggesting that power increases the reliance on pre-existing knowledge structures in person perception.

The Power as Control Model provides a succinct account of the effects of power on social perception which has proved largely consistent with empirical data. However, it is relatively confined in scope, providing little insight into power's effects on behaviour. The next section will discuss more wide-ranging theories: the Social Distance, Approach-Inhibition, Situated, and Disinhibition Models of Power.

Behavioural Approach-Inhibition Theory of Power

Keltner and colleagues (2003) built heavily on work by Jeffrey Gray (1987), proposing that the relative frequency with which people with high and low power encounter rewards and punishments differentially activates brain systems associated with approach and inhibition. Early psychophysiological work suggested that individual differences in affect and impulsivity are a function of three underlying neurological systems: the Behavioural Inhibition System, the Behavioural Approach System, and the Fight or Flight System (Gray, 1987). The approach system is said to activate in the presence of rewards, and to underlie positive affect and striving for desired outcomes. In other words, the approach system promotes attention towards rewards and goal-directed behaviour. The inhibition system, on the other hand, is thought to underlie trait anxiety and responses to threats, manifesting in goal conflict and inhibition of ongoing processes. In line with this thinking, activation of the approach system is associated with impulsivity and optimism, whilst activation of the inhibition system is associated with perceptions of threat, punishment, and omissions of anticipated rewards (Carver & White, 1994; Gomez, Gomez, & Cooper, 2002). As high power is associated with greater access to rewards, and low power with increased punishments, Keltner and colleagues (2003) argue that high and low power differentially activate the approach and inhibition systems.

Power's effects on thought and behaviour are largely consistent with activation of the behavioural approach system. High-power people show greater perceptions of control (Fast et al., 2009) confidence (Briñol et al., 2007; Fast et al., 2012), and process information in a more optimistic fashion (Anderson & Berdahl, 2002; Inesi, 2010; Keltner et al., 1998). Power also results in greater behavioural indices of approach. Power-holders are lively and energetic in social interactions (Depaulo & Friedman, 1998; Dovidio & Ellyson, 1982, 1985; Magee et al., 2007; Moreland & Levine, 1989), and are more likely to take action, irrespective of the consequence (Anderson & Galinsky, 2006; Galinsky et al., 2003; Maner et al., 2010). Power-holders are also more proficient at setting and carrying out goals (Guinote, 2007c). All in all, power seems to activate the behavioural approach system, focusing people on rewards and prompting goal-directed action.

Whether power supresses the behavioural inhibition system is less clear. The powerful are less sensitive to negative information. For example, high-power people are less likely to interpret teasing as negative (Anderson & Berdahl, 2002; Keltner et al., 1998). The powerful also report lower levels of behavioural inhibition (Anderson & Berdahl, 2002), and are less likely to inhibit action in situations which prompt behaviour; for example, turning off a particularly annoying fan (Galinsky et al., 2003). However, it is unclear if the aforementioned data reflect a suppression of the inhibition system. That is, positive interpretation of social information and behavioural disinhibition could equally arise from increased activation of the approach system. Moreover, when social situations are threatening to the powerful (e.g., when hierarchies become unstable or illegitimate) inhibitory processes can occasionally be comparable across levels of power (for review see Deng et al., 2018). Thus, further work is needed to clearly distinguish the contribution of the inhibition system to the effects of power.

In sum, the Approach-Inhibition Model provides an account of the cognitive and behavioural outcomes of power in terms of brain systems associated with approach and inhibition. Although a large amount of evidence suggests that power activates the approach system, it is less clear what role the inhibition system plays.

Social Distance Theory of Power

The Social Distance Theory of Power (Magee & Smith, 2013) proposes that the effects of power can be understood in terms of experienced social distance—a sense of detachment, prompting coldness and a neglect of common goals (Thibaut & Kelley, 1959). In this view, independence (power) is associated with feelings of social distance, whereas dependence (powerlessness) is associated with feelings of social closeness. The greater experience of social distance is argued to manifest in neglect of social relationships, reduced motivation to associate, and increased abstraction in mental processing (due to the typical demands placed in the powerful).

Interpreting the effects of power as mediated via feelings of social distance aligns with many of the typical outcomes associated with power. For example, there is evidence that people with high power are disinterested in those around them, as is evident by a lazy and heuristic style of impression formation (Goodwin et al., 2000; Richeson & Ambady, 2003; Vescio et al., 2005) and deficiency in identifying emotions in others (Galinsky et al., 2006). Power-holders are also less likely to adopt complimentary interpersonal behaviour

(Anderson, Keltner, & John, 2003; Van Kleef et al., 2008)—a sign of social distance. In a recent study, high-power participants responded to dominant cues with approach (non-complimentary behaviour), whereas low-power participants responded with avoidance (complimentary behaviour; Weick, McCall, & Blascovich, 2017). The self-interested nature of power-holders, as reviewed in an earlier section, is also consistent with increased feelings of social distance (Lammers & Stapel, 2009; Lammers et al., 2010; Lammers, Stoker, Jordan, Pollmann, & Stapel, 2011; Trautmann et al., 2013; Yap et al., 2013). Power-holders also prefer to work alone (Lammers, Galinsky, Gordijn, & Otten, 2012), and are less likely to adopt the goals of their relationship partners (Laurin et al., 2016).

The model also provides an account of power's broader effects on cognition. Based on the tenets of construal level theory (Trope & Liberman, 2010), high power is argued to promote greater abstraction of thought, increasing the reliance on high-level schematic representations, tuning cognition to central and superordinate features. Low power, on the other hand, is thought to be associated with low-level unstructured representation, increasing the focus on peripheral and subordinate features. Supporting this view, high-power participants are more likely to focus on central features of a task, and detect more Gestalt patterns in stimuli, than low-power participants (Guinote, 2007b; Huang, Galinsky, Gruenfeld, & Guillory, 2011; Smith & Trope, 2006; Stel, van Dijk, Smith, van Dijk, & Djalal, 2012; but see Gilder & Heerey, 2018). High-power participants are also more likely to describe actions in terms of the abstract goals rather than the concrete behaviours compared to low-power participants (P. K. Smith & Trope, 2006). Supportive evidence can also be found from research on how power affects creativity, goal-setting and selection (Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Gervais, Guinote, Allen, & Slabu, 2013; but see Sligte, de Dreu, & Nijstad, 2011).

However, the model may have a more difficult time accounting for the fact that power does not always lead to behaviours associated with greater interpersonal distance (Overall, Hammond, McNulty, & Finkel, 2016), and sometimes can lead to more sensitive interpersonal behaviour (Côté et al., 2011; Overbeck & Park, 2001; Schmid Mast et al., 2009); for example, a greater motivation to connect with people following social exclusion (Narayanan, Tai, & Kinias, 2013) and a greater propensity to forgive (Karremans & Smith, 2010 but note the effects of relationship commitment).

In sum, the Social Distance Theory of Power suggest that power instils a sense of psychological distance between people, resulting in disinterested and neglectful social relationships, and a more abstract style of thinking. The empirical data largely support the model, although there is some evidence to suggest that power does not *always* lead to behaviours associated with greater social distance.

Situated Focus Theory of Power

Research often concludes that power exerts general effects on behaviour and cognition; including impression formation (Fiske, 1993), action (Galinsky et al., 2003) and motivation (Anderson & Berdahl, 2002). However, a substantial body of research suggests that the effects of power may be understood in terms of variability. For example, groups with high power are objectively more variable than those with low power (Guinote et al., 2002). Power sometimes leads to greater stereotyping, but other times to greater individuation (Overbeck & Park, 2006). Likewise, power is associated with greater risk taking and action in some circumstances, but reduced risk taking and action in other circumstances (Anderson & Galinsky, 2006; Lammers et al., 2008; Maner et al., 2007). Similarly, power can produce pro-social and anti-social behaviour depending on the person and the context (Bargh et al., 1995; Chen et al., 2001; Côté et al., 2011; DeCelles et al., 2012).

In an attempt to account for the aforementioned data, Guinote (2007a) proposed the Situated Theory of Power (see also Guinote, 2017 for recent review). The theory argues that the effects of power are goal-dependent. According to this view, power increases cognitive focus and flexibility, allowing individuals to more efficiently process goal-relevant information. For example, when engaged in difficult cognitive tasks power-holders process peripheral information when it facilitates the task but not when it is detrimental, suggesting an increased attentional focus and flexibility (Guinote, 2007b; P. K. Smith et al., 2008). Power also increases reliance on goal-relevant internal states. For example, sensations of hunger when snacking (Guinote, 2010) and subjective experiences when making intuitive judgements (Weick & Guinote, 2008). Furthermore, in the absence of clear goals, power increases the reliance on chronic dispositions (Guinote et al., 2012; Kossowska et al., 2016; Kraus et al., 2011), suggesting power increases the reliance on whatever factor is currently driving cognition.

In sum, the Situated Theory of Power predicts that high-power is associated with a goal-orientated cognition, attuning people to goal-relevant factors that drive cognition. This attunement, in turn, causes power to be associated with more definitive thought and behaviour.

Disinhibition Model of Power

Hirsh, Galinsky, and Zhong's (2011) Disinhibition Model provides an alternative explanation of the effects of power, drawing parallels between the effects of power, anonymity and alcohol consumption. The model is influenced by the psychophysiological work of Gray, but emphasises his later work on goal-conflict (McNaughton & Gray, 2000). In this view, competing responses arise when multiple goals are active, resulting in activation of the inhibition system. It is argued that high power is associated with reduced social concerns, decreasing the salience of competing response options, and thereby activating the approach system (for review of the links between power and approach see previous sections) and silencing the inhibition system. The most salient option in any given context is therefore more likely to be acted upon. Low power does not provide this benefit, increasing activation in the inhibition system, as a result of increased competition between response options. Hence, the Disinhibition Model argues, similarly to the Situated Theory of Power, that high power produces unequivocal responses to the context, whereas low power produces equivocal responses to the context.

Increased activation of the approach system translates to a strengthening of focal goals, and a reduction in competition from non-focal goals. Crucially, activation of the approach system silences the inhibition system further reducing competition. This line of reasoning is supported by studies suggesting that the approach and inhibition systems have an antagonistic relationship, such that activation in one system silences activation in the other (Corr, 2002). This leads people with high power to express goal-directed behaviour in a more uninhibited manner, compared to those with low power. In one study, Guinote (2008) found participants with high power were more responsive to goal-relevant contextual information, compared participants with low power (see also Galinsky et al., 2008). Moreover, when contextual information is goal-irrelevant power-holders rely more heavily on their pre-dispositions (Guinote et al., 2012; see also Bargh et al., 1995; Chen et al., 2001; Côté et al., 2011; DeCelles et al., 2012; Kossowska et al., 2016; Kraus et al., 2011), suggesting that power reduces conflict between response options.

In sum, high power may activate brain systems associated with reduced response conflict, allowing more definitive cognitive and behavioural responses. Low power, on the other hand, may increase response conflict and inhibit responses.

1.6. Summary

The present chapter introduced the concept of power. A social-relational and definitions as provided in terms of relative control over valued resources and outcomes, and a psychological definition was presented in terms of a mind-set associated with feelings of social influence. Prominent empirical work on power was reviewed, including: how people come to hold positions of power, how power affects cognition and action, and how power predicts mental and physical health. Finally, prominent theories of power were outlined. Chapter 2 will present the relevant theoretical and empirical links between power and mood.

CHAPTER 2: POWER AND MOOD

2.1. Overview

Chapter 2 discusses power and mood. The chapter begins by giving an overview of the concept of mood, highlighting the importance of mood in judgement and behaviour, and exploring the links between mood and social life. The next section discusses the relevant links between power and mood, in the context of lay-theories and theoretical models of power: the Approach-Inhibition (2003) and Situated (2007a) Models of Power. Lastly, a rationale for the current research is presented.

2.2. Mood

Mood states are important. They are subjectivly impactful; we smile and laugh when feeling positive, and shake and cry when feeling negative. Mood states colour how we perceive the world around us. Positive mood highlights what is desirable and attractive, whilst negative mood tints the world with danger and threat (Lewis, Haviland-Jones, & Barrett, 2008). Mood affects how we understand and evaluate ourselves (Schwarz & Clore, 1981), and what we are likely to store in memory (Blaney, 1986). Lastly, mood states motivate us. We make plans and calibrate decisions in the hopes of maximising positive mood and minimising negative mood (T. D. Wilson & Gilbert, 2005), and there is even a sense that national policy objectives should align with these goals (Diener, 2000). With this in mind, the coming section discusses mood, and its role in cognition and social life.

Before continuing it may be beneficial to outline some relevant concepts. In the coming work we refer to *emotion* as a brief adaptive response arising from a relatively elaborate cognitive appraisal, involving coordination of brain, autonomic and behavioural systems (Davidson, Scherer, & Goldsmith, 2003). *Mood* refers to a somewhat diffuse state categorized by its hedonic valence, falling along a spectrum from negative to positive (Frijda, 2009; Russell, 2009). Lastly, *feelings* are the subjective experience of the latter two; emotion and mood.

A seemingly perpetual question surrounding mood is: what is the relationship between mood and cognition? Previously dominant views held that mood is invasive and irrational, to be controlled and overcome; with some going as far as to state that moods are ‘fatal flaws’ of evolution (Koestler, 1978). However, empirical data suggests that mood can sometimes foster quick and effective responses, with very little loss of accuracy (e.g., Isen & Means, 1983). Whilst at other times, mood can lead to substantial errors and sub-optimal decision outcomes (e.g., Forgas, 1998). That said, many theoretical models assume that mood provides an adaptive on-line evaluation of the environment and one's current state, informing judgement and behaviour (Frijda, 1987; Gray, 1987; Lazarus, 1991b).

The effect of mood on cognition is evident in numerous domains (e.g., memory recall, perceptual discrimination, associative learning, attitude formation; for reviews see Davidson et al., 2003; Forgas, 2008, 2017). Bechara and colleagues (1994) provide a particularly compelling example of when, and how, mood informs judgement, by comparing the performance of neurologically healthy and brain-damaged participants on a card selection task. Over the course of picking cards from three decks of cards, neurologically healthy participants began to show increased indices of mood when considering disadvantageous decks. However, brain-damaged participants' did not differentiate between advantageous and disadvantageous decks, suggesting that mood typically provides a 'somatic marker' that guides thought and behaviour (Bechara, Damasio, Tranel, & Damasio, 1997; Damasio, Everitt, & Bishop, 1996). Similar effects are evident in every-day life. For example, Schwarz and Clore (1981) asked participants to report their life satisfaction on sunny or rainy days. Consistent with the view that mood informs judgement, participants were more satisfied with their lives on sunny days compared to rainy days.

Mood not only infuses cognition, but also fundamentally changes how cognition unfolds. From an evolutionary perspective, negative mood is of higher importance than positive mood, signalling threats and prompting appropriate action (Frijda, 1987; Taylor, 1991). Consistent with this idea, negative stimuli and feelings are generally more psychologically impactful (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). For example, learned associations often form following only a single electric shock or nauseating experience, but not following a single treat or monetary reward (Pelchat & Rozin, 1982; Solomon & Wynne, 1954). Furthermore, negative mood is thought to result in more effortful and elaborate processing, in an attempt to better deal with threats and dangers (Taylor, 1991).

That is, positive mood prompts assimilative top-down processing, which relies more heavily on pre-existing knowledge structures. Negative mood, on the other hand, leads to an accommodative bottom-up processing style, which is more sensitive to the details of the external world (Bless & Fiedler, 2006; Fiedler, 2001; Forgas & George, 2001; see also Isen & Daubman, 1984; Isen, Daubman, & Nowicki, 1987; Isen & Means, 1983). All in all, it is clear that mood has far reaching effects on cognitive processes.

The effects of mood on cognition are particularly salient in social life. Sampling mood in the moment suggests that people's experiences are more potent when alone versus with friends, with family versus at work, and when interacting with high versus low status peers (Bolger & Schilling, 1991; Fridlund, 1992; Kraut & Johnston, 1979; Smoski & Bachorowski, 2003). Mood states influence how we process social information (Forgas, 2008, 2017). In one study, observers were asked to rate their own and their partner's behaviours on a videotape. Observers with elevated mood reported more positive and fewer negative behaviours than observers with depressed mood (Forgas, Bower, & Krantz, 1984). Similar outcomes are evident in impression formation. Elevated mood leads to warm and positive impressions of others, whilst negative mood predicts cold and negative impressions (Bower, 1991; Forgas, 1991; Forgas & Bower, 1987), suggesting that mood states play an important role in social information processing.

The effect of mood on social cognition manifests in tangible downstream behavioural consequences (for review see Forgas, 1995, 2017). As previously discussed, positive and negative mood covary with activation in two fundamental motivational systems—the behavioural approach and inhibition systems (Corr, 2002; Gray, 1987; McNaughton & Gray, 2000). Here, positive mood indicates safety and reward, prompting approach; whilst negative mood indicates danger and punishment, prompting inhibition of movement and/or avoidance (Carver & White, 1994; Gray, 1987; McNaughton & Gray, 2000). This is reflected in the relationship between mood and self-reported desire to engage in social interactions (Dweck & Leggett, 1988; Hirschfeld et al., 2000). In a similar vein, elevated mood is associated with closer interpersonal proximity, greater mutual eye-gaze, more laughter and more relaxed and open postures (for review see Isen, 1987). Other research has explored the correlates of particular traits (e.g., social anxiety, neuroticism), suggesting that negative mood increases maladaptive responses to social interaction. For example, overly sensitive reactions to perceived transgressions, reduced ability to cope with social rejection, and a general tendency to avoid others (for review see Krohne, 2003).

There is even evidence that momentary mood states influence complex pro-social behaviour, such as charitable giving (Schaller & Cialdini, 1990). Other experiments have shown that mood impacts on real-life interpersonal strategies, such as how people formulate and respond to interpersonal requests, the amount of information people share, and the type of information people wish to encounter (Forgas, 2002; Trope, Ferguson, & Raghunathan, 2001). Broader theoretical accounts suggest that mood-based experiences function as social commitment devices, promoting long-term adaptive strategies (Frank, 1988), and aiding in activating and selecting cognitive strategies best suited to current social challenges (Cosmides & Tooby, 2000). In a similar vein, elaborated mood states can function to perpetuate and enforce socio-moral norms, predicting the degree to which people will reward and punish others (Haidt, 2001; Keltner & Haidt, 1999). Taken together the work suggests that mood plays an important part in producing and regulating social behaviour.

Whilst the current review is relatively constrained in scope (see for example Davidson et al., 2003 for reviews of the relationship between mood, genetics, neuroscience, learning, personality, health and mental disorders), it is evident that mood has far reaching effects on thought and behaviour. Evidence was reviewed suggesting that mood plays a particularly important role in social life. With this in mind, the next section explores the links between mood and one of the most ubiquitous forces in social life—power (Russel, 1938).

2.3. Power and Mood

Given the pervasive links between social life and mood, and the ubiquity of power (Guinote & Vescio, 2010; P. K. Smith & Hofmann, 2016), it is perhaps not surprising that people hold beliefs about the relationship between power and mood. Lay theories suggest that high power is associated with elevated mood and low power with depressed mood (Mondillon et al., 2005). Intuitions may derive from the fact that power dictates the allocation of valued resources (Fiske & Dépret, 1996), assuring that the powerful get what they want, more-so than their powerless peers. More cynical views suggest that power is an end in itself. George Orwell explored the effects of power in *Animal Farm* and *1984,* describing power as euphoric and intoxicating, suggesting that feelings of social influence elevate mood (Orwell, 1945, 1949). This aligns with archetypes of tyrannical bosses and megalomaniacal dictators, and with the fact that people seem to enjoy the psychological sense of control (Deci & Ryan, 2002). Irrespective of whether power is a means or an end, beliefs converge in stating that power elevates mood and powerlessness depresses mood. Formalising these beliefs, the Approach-Inhibition Model of Power argues that high power activates brain systems associated with positive mood and low power activates brain systems associated with negative mood (Keltner et al., 2003).

Supporting this view, measures of social and economic status, dominance, assertiveness, social potency, and assumed leadership roles positively correlate with mood (Anderson et al., 2001; Clark, 1990; Collins, 1990; Kemper, 1991; Watson & Clark, 1997). This is corroborated by data from developmental cohorts–peer-ratings of status, which positively predict mood (D. B. Hecht, Inderbitzen, & Bukowski, 1998; Kupersmidt & Patterson, 1991). Subsequent research measuring perceptions of power in everyday life reports similar findings (Anderson & Berdahl, 2002; Strelan, Weick, & Vasiljevic, 2014; Weick & Guinote, 2008, 2010). Smith and Hofmann (2016) recently tracked people’s mood over a three-day period, finding that high power positions were associated with elevated mood and low power positions with depressed mood.

Some experimental research is consistent with the view that high power produces elevated mood and low power depressed mood. Manipulations of high power have been observed to elevate mood and increase smiling compared to low power (Berdahl & Martorana, 2006; Côté & Moskowitz, 2002; Keltner et al., 2003; LaFrance & Hecht, 1999; Langner & Keltner, 2008; Wojciszke & Struzynska-Kujalowicz, 2007 see also Bombari, Mast, & Bachmann, 2017). This research has shaped the seemingly prevailing view that high power elevates mood and low power depresses mood (apearing in major handbooks; Fiske, Gilbert, & Lindzey, 2010).

However, when all the available experimental data on power and mood is examined (data is easily overlooked as mood is often included as a non-focal variable), the relationship between power and mood becomes far less clear. Whilst numerous studies report that power elevates mood (see above), an equally substantial body of research finds no significant effect of power on mood (Anderson & Berdahl, 2002; Fast et al., 2012; Galinsky et al., 2003; Guinote et al., 2012; Overbeck & Droutman, 2013; Rucker & Galinsky, 2008; P. K. Smith & Bargh, 2008; P. K. Smith & Trope, 2006; Weick & Guinote, 2008, 2010). These results suggest that the relationship between power and mood may not be as clear as originally thought.

There is reason to believe that the relationship between power and mood may be dependent on the context. Such intuitions can be seen in popular articles on how to manage a ‘moody’ or unpredictable boss (e.g., J. Smith, 2013; Usheroff, 2014). Media portrayals also readily capture this side of power. For example, Tony Montana from *Scarface* and Walter White from *Breaking Bad* (De Palma, 1983; Gilligan, 2008). Here we follow the titular characters in their attempts to become drug king-pins. As their power increases the characters become increasingly prone to outbursts of joy in response to positive outcomes, but also to surges of unhappiness when circumstances take a turn for the worse.

This aspect of power is formalised in the Situated Theory of Power (Guinote, 2007a). In this view, the effects of power are understood in terms of broader views of cognition, in which mental processes flexibly adapt to the demands of the present context (e.g., Barsalou, 1999). Here, a context can be thought of as an environmental opportunity for cognition, action or affect, akin to an ‘affordance’ (see Gibson, 1986). For example, handles afford grasping (Tucker & Ellis, 1998), steps afford climbing (Warren, Kay, Zosh, Duchon, & Sahuc, 2001), a snake affords fear and a romantic partner affords happiness (Lazarus, 1991a, 1991b). The same logic also applies to subtle and more every-day contexts. For example, sunny and warm weather affords positive mood, whilst windy and cold weather affords negative mood (Denissen, Butalid, Penke, & van Aken, 2008). In this sense, a ‘context’ can be defined according to whether or not it affords positive or negative mood.

The Situated Theory of Power (Guinote, 2007a) argues that power attunes people to the important features in their surroundings, resulting in greater variability. In terms of mood, this translates to greater ups and downs and a more variable mood. That is, high power should elevate mood in positive contexts but also depress mood in negative contexts, compared to low power. In this sense, power is associated with moodiness and volatility. Similar predictions can be derived from the Disinhibition Model of Power (Hirsh et al., 2011).

Tests of variability in mood associated with power are difficult to come by. Current data is almost exclusively comprised of single measures of mood, often as control variables (Anderson & Berdahl, 2002; Berdahl & Martorana, 2006; Côté & Moskowitz, 2002; Fast et al., 2012; Galinsky et al., 2003; Guinote et al., 2012; LaFrance & Hecht, 1999; Langner & Keltner, 2008; Overbeck & Droutman, 2013; Rucker & Galinsky, 2008; P. K. Smith & Bargh, 2008; P. K. Smith & Trope, 2006; Strelan et al., 2014; Weick & Guinote, 2008, 2010;

Wojciszke & Struzynska-Kujalowicz, 2007). However, in order to test variability, multiple measures of mood are required across contexts of differing valence (negative vs. positive).

One notable exception is a study by Guinote (2008), who assigned participants to high or low power roles and then asked participants to plan two days; one in a positive context (summer) and one in a negative context (winter). Raters then estimated participants' mood throughout these days. Participants assigned a high power role were judged to show a greater difference in their mood between summer and winter, compared to those in a low power role. Although these results are encouraging, they are derived from a single small sample (n = 44), and may be accounted for in other ways. In particular, it was found that high power participants made more active outdoor plans in the summer and less in the winter compared to low power participants, meaning that any differences in mood could be explained by objective differences in planning. To the author's knowledge, there currently does not exist a more convincing test of variability in mood associated with power.

The current literature is also limited in its ability to distinguish between the independent contributions of high and low power. Although empirical work often describes asymmetric effects of high and low power (e.g., P. K. Smith et al., 2008; Wilkinson et al., 2010), researchers regularly assume the effects of high and low power are symmetrical (see also Moskowitz, 2004). A recent review of 293 studies on power found that only 17% of studies included a control condition, with researchers largely framing differences between high and low power in terms of power, as opposed to powerlessness (du Plessis, Schaerer, Yap, & Thau, 2016). Research including measures of power and mood falls prey to similar limitations, potentially concealing differential effects of high and low power (Anderson & Berdahl, 2002; Berdahl & Martorana, 2006; Guinote et al., 2012; Overbeck & Droutman, 2013; Weick & Guinote, 2008). This issue is further exacerbated by the fact that there is reason to suspect that the relationship between power and mood may not be linear. Several studies have found that feelings of high (vs. medium) power do not affect mood, whilst feelings of low (vs. medium) power depress mood (Côté & Moskowitz, 2002; M. A. Hecht & LaFrance, 1998; Wojciszke & Struzynska-Kujalowicz, 2007). Thus, research ought to include comparisons between high (vs. medium) and low (vs. medium) power to tease apart the effects of power and powerlessness.

In sum, a recent review of the literature suggests the relationship between power and mood is more complex than initially thought. Lay belief and academic theory suggest that the relationship between power and mood may depend on the valence of the context. That is, power may be associated with greater variability across contexts of opposing valence (negative vs. positive). Although these assumptions are supported by some initial data, conclusions remain tentative. Moreover, there is reason to believe that current approaches (assuming the effects of high and low power are linear and neglecting to include baseline/control levels of power) may have provided a one-sided picture of the effects of power. All in all, the present review suggests that more robust tests of the relationship between power, context and mood are required.

2.4. Summary

The present chapter introduced the concept of mood. This was followed by a discussion of relevant empirical and theoretical links between power and mood. Lay intuition and academic theory suggest that power should elevate mood (Keltner et al., 2003) and increase variability in mood (Guinote, 2007a) across contexts (negative vs. positive). However, the available empirical evidence is inconsistent and limited. With these limitations in mind, the present research investigated the effects of power on mood in and across different contexts and tested the predictions of the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) Models of Power. The next chapter documents the empirical work, beginning with an overview of the present programme of research.

CHAPTER 3: EMPIRICAL WORK

3.1. Overview

Chapter 3 presents the empirical work, describing five studies testing the effects of power on mood across different contexts. The programme of research builds on previous work and tests predictions of the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) models of power. We expect high power to elevate and low power to depress mood at baseline (Keltner et al., 2003), and high power to increase and low power to decreases variability in mood across contexts of opposing valence (negative vs. positive; Guinote, 2007).

Following recent recommendations (e.g., Cumming, 2014), our findings are replicated across different samples and operationalisations. Power was operationalised via personality (Studies 1-2), priming (Study 3) and role assignment (Study 4). Stimuli of different valence (negative vs. neutral vs. positive) were randomly sampled using numerous operationalisations: imagined scenarios (Studies 1a and 1b), experience sampling (Study 2), music (Study 3) and image induction (Study 4). For full breakdown of all operationalisations of power, context and stimuli, by sample, see Table 1.

All available data was collated via meta-analysis, avoiding potential ‘file-drawer’ issues and aiding interpretation of seemingly inconsistent results (e.g., Cumming, 2014). Results from self-reported mood are summarised at intermittent stages (Studies 1a and 1b, Study 2, Studies 3 and 4), and finally across all samples (Studies 1-4). Lastly, to more fully capture the experience of mood (Cacioppo, Tassinary, & Berntson, 2007) we measured facial muscle activation associated with mood states in Study 4.

Table 1.

Studies 1-4: Overview of the operationalisations of power, context, number of sampled stimuli and measures of mood. Tables A25-A30 in the Appendix provide a full lists of stimuli and further details on pre-tests.

	Operationalisation			
Sample	Power	Context	# of Stimuli	Measure of Mood
Study 1a	Personality	Imagined Context	3	Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), 20-item measure (e.g., *afraid*, *enthusiastic*) rated from 1 (*very slightly or not at all*) to 5 (*extremely*).
Study 1b	Personality	Imagined Context	17	Semantic Differential (Mehrabian & Russell, 1974; Russell & Mehrabian, 1977), 6-item measure rated from -3 (e.g., *unhappy*) to +3 (e.g., *happy*).
Study 2	Personality	Circadian rhythm	21	Semantic Differential (Yik, Russell, & Steiger, 2011), 3-item measure rated from -3 (e.g., *unhappy*) to +3 (e.g., *happy*).
Study 3	Prime	Music	25	Self-Assessment Manikin (Bradley & Lang, 1994), single-item pictorial measure rated from 1 (*negative*) to 9 (*positive*).
Study 4	Role	Images	48	Self-Assessment Manikin (Bradley & Lang, 1994), single-item pictorial measure rated from 1 (*negative*) to 9 (*positive*). Facial electromyography (corrugator and zygomaticus muscles).

3.2. Studies 1a and 1b: Mood in Imagined Contexts

Studies 1a and 1b build on the most consistent finding in the literature—a positive relationship between self-reported feelings of power and mood at baseline (e.g., Anderson & Berdahl, 2002; P. K. Smith & Hofmann, 2016). The research seeks to replicate the relationship between power and mood at baseline, and extend this work by exploring the relationship between power and mood in positive and negative contexts. An initial test of the variability hypothesis is provided by comparing mood across positive and negative contexts as a function of power. Participants in Study 1a imagined two days, in the weekend in summer and in the week in exam period. As weekends and summer are typically associated with relaxation and leisure activities, and weekdays and exams with routine activities and obligations, the former represents a positive context and the latter a negative context (Guinote, 2008). Study 1b controlled for potential confounds in Study 1a's imagination task. That is, as power affects planning and recall of events, differences in mood between levels of power could be due to objective differences in the number and types of activities brought to mind (Weick & Guinote, 2008, 2010). Study 1b controls for this by asking participants to imagine a range of specific events; both positive (e.g., "*you receive a prestigious award*") and negative (e.g., "*you are the victim of a theft*"). Due to the similarity in measures of power and operationalisations of context, the methodology and results of Study 1a and 1b are presented together.

Methods

Participants and Design

Study 1a. Two-hundred and thirteen students from the School of Psychology, University of Kent participated in exchange for course credit. Seventeen participants were excluded as they failed pre-planned attention checks (e.g., "*If you are reading this please select 4*"), leaving a final sample of 196 (172 female; M_{age} = 20.16, *SD* = 4.62).

Study 1b. Two-hundred and eighty-nine paid workers from the U.S. participated through *Amazon Mechanical Turk* in exchange for $0.80. Fourteen participants were excluded as they failed pre-planned attention checks, leaving a final sample of 275 (109 female; M_{age} = 23.96, *SD* = 11.06) participants.

Design. Study 1a and Study 1b followed mixed designs. Power was measured between participants (low vs. medium vs. high) and contexts were manipulated within participants (negative vs. baseline vs. positive).

Procedure and Materials

Participants in both studies completed the task online, which was described as a study on planning events and relationships. Participants indicated how much control they felt in their everyday life (e.g., "I feel powerful in my everyday life"; Anderson et al., 2012), and then their mood at baseline ("*How do you generally feel?"*) and in different positive and negative imagined contexts ("*How do you feel in [imagined context]?"*). In Study 1a participants completed the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988)—a 20-item measure (e.g., *afraid, enthusiastic*) of mood rated from 1 (*very slightly or not at all*) to 5 (*extremely*). In Study 1b participants completed an Affect Semantic Differential Scale—a 6-item bipolar self-report measure of mood (Mehrabian & Russell, 1974; Russell & Mehrabian, 1977), anchored at -3 (e.g., *unhappy*) and +3 (e.g., *happy*). In Study 1a, participants planned two future days, during summer in the weekend (positive) and during exam period in the week (negative; see Guinote, 2008). In Study 1b, participants imagined themselves in two positive (e.g., *"you receive a prestigious award"*) and two negative situations (e.g., *"you are the victim of a theft"*), randomly sampled from a pool of sixteen contexts (i_{pos} = 8, i_{neg} = 8). The sixteen contexts were selected based on a pre-test using a larger pool of items, whereby 150 participants (69 female; M_{age} = 34.92, *SD* = 12.41) recruited through *Amazon Mechanical Turk* rated 40 events on desirability, controllability and potential for gain/loss, from 1 (*very* *undesirable; completely controllable; lose a lot*) to 7 (*very desirable; completely controllable; gain a lot;* see Tables A25 and A28 in Appendix). The contexts in both studies were presented in a randomised order. Lastly, participants were probed for suspicion and debriefed.

Results

Data Preparation

All data were collected prior to analysis. Multi-item measures were averaged to derive composites prior to analyses (*a*s > .74). In Study 1a, participants' PANAS scores on the negative dimension were subtracted from their scores on the positive dimension to provide an index of overall mood (a typical approach to assessing well-being and mood; Diener, 2009; for representative examples see Bradburn, 1969; Diener et al., 2010). Higher scores represent greater positive mood. For Study 1b, mood scores for baseline, and each context were aggregated. To aid subsequent cross-study comparisons using discrete levels of power (see Studies 3 and 4), and to pry apart the effects of high (vs. medium) and low (vs. medium) power, Sense of Power scores were converted into tertiles (Low vs. Medium vs. High; see DeCoster, Iselin & Gallucci, 2009).

Operationalisation Check

Participants reported being in a more positive mood after imagining a positive context, and less a positive mood after imagining a negative context, compared with the baseline measure (Table 2). Thus, the manipulation of context was successful.

Table 2.

Studies 1a and 1b: Mood in different contexts.

	Context			
Sample	Negative	Baseline	Positive	Valence main effect
Study 1a	0.38_a(1.16)	0.94_b(1.06)	1.81_c(1.02)	$F(2, 390) = 143.50$, $p < .001$, $\eta_p^2 = .43$
Study 1b	2.21_a(0.71)	5.01_b(1.28)	5.85_c(1.01)	$F(2, 548) = 1081.78$, $p < .001$, $\eta_p^2 = .80$

NB: Observed means and standard deviations in parentheses. Higher values indicate more positive mood. Scores are derived from the PANAS in Study 1a (Watson et al., 1988) and the Affect Semantic Differential Scale in Study 1b (Mehrabian & Russell, 1974; Russell & Mehrabian, 1977). Means not sharing a common subscript within rows are significantly different ($p < .05$).

Main analysis

To maximize statistical power and identify trends that generalise across studies we analyse overall variations in mood across Studies 1a and 1b at the meta-level (Cumming, 2012, 2014). As contexts (negative vs. baseline vs. positive) are nested within participants and may be modelled as a random effect, our data lend themselves to multi-level modelling (see Judd, Westfall, & Kenny, 2012; Quené & Van den Bergh, 2004). A random slope and intercept model with homogeneous variances was fitted to the mood data (descriptive statistics are provided in Appendices, Tables A4 and A5). Intercepts were allowed to vary between participants and between stimuli. Slopes were allowed to vary within participants and between contexts (negative vs. baseline vs. positive). Fixed effect dummy coefficients compared high (D_1=1, D_2=0) and low (D_2=0, D_2=1) power with medium power, and positive (D_3=1, D_4=0) and negative (D_3=0, D_4=1) contexts with baseline. A fixed effect contrast coefficient (Study 1a=1, Study 1b=-1) was used to model between-study variance. All fixed effects interactions were included. Adding the fixed effects improved the model fit, Δ-2LL = 194.05, df = 17, $p < .001$. Variance estimates are provided below (Table 3.). Crucial hypothesis tests are presented below.

Mood in Different Contexts. We initially examined the coefficients estimating differences between high (vs. medium) and low (vs. medium) power (D_1, D_2) at baseline (D_3=0, D_4=0). The results showed that, high power was associated with elevated mood, coeff_{D1} = 0.44, SE = 0.10, p < .001, 95% CI [0.25, 0.64], r = .14, whilst low power was associated with depressed mood, coeff_{D2} = -0.82, SE = 0.10, p < .001, 95% CI [-1.01, -0.62], r = -.24.

To examine the effects of high (vs. medium) and low (vs. medium) power in positive and negative contexts the model was re-run after recoding the dummy coefficients representing context (D_3, D_4). A model in which 0 represented positive contexts (baseline: D_3 = 1, positive: D_3 = 0) provided estimates of power in positive contexts, and a model in which 0 represented negative contexts provided estimates of power in negative contexts (baseline: D_4 = 1, negative: D_4 = 0; see Tables A12 and A13 for full variance estimates). A similar pattern of results was found in positive contexts. High power was associated with elevated mood, coeff_{D1} = 0.30, SE = 0.08, p < .001, 95% CI [0.14, 0.45], r = .14, and low power with depressed mood, coeff_{D2} = -0.25, SE = 0.08, p = .002, 95% CI [-0.42, -0.09], r = -.11. However, neither high nor low power predicted mood in negative contexts, coeff_{D1} = 0.03, SE = 0.10, p = .851, 95% CI [-0.18, 0.22], r = .01, coeff_{D2} = -0.02, SE = 0.010, p = .641, 95% CI [-0.25, 0.88], r = -.02.

To determine if the effects of power differed across contexts, we examined interactions between power (D_1, D_2) and context (D_3, D_4) dummy variables in the initial model. In this model, the positive context x power (D_1xD_3, D_2xD_3) and negative context x power (D_1xD_4, D_2xD_4) coefficients reflect differences in the effects of high (vs. medium) and low (vs. medium) power in positive and negative contexts (vs. at baseline). The association between high power and elevated mood was similar in positive contexts as at baseline (or at least no different), coeff_{D1xD3} = -0.15, SE = 0.11, p = .201, 95% CI [-0.37, 0.08], r = -.04, whilst the association between low power and depressed mood was noticeably weaker in positive contexts compared to at baseline, $coeff_{D2xD3} = 0.59$, SE = 0.12, $p < .001$, 95% CI [0.36, 0.82], $r = 0.17$, although low power still depressed mood in positive contexts (see prior analyses). The association between high and low power and mood were both weaker in negative contexts compared to at baseline, $coeff_{D1xD4} = -0.41$, SE = 0.12, $p = .001$, 95% CI [-0.65, -0.17], $r = -.11$, $coeff_{D2xD4} = 0.81$, SE = 0.13, $p < .001$, 95% CI [0.56, 1.05], $r = .21$, as was suggested by the null-relationship between high and low power and mood in negative contexts (see prior analyses).

Variability in Mood between Contexts. To examine how much individuals' mood varied between contexts of opposing valence (negative vs. positive), responses at baseline were excluded. As a result, the context dummy variable (positive: $D_3 = 1$, negative: $D_3 = 0$) now represented differences between contexts of opposing valence (negative vs. positive). Crucially, interactions involving dummy variables representing power and context now provide estimates of the effects of high (vs. medium) and low (vs. medium) power on variability. That is, coefficients (D_1xD_3 and D_2xD_3) reflect greater/lesser differences in mood between negative and positive contexts as a function of high (vs. medium, D_1xD_3) and low (vs. medium, D_2xD_3) power. As shown in Table 3., high power participants varied more, $coeff_{D1xD3} = 0.29$, SE = 0.11, $p = .005$, 95% CI [0.08, 0.49], $r = .10$, and low power participants varied less, $coeff_{D2xD3} = -0.23$, SE = 0.11, $p = .036$, 95% CI [-0.44, -0.01], $r = -.08$, in their mood across negative and positive contexts.

Table 3.

Studies 1a and 1b: Multi-level model predicting variations in mood, with medium power at baseline providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power, and high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.60***	0.48	2.60	4.59	3.08***	0.59	1.82	4.35	13.99	5.22	.81
D_1: High Power (1=high, 0=medium)					**0.44*** **	**0.10**	**0.25**	**0.64**	**1076.78**	**4.47**	**.14**
D_2: Low Power (1=low, 0=medium)					**-0.82*** **	**0.10**	**-1.02**	**-0.62**	**1076.83**	**-8.13**	**-.24**
D_3: Positive Context (1=positive, 0=baseline)					0.72	0.74	-0.86	2.31	13.93	0.98	.25
D_4: Negative Context (1=negative, 0=baseline)					-1.84*	0.74	-3.42	-0.26	13.99	-2.49	-.55
D_1xD_3: High Power x Positive Context					**-0.15**	**0.11**	**-0.37**	**0.08**	**866.51**	**-1.28**	**-.04**
D_1xD_4: High Power x Negative Context					**-0.41** **	**0.12**	**-0.65**	**-0.17**	**875.51**	**-3.32**	**-.11**
D_2xD_3: Low Power x Positive Context					**0.59*** **	**0.12**	**0.36**	**0.81**	**865.88**	**5.08**	**.17**
D_2xD_4: Low Power x Negative Context					**0.81*** **	**0.13**	**0.56**	**1.05**	**875.14**	**6.42**	**.21**
Fixed Effects (Study)											
Study					-2.09**	0.59	-3.35	-0.82	13.86	-3.54	-.69
Study x High Power					0.04	0.07	-0.10	0.18	443.27	0.61	.03
Study x Low Power					0.13†	0.07	-0.01	0.27	443.46	1.76	.08
Study x Positive Context					0.01	0.73	-1.57	1.58	13.72	0.01	.00
Study x Negative Context					1.17	0.74	-0.41	2.75	13.74	1.59	.39
Study x High Power x Positive Context					0.02	0.12	-0.21	0.25	906.89	0.18	.01
Study x High Power x Negative Context					0.44**	0.13	0.19	0.69	919.15	3.48	.02
Study x Low Power x Positive Context					-0.42**	0.12	-0.65	-0.18	906.95	-3.48	-.01
Study x Low Power x Negative Context					-0.37**	0.13	-0.63	-0.12	919.44	-2.90	.00
Variance Components											
Residual	0.65***	0.03	0.58	0.72	0.58***	0.03	0.52	0.65	-	-	-
Random Intercept Variance											

Participant	0.25***	0.03	0.19	0.32	0.20***	0.03	0.15	0.26	-	-	-
Stimuli	4.53***	1.44	2.43	8.44	0.69**	0.26	0.32	1.46	-	-	-
Random Slope Variance											
Positive Context	0.02	0.04	0.00	1.05	0.06	0.04	0.02	0.23	-	-	-
Negative Context	0.23***	0.06	0.14	0.38	0.25***	0.06	0.16	0.39	-	-	-
Fit Statistics											
ML deviance (number of parameters)	5463.53(6)				5269.48(23)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the high- and low-power dummy variables denote deviations from medium power at baseline/in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table 4.

Studies 1a and 1b: Multi-level model predicting variations in mood, with medium power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.67***	0.50	2.61	4.73	1.25***	0.44	0.31	2.20	14.10	2.85	.60
D_1: High Power (1=high, 0=medium)					0.06	0.08	-0.11	0.22	892.53	0.66	.02
D_2: Low Power (1=low, 0=medium)					-0.06	0.09	-0.23	0.10	892.72	-0.75	-.03
D_3: Positive Context (1=positive, 0=negative)					2.56***	0.62	1.22	3.89	14.01	4.12	.74
D_1xD_3: High Power * Positive Context					**0.29***	**0.11**	**0.08**	**0.49**	**750.43**	**2.70**	**.10**
D_2xD_3: Low Power * Positive Context					**-0.23***	**0.11**	**-0.44**	**-0.01**	**748.53**	**-2.09**	**-.08**
Fixed Effects (Study)											
Study					-0.92*	0.44	-1.87	0.02	14.00	-2.11	-.49
Study x High Power					0.17*	0.07	0.03	0.31	440.76	2.42	.11
Study x Low Power					0.00	0.07	-0.14	0.14	441.21	-0.02	.00
Study x Positive Context					-1.16†	0.62	-2.49	0.17	13.74	-1.88	.45
Study x High Power x Positive Context					-0.42***	0.12	-0.65	-0.19	907.82	-3.59	-.01
Study x Low Power x Positive Context					-0.05	0.12	-0.28	0.19	908.06	-0.40	-.01
Variance Components											
Residual	0.58***	0.04	0.51	0.66	0.59***	0.04	0.52	0.67	-	-	-
Random Intercept Variance											
Participant	0.14***	0.03	0.09	0.22	0.12**	0.03	0.08	0.20	-	-	-
Stimuli	4.52***	1.51	2.35	8.70	0.67***	0.26	0.32	1.43	-	-	-
Random Slope Variance											
Positive Context	0.19***	0.05	0.11	0.33	0.14**	0.05	0.07	0.28	-	-	-
Fit Statistics											
ML deviance (number of parameters)	3962.41(5)				3899.55(16)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the interaction between low- and high-power and context dummy variables (highlighted in bold) denote greater/lesser variability relative to medium power. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Discussion

Supporting lay beliefs and theoretical models (Keltner et al., 2003), the results from Studies 1a and 1b suggest that high power is associated with elevated mood, and low power with depressed mood at baseline and in positive contexts. However, no differences between levels of power were found in negative contexts, suggesting that the effects of power are moderated by the valence of the context. Furthermore, high power was associated with greater variability in mood, and low power with lesser variability in mood across contexts of opposing valence—consistent with theoretical predictions (Guinote, 2007b). The initial findings are encouraging, largely supporting our predictions. Moving forward, the findings are consolidated across different operationalisations of power and context, and more ecologically valid measures of mood (e.g., experience sampling).

3.3. Study 2: Mood in Every Day Life

Continuing with our individual difference approach, we again sought to test the relationship between power and mood in and across different contexts. Study 2 used a novel mobile phone application to track feelings of power and mood in everyday life. This approach is particularly advantageous due to its ability to detect variability in mood within individuals across situations and time (Csikszentmihalyi & Larson, 2014). Moreover, the approach samples mood in response to more subtle every-day stimuli (compared to the more unambiguous and salient stimuli used in Studies 1a and 1b), which may allow for greater differences to manifest between individuals (Fiske et al., 2010). Similarly, Study 2 addresses potential problems associated with carry-over effects when presenting contexts of opposing valence in relatively swift succession. The approach also increases the generalisability of our findings by capturing a wide range of everyday experiences across a seven-day period.

Taking cues from previous experience sampling research, positive and negative contexts were identified as a function of participants' circadian rhythms. Differences in sleep-wake cycles influence mood across the day, and are associated with preferences for mornings versus evenings (e.g., Larsen & Kasimatis, 1990). Sampling participants' experiences throughout the day, in preferred (e.g., evenings for evening-types) and non-preferred times (e.g., mornings for evening-types) provided a measure of mood in positive and negative contexts (Kerkhof, 1998). Participants completed the Sense of Power scale (Anderson et al., 2012) and the Reduced Morning-Evening Questionnaire—a measure of preferred time-of-day (Adan & Almirall, 1991), and were then prompted via a novel experience sampling application to report their mood three times a day, at random intervals over a seven day period.

Methods

Participants and Design

Two-hundred and thirty-two students from the School of Psychology, University of Kent participated in exchange for course credits. Forty-two participants were excluded due to: failing pre-planned attention checks (*n* = 6), equipment error (*n* = 12), software adaptability issues (*n* = 9) or lack of responses (*n* = 17), leaving a final sample of 190 participants (167 female; $M_{age} = 20.22$, $SD = 2.20$).

Study 2 followed a correlational design. Power was measured between participants (low vs. medium vs. high) and contexts were identified within participants (negative vs. neutral vs. positive).

Procedure and Materials

Participants attended an initial lab session in which they completed a battery of individual difference measures, including the Sense of Power Scale (e.g., "*I feel powerful in my everyday life*"; Anderson et al., 2012). Participants also completed the Reduced Morning-Evening Questionnaire, a five item scale (e.g., "*One hears about 'morning' and 'evening' types. Which one of these do you consider yourself?*") ranging from 1 (*Definitely morning type*) to 4 (*Definitely evening type*), assessing individuals' preferences towards evenings or mornings (Adan & Almirall, 1991). To sample participants' experiences, Google's Personal Analytics Companion (PACO; Version 1.1.7.1; Google, 2015) was installed on participants' smart phones. The application was set to signal three times a day at random intervals, between the times of 10:00 am and 8:00 pm[1]. Signals were restricted to appear no less than 30 minutes apart. Following the lab session (day 0), participants reported on their mood for seven days (day 1-7). On receiving a signal, participants completed a brief questionnaire

[1] Notifications were set to alert no earlier than 10:00AM, as previous research has documented later rising times in student populations, and a reluctance to respond to early notifications (e.g., Mecacci & Zani, 1983).

assessing their current mood on a 3-item measure, from 1 *(Unhappy, Scared, Sad*) to 7 (*Happy, Peaceful, Enthusiastic*; Yik et al., 2011). Participants then returned to the lab, completed the same Sense of Power Scale and were debriefed.

Results

Data Preparation

Mean scores and reliability statistics were calculated for measures of Sense of Power and mood (as $\geq$ .74). The time 1 and 2 Sense of Power measures were then collapsed (r = .72) and converted into tertiles (Low vs. Medium vs. High) to aid later cross-study comparisons and to differentiate between the effects of high (vs. medium) and low (vs. medium) power. Responses to the Morning-Evening Questionnaire were summed and then categorised into five ‘types’ following Adan and Almirall (1991); $n_{DefinitelyEvening}$ = 24, $n_{ModeratlyEvening}$ = 68, $n_{Neither}$ = 87, $n_{ModeratlyMorning}$ = 11, $n_{DefinitelyMorning}$ = 0. Due to a lack of morning types (as is typical in student samples; Mecacci & Zani, 1983), the first two and last three categories were collapsed, classifying participants as either evening or non-evening types ($n_{Evening}$ = 92, $n_{Non\text{-}Evening}$ = 98). Lastly, responses were coded based on the time of day they were completed, from 10:00 am to 8:00 pm in bins of two hours ranging from 1 (10:00 am to 12:00 am) to 5 (6:00 pm to 8:00 pm). Responses recorded more than 10 minutes following a notification were excluded prior to the analysis.

Operationalisation Check

Confirming the operationalisation of context, evening types experienced more positive mood in the evenings (6:00 pm to 8:00 pm; M = 5.01, SD = 0.64), t(188) = 1.86, p = .063, and more negative mood in the mornings (10:00 am to 12:00 am; M = 4.54, SD = 0.99), t(183) = -2.31, p = .022, compared to non-evening types (10:00 am to 8:00 pm; M = 4.82, SD = 0.64), although the first comparison was only marginally significant. As such, evenings were classified as positive contexts, and mornings as negative contexts for evening types. Neutral contexts were identified as any time for non-evening types.

Main analysis

Continuing with the multi-level analysis approach, a random intercept and slope model with homogeneous variances was fitted to the mood data (descriptive statistics are provided in Appendices, Table A6). Intercepts were allowed to vary across participants and time intervals. Slopes were allowed to vary within participants and between contexts (negative vs. neutral vs. positive). Fixed effect dummy coefficients compared high (D_1=1, D_2=0) and low (D_2=0, D_2=1) power with medium power, and positive (D_3=1, D_4=0) and negative (D_3=0, D_4=1) contexts with baseline. Adding these fixed effects improved the model fit, Δ-2LL = 17.93, df = 8, *p* = .022. Variance estimates and crucial hypothesis tests are presented below (Table 5).

Mood in Different Contexts. We first looked at the coefficients estimating differences between high (vs. medium) and low (vs. medium) power in neutral contexts (D_1, D_2). High power did not predict mood, coeff_{D1} = 0.10, SE = 0.11, *p* = .360, 95% CI [-0.12, 0.31], *r* = .06, whilst low power was associated with depressed mood, coeff_{D2} = -0.26, SE = 0.11, *p* = .017, 95% CI [-0.48, -0.05], *r* = -.17.

We again recoded the dummy variables representing contexts to provide estimates of high (vs. medium) and low (vs. medium) power in positive contexts (baseline: D_3 = 1, positive: D_3 = 0) and negative contexts (baseline: D_4 = 1, negative: D_4 = 0; see Tables A14 and A15 for full variance estimates). This analysis revealed that high power was associated with elevated mood in positive contexts, coeff_{D1} = 0.33, SE = 0.16, *p* = .041, 95% CI [0.01, 0.65], *r* = .08, whilst low power was not associated with any differences in mood in positive contexts, coeff_{D2} = 0.06, SE = 0.17, *p* = .621, 95% CI [-0.27, 0.40], *r* = .01. Moving to negative contexts, neither high nor low power predicted differences in mood, compared to medium power, $coeff_{D1}$ = -0.02, SE = 0.18, *p* = .852, 95% CI [-0.38, 0.34], *r* = -.00, $coeff_{D2}$ = 0.16, SE = 0.20, *p* = .241, 95% CI [-0.22, 0.55], *r* = .02.

As in Studies 1a and 1b, we examined the power x context interactions in the initial model (negative vs. neutral vs. positive; D_1xD_3, D_2xD_3, D_1xD_4, D_2xD_4) to investigate differences in the effects of high (vs. medium) and low (vs. medium) power in positive and negative contexts (vs. in neutral contexts). The association between high power was no different in positive contexts compared to neutral contexts, $coeff_{D1xD3}$ = 0.19, SE = 0.15, *p* = .195, 95% CI [-0.10, 0.49], *r* = .13, although it is worth noting that high power was associated with elevated mood in positive contexts but not in neutral contexts (see above). The association between low power was marginally weaker in positive contexts compared to neutral contexts, $coeff_{D2xD3}$ = 0.31, SE = 0.16, *p* = .055, 95% CI [-0.01, 0.63], *r* = .19, as was suggested by the fact that low power depressed mood in neutral contexts but not in positive contexts (see prior analysis). Turning to negative contexts, the association high power was no different in negative contexts compared to neutral contexts, $coeff_{D1xD4}$ = -0.15, SE = 0.21, *p* = .481, 95% CI [-0.55, 0.26], *r* = -.08. However, the association between low power and depressed mood was less pronounced in negative contexts compared to neutral contexts (although this effect was marginal), $coeff_{D2xD4}$ = 0.41, SE = 0.23, *p* = .071, 95% CI [-0.04, 0.86], *r* = .13; consistent with prior analysis suggesting that low power depressed mood in neutral contexts but not negative contexts.

Variability in Mood between Contexts. To examine variations in mood between contexts, responses in neutral contexts were excluded and interactions involving dummies representing high (vs. medium) and low (vs. medium) power and different contexts (i.e., D_1xD_3 and D_2xD_3) were examined (Table 6). High power was associated with greater variability in mood, $coeff_{D1xD3}$ = 0.38, SE = 0.10, *p* = .064, 95% CI [-0.04, 0.80], *r* = .13, although this effect was marginally significant. Whilst the association between low power and variability in mood was in the expected direction, it did not reach significance, $coeff_{D2xD3} = -0.09$, SE = 0.23, $p = .348$, 95% CI [-0.55, 0.36], $r = -.03$

Table 5.

Study 2: Multi-level model predicting variations in mood, with medium power in neutral contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power, and high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.82***	0.04	4.72	4.49	4.86***	0.08	4.71	5.01	205.58	64.23	.98
D_1: High Power (1=high, 0=medium)					**0.10**	**0.11**	**-0.12**	**0.32**	**204.27**	**0.92**	**.06**
D_2: Low Power (1=low, 0=medium)					**-0.26***	**0.11**	**-0.48**	**-0.05**	**201.18**	**-2.40**	**-.17**
D_3: Positive Context (1=positive, 0=neutral)					0.05	0.11	-0.16	0.26	97.74	0.47	.05
D_4: Negative Context (1=negative, 0=neutral)					-0.31*	0.15	-0.61	-0.02	92.08	-2.10	-.21
$D_1 x D_3$: High Power x Positive Context					**0.19**	**0.15**	**-0.10**	**0.49**	**95.02**	**1.30**	**.13**
$D_1 x D_4$: High Power x Negative Context					**-0.15**	**0.21**	**-0.55**	**0.26**	**86.48**	**-0.71**	**-.08**
$D_2 x D_3$: Low Power x Positive Context					**0.31†**	**0.16**	**-0.01**	**0.63**	**96.35**	**1.94**	**.19**
$D_2 x D_4$: Low Power x Negative Context					**0.41†**	**0.23**	**-0.04**	**0.86**	**84.64**	**1.83**	**.19**
Variance Components											
Residual	0.89***	0.03	0.83	0.95	0.89***	0.03	0.83	0.95	-	-	-
Random Intercept Variance											
Participant	0.29***	0.04	0.23	0.38	0.28***	0.04	0.22	0.37	-	-	-
Stimuli	0.15***	0.03	0.11	0.21	0.16***	0.03	0.11	0.21	-	-	-
Random Slope Variance											
Positive Context	0.06	0.06	0.01	0.36	0.02	0.05	0.00	2.68	-	-	-
Negative Context	0.31**	0.11	0.15	0.63	0.21*	0.09	0.08	0.50	-	-	-
Fit Statistics											
ML deviance (number of parameters)	9144.08(6)				9126.78(14)						

NB: ***p < .001, **p < .01, *p < .05, $^{\dagger}p$ < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power at baseline/in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table 6.

Study 2: Multi-level model predicting variations in mood, with medium power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.78***	0.07	4.63	4.91	4.44***	0.15	4.15	4.74	206.44	29.98	.90
D_1: High Power (1=high, 0=medium)					0.12	0.20	-0.28	0.52	187.39	0.60	.04
D_2: Low Power (1=low, 0=medium)					0.19	0.22	-0.25	0.63	190.08	0.86	.06
D_3: Positive Context (1=positive, 0=negative)					0.34*	0.15	0.04	0.64	215.88	2.22	.15
D_1xD_3: High Power x Context					**0.38†**	**0.21**	**-0.04**	**0.80**	**196.90**	**1.80**	**.13**
D_2xD_3: Low Power x Context					**-0.09**	**0.23**	**-0.55**	**0.36**	**208.79**	**-0.40**	**-.03**
Variance Components											
Residual	1.14***	0.08	1.00	1.30	1.11***	0.07	0.97	1.26	-	-	-
Random Intercept Variance											
Participant	0.25***	0.07	0.14	0.43	0.25***	0.07	0.15	0.42	-	-	-
Random Slope Variance											
Positive Context	0.09	0.09	0.02	0.57	0.01	0.07	0.00	18268	-	-	-
Fit Statistics											
ML deviance (number of parameters)	1995.49(4)				1784.63(9)						

NB: ****p* < .001, ***p* < .01, **p* < .05, $^{\dagger}p$ < .10. Coefficients for the interaction between low- and high-power and context dummy variables (highlighted in bold) denote greater/lesser variability relative to medium power. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Discussion

Study 2 sampled mood in the moment across a seven day period, adding to the mounting evidence suggesting that low power dampens mood at baseline/in neutral contexts, and high power elevates mood in positive contexts. Consistent with Studies 1a and 1b there was no effect of high or low power on mood in negative contexts. Inconsistent with Studies 1a and 1b, there was no discernible effect of high power in neutral contexts, nor of low power in positive contexts. Lastly, high power was again found to be associated with greater variability in mood, although this effect was marginally significant. However, low power was not associated with lesser variability.

The fact that Study 2 did not replicate all the previous findings could be due to differences in the experimental design. Ecological assessment typically trades experimental control for ecological validity, resulting in a greater noise-to-signal ratio and therefore a less sensitive statistical test (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004; Stone & Neale, 1982). A comparison of the standard errors derived from the meta-analysis of Studies 1a and 1b with the results obtained in Study 2 is consistent with this explanation ($SE_{meta} < 0.11$, $SE_{Study2} > 0.11$). Lastly, the results may reflect natural variations between samples. Indeed, the size of the effects across Studies 1-2 are small to small-to-medium (Cohen, 1992), and therefore should not be expected to consistently arise in all samples (even when samples are assumed to be “adequately” powered; Bakker, Hartgerink, Wicherts, & van der Maas, 2016; Cohen, 1992). Such concerns can be largely dispelled by meta-analysing multiple samples (an approach we subsequently employ; Cumming, 2014). As such, we refrain from stating any firm conclusions at this point. Moving forward we sought to isolate the effects of power on mood by manipulating temporary feelings of power between participants.

3.4. Studies 3 and 4: Mood in Response to Music and Images

Three correlational studies (Studies 1a, 1b and 2) probed the relationship between chronic feelings of power, context and mood. The final two studies (Studies 3 and 4) experimentally manipulate power to provide causal evidence for the impact of power on mood. Participants were primed with a high-power, low-power, or neutral mind-set (Study 3; Galinsky et al., 2003) or assigned a role (high power vs. low power vs. no role) in a group task (Study 4; Guinote, 2007c). Participants then reported their mood at baseline and after listening to short music experts (Study 3) or viewing images (Study 4) that differed in valence. In addition, Study 4 measured facial expressions associated with momentary mood (i.e., positive-smile, negative-frown; Fridlund & Cacioppo, 1986). Facial expression (via EMG) provides an unobtrusive measure of low-level mood that may occur outside of awareness (Tassinary & Cacioppo, 1992). Due to the similarity in the measures of power and operationalisations of context in Studies 3 and 4, we approach the presentation and analysis of the results in a similar fashion to that of Studies 1a and 1b.

Methods

Participants and Design

Study 3. Two-hundred and nineteen students from the School of Psychology, University of Kent participated in exchange for course credits. Twenty-two participants were excluded due to: not adhering to the procedure (*n* = 3), identifying the aim of the study (*n* = 18; see Table A1 for supporting information and further details on excluded participants) or equipment error (*n* =1), leaving a final sample of 197 participants (154 female; M_{age} = 19.75, *SD* = 3.35).

Study 4. One-hundred and ninety-three students from the School of Psychology, University of Kent participated in exchange for course credits and the chance to win £50 in a cash draw. Nine participants were excluded; due to equipment error (*n* = 3), identifying the aim of the study (n = 4; see also Table A1) or requesting to prematurely end the study (n = 2), leaving a final sample of 184 participants (138 female; M_{age} = 19.74, SD = 3.08).

Design. Study 3 and Study 4 followed mixed designs. Power was manipulated between participants (low vs. control vs. high) and contexts were manipulated within participants (negative vs. neutral vs. positive).

Procedure and Materials

Participants were invited to take part in a study on music perception (Study 3) or virtual communication (Study 4). Upon arrival in the laboratory, participants were seated individually in front of a computer. To manipulate different levels of power, participants were randomly assigned to one of three conditions, in which they were asked to describe a past event where they felt powerful, powerless, or a neutral event (Study 3; Galinsky et al., 2003) or were led to believe they would take part in a group task with a second participant (Study 4; Guinote, 2007c). For the group task, participants in the high and low power conditions were informed that they would either be assigned a Director or Worker role; entailing differential power (see Guinote, 2007c). The Director was asked to lead the group task and was granted six lottery tickets (for a £50 draw) irrespective of their performance in the task. The Worker was asked to take a subordinate role in the group task, and was told they would be granted as many lottery tickets as the Director deemed commensurate with their performance (from 2-8). In reality, all participants were granted one lottery ticket. No roles were mentioned for participants in the medium power condition. Following the power manipulations, participants indicated how much control and influence they had in the recalled event or assigned role (*1=not at all, 9=very much*). These items served as manipulation checks. Participants in Study 4 also indicated how they were currently feeling (*1=very sad, very bad, very tense, 7=very happy, very good, very relaxed, very content*). Participants were then presented with a series of music excerpts (Study 3) or images (Study 4) varying in their valence (Table 8; Tables A26, A27, A29 and A30). In Study 3 participants listened to 25 (1 neutral, 12 positive, 12 negative) music excerpts (30s duration) played twice successively through a pair of over-ear headphones at a loud but comfortable volume (~70dB). The music excerpts were selected from a pool of 75 orchestral, modern, rock, pop and dance tracks gathered from various online sources (see also Table A26) on the basis of their pre-test ratings of valence and arousal. Twenty students (18 female, M_{age} = 19.00, *SD* = 2.20) rated each excerpt on valence and arousal from 1 (*negative; calm*) to 9 (*positive; excited*) using the Self-Assessment Manikin (Bradley & Lang, 1994). Three groups of excepts were formed along the dimension of valence: negative (M = 3.52, SD = 1.30), neutral (M = 5.50, SD = 1.40), and positive (M = 6.55, SD = 0.89), $F(2, 38) = 41.98$, $p < .001$, $\eta_p^2 = .69$ (see also Table A29).

In Study 4, participants viewed 48 (16 positive, 16 neutral, 16 negative) images (6s viewing time) selected from the International Affective Picture System (Lang, Bradley, & Cuthbert, 2008) on the basis of their valence ratings: negative (M = 2.37, SD = 0.54), neutral (M = 5.04, SD = 0.19), and positive (M = 7.55, SD = 0.54), $F(2, 45) = 481.36$, $p < .001$, $\eta_p^2 = .96$ (see also Table A30). Following each stimulus presentation participants reported their mood from 1 (*negative*) to 9 (*positive*) using the Self-Assessment Manikin—a pictorial self-report measure of mood (Bradley & Lang, 1994).

In addition to the procedure described above, in Study 4 participants' zygomaticus (smile) muscle and corrugator (brow) muscle activation was recorded using facial electromyography throughout the entire session. Activation in the zygomaticus muscle is typically evoked by positive states (i.e., joy, happiness and amusement) and activation of the corrugator muscle by negative states (i.e., disgust, fear, anger, and sadness; see Reisenzein, Studtmann, & Horstmann, 2013). Thus, Study 4 also provided a behavioural index of positive and negative mood. Physiological signals were sampled via a BIOPAC MP150 system

(BIOPAC Systems, Santa Barbara, CA) at 2000Hz throughout the entire study. Electric potentials were sampled via Ag-AgCl electrodes filled with NaCl gel, placed on the Zygomatic (right cheek) and Corrugator (right brow; see Fridlund & Cacioppo, 1986 for exact placement). Raw EMG activity was filtered (High: 10Hz; Low: 500Hz) and then amplified (x5000). An electrode placed on the right finger served as a ground.

Results

Data Preparation

The two manipulation-check items measuring power (*rs* > .76) and the four items (*a* = .90, *M* = 4.61, *SD* = 1.11) measuring mood at baseline in Study 4 were collapsed. Physiological data were reduced off-line using AcqKnowledge Software (Version 4.1). Trials in which there was reason to believe the recordings were unreliable (e.g., due to movement) were identified through visual inspection and discarded prior to the data analysis. Facial muscle activity was rectified, as per Fridlund and Cacioppo (1986). The average activity in the one second before each image presentation was then subtracted from the average activity whilst image-viewing (full six seconds), separately for each trial, and for zygomaticus and corrugator.

Manipulation Check

Power. As shown in Table 7, participants felt more powerful following the high power manipulations compared to the control. Participants also felt more powerless following the low power prime compared to the control. Thus, the priming (Study 3) and role assignment (Study 4) manipulations successfully induced feelings of high and low power.

Table 7.

Studies 3 and 4: Feelings of power following low, control and high power manipulations.

	Power			
Sample	Low	Control	High	Power main effect
Study 3	$2.60_a(1.40)$	$4.46_b(1.68)$	$7.57_c(1.08)$	$F(2, 194) = 193.21$, $p < .001$, $\eta_p^2 = .67$
Study 4	$3.54_a(1.51)$	$5.06_b(1.07)$	$7.51_c(1.17)$	$F(2, 181) = 156.17$, $p < .001$, $\eta_p^2 = .63$

NB: Observed means and standard deviations in parentheses. Higher values indicate greater feelings of power. Means not sharing a common subscript within rows are significantly different ($p < .05$).

Context. The music excerpts (Study 3) and images (Study 4) successfully influenced participants' mood. Participants reported greater positive mood following positive stimuli, and greater negative mood following negative stimuli, compared to neutral stimuli. Facial displays were also consistent with self-reported mood, participants smiled more towards positive stimuli than towards neutral or negative stimuli, and frowned more towards negative stimuli than towards neutral or positive stimuli (Table 8).

Table 8.

Studies 3 and 4: Indices of mood in different contexts.

	Context			
Sample	Negative	Neutral	Positive	Valence main effect
Study 3 (self-report)	4.38_a(1.51)	5.56_b(1.51)	6.04_c(0.86)	$F(2, 392) = 114.27$, $p < .001$, $\eta_p^2 = .37$
Study 4 (self-report)	2.71_a(0.95)	5.12_b(0.52)	6.76_c(0.75)	$F(2, 366) = 1213.22$, $p < .001$, $\eta_p^2 = .87$
Study 4 (zygomaticus activation)	-0.17_a(0.21)	-0.11_a(0.28)	0.28_b(0.92)	$F(2, 366) = 38.67$, $p < .001$, $\eta_p^2 = .18$
Study 4 (corrugator activation)	0.11_a(0.37)	-0.06_b(0.38)	-0.05_b(0.57)	$F(2, 366) = 7.54$, $p = .001$, $\eta_p^2 = .04$

NB: Observed means and standard deviations in parentheses. Higher values indicate more positive mood. Means not sharing a common subscript within rows are significantly different ($p < .05$).

Main Analysis

As in Studies 1a and 1b, we chose to focus on overall variations in mood at the meta-level (across Studies 3 and 4), so as to identify trends that generalise across studies (Cumming, 2012, 2014). A random slope and intercept model with homogeneous variances was fitted to the mood data (descriptive statistics are provided in Appendices, Tables A7 and A8). Random effect coefficients allowed intercepts to vary across participants and stimuli. Slopes were allowed to vary within participants and between contexts (negative vs. neutral vs. positive). Fixed effect dummy coefficients compared high (D_1=1, D_2=0) and low (D_2=0, D_2=1) power with control participants, and positive (D_3=1, D_4=0) and negative (D_3=0, D_4=1) contexts with neutral contexts. A fixed effect contrast coefficient (Study 3=1, Study 4=-1) modelled between-study variance. Adding these fixed effects improved the model fit, Δ-2LL = 160.08, df = 13, p < .001. Variance estimates and crucial hypothesis tests are presented below (Table 9).

Mood in Different Contexts. As in previous analyses we examined coefficients estimating the effects of high (vs. control) and low (vs. control) power (D_1, D_2) in neutral contexts. Across Studies 3 and 4, high power did not elevate mood, $coeff_{D1}$ = 0.04, SE = 0.09, p = .407, 95% CI [-0.13, 0.22], r = .02. Low power, on the other hand, depressed mood, $coeff_{D2}$ = -0.18, SE = 0.08, p = .038, 95% CI [-0.35, -0.01], r = -.07.

Context dummy variables were again re-coded to provide simple effects of high (vs. control) and low (vs. control) power in positive contexts (neutral: D_3 = 1, positive: D_3 = 0) and negative contexts (neutral: D_4 = 1, negative: D_4 = 0; see Tables A16 and A17 for full variance estimates). In positive contexts, high power elevated mood, $coeff_{D1}$ = 0.17, SE = 0.09, p = .063, 95% CI [-0.01, 0.35], r = .10, whilst low power dampened mood, $coeff_{D2}$ = -0.16, SE = 0.09, p = .067, 95% CI [-0.34, 0.01], r = -.09, although both effects were marginally significant. Turning to negative contexts, neither high nor low power elevated or depressed mood, coeff_{D1} = 0.09, SE = 0.12, *p* = .796, 95% CI [-0.14, 0.31], *r* = .04, coeff_{D2} = 0.01, SE = 0.11, *p* = .926, 95% CI [-0.21, 0.23], *r* = .00.

Going back to the initial model, we finally looked at the moderating role of context (D_1xD_3, D_2xD_3, D_1xD_4, D_2xD_4). Neither the effects of high power nor of low power were moderated by the valence of the context, coeff_{D1xD3} = 0.13, SE = 0.11, *p* = .252, 95% CI [-0.09, 0.35], *r* = .05, coeff_{D2xD3} = 0.03, SE = 0.11, *p* = .809, 95% CI [-0.19, 0.25], *r* = .01, coeff_{D1xD4} = 0.05, SE = 0.14, *p* = .727, 95% CI [-0.23, 0.33], *r* = .02, coeff_{D2xD4} = 0.19, SE = 0.14, *p* = .167, 95% CI [-0.08, 0.46], *r* = .06.

Variability in Mood between Contexts. To provide an estimate of how much participants' mood varied between contexts, we excluded responses in neutral contexts and examined the interactions involving dummies representing different levels of power and different contexts (i.e., D_1xD_3 and D_2xD_3). As shown in Table 10, across Studies 3 and 4 neither participants with high nor low power exhibited greater or lesser variability in their mood, coeff_{D1xD3} = 0.08, SE = 0.16, *p* = .610, 95% CI [-0.24, 0.77], *r* = .03, coeff_{D2xD3} = -0.16, SE = 0.16, *p* = .293, 95% CI [-0.30, 0.15], *r* = -.05. However, the effects were in the expected direction.

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Table 9.

Studies 3 and 4: Multi-level model predicting variations in mood, with control power in neutral contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power, and high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	5.00***	0.18	4.65	5.35	5.39***	0.24	4.91	5.86	74.45	22.67	.93
D_1: High Power (1=high, 0=control)					**0.04**	**0.09**	**-0.13**	**0.22**	**805.60**	**0.51**	**.02**
D_2: Low Power (1=low, 0=control)					**-0.18***	**0.09**	**-0.35**	**-0.01**	**805.52**	**-2.08**	**-.07**
D_3: Positive Context (1=positive, 0=neutral)					1.01***	0.26	0.50	1.53	79.02	3.94	.41
D_4: Negative Context (1=negative, 0=neutral)					-1.88***	0.26	-2.40	-1.35	86.98	-7.12	-.61
D_1xD_3: High Power x Positive Context					**0.13**	**0.11**	**-0.09**	**0.35**	**508.71**	**1.15**	**.05**
D_1xD_4: High Power x Negative Context					**0.05**	**0.14**	**-0.23**	**0.33**	**504.15**	**0.35**	**.02**
D_2xD_3: Low Power x Positive Context					**0.03**	**0.11**	**-0.19**	**0.25**	**525.84**	**0.24**	**.01**
D_2xD_4: Low Power x Negative Context					**0.19**	**0.14**	**-0.08**	**0.46**	**517.58**	**1.38**	**.06**
Fixed Effects (Study)											
Study					0.31	0.24	-0.16	0.79	73.31	1.33	.15
Study x High Power					-0.06	0.08	-0.22	0.10	537.77	-0.75	-.03
Study x Low Power					-0.22**	0.08	-0.38	-0.07	530.71	-2.84	-.12
Study x Positive Context					-0.57*	0.25	-1.07	-0.07	69.34	-2.28	-.26
Study x Negative Context					0.62*	0.25	0.12	1.12	71.83	2.46	.28
Study x High Power x Positive Context					-0.06	0.13	-0.32	0.20	1175.27	-0.44	-.01
Study x High Power x Negative Context					0.13	0.16	-0.18	0.44	809.71	0.84	.03
Study x Low Power x Positive Context					0.15	0.13	-0.10	0.40	1120.25	1.21	.04
Study x Low Power x Negative Context					0.12	0.15	-0.17	0.42	781.70	0.82	.03
Variance Components											
Residual	1.08***	0.01	1.06	1.11	1.08***	0.01	1.06	1.11	-	-	-
Random Intercept Variance											

Participant	0.20***	0.02	0.16	0.25	0.19***	0.02	0.15	0.24	-	-	-
Stimuli	2.15***	0.37	1.54	3.01	0.20***	0.03	0.14	0.28	-	-	-
Random Slope Variance											
Positive Context	0.44***	0.04	0.36	0.53	0.43***	0.04	0.36	0.53	-	-	-
Negative Context	0.86***	0.07	0.72	1.02	0.86***	0.07	0.72	1.01	-	-	-
Fit Statistics											
ML deviance (number of parameters)	42324.41(6)				42164.33(23)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the high- and low-power dummy variables denote deviations from controls in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results

Table 10.

Studies 3 and 4: Multi-level model predicting variations in mood across, with control power in negative contexts providing the reference category.

Crucial hypothesis tests are highlighted in bold: high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.67***	0.50	2.61	4.73	3.51***	0.13	3.26	3.77	143.51	27.63	.92
D_1: High Power (1=high, 0=control)					0.09	0.12	-0.14	0.33	373.01	0.77	.04
D_2: Low Power (1=low, 0=control)					0.01	0.12	-0.22	0.24	372.45	0.09	.00
D_3: Positive Context (1=positive, 0=negative)					2.89***	0.18	2.54	3.24	133.64	16.41	.82
D_1xD_3: High Power x Positive Context					**0.08**	**0.16**	**-0.24**	**0.40**	**378.01**	**0.50**	**.03**
D_2xD_3: Low Power x Positive Context					**-0.16**	**0.16**	**-0.47**	**0.15**	**378.53**	**-1.04**	**-.05**
Fixed Effects (Study)											
Study					0.88***	0.13	0.63	1.14	143.07	6.96	.50
Study x High Power					0.06	0.12	-0.18	0.29	368.63	0.46	.02
Study x Low Power					-0.19	0.12	-0.42	0.04	368.10	-1.58	-.08
Study x Positive Context					-1.19***	0.15	-1.49	-0.89	74.72	-7.91	-.67
Study x High Power x Positive Context					-0.19	0.16	-0.51	0.13	376.02	-1.17	-.06
Study x Low Power x Positive Context					0.03	0.16	-0.28	0.34	375.37	0.19	.01
Variance Components											
Residual	0.58***	0.04	0.51	0.66	0.59***	0.04	0.52	0.67	-	-	-
Random Intercept Variance											
Participant	0.14***	0.03	0.09	0.22	0.12**	0.03	0.08	0.20	-	-	-
Stimuli	4.52***	1.51	2.35	8.70	0.67***	0.26	0.32	1.43	-	-	-
Random Slope Variance											
Positive Context	0.19***	0.05	0.11	0.33	0.14**	0.05	0.07	0.28	-	-	-
Fit Statistics											
ML deviance (number of parameters)	3962.41(5)				34121.14(16)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the interaction between low- and high-power and context dummy variables (highlighted in bold) denote greater/lesser variability relative to controls. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Facial Muscle Activation in Different Contexts. Similar models were fit to the zygomaticus (smile) and corrugator (frown) data as was fitted to the mood data. Random effect coefficients allowed intercepts to vary across participants and stimuli. Slopes were allowed to vary within participants and between contexts (negative vs. neutral vs. positive). Fixed effect dummy coefficients compared high (D_1=1, D_2=0) and low (D_2=0, D_2=1) power with control participants, and positive (D_3=1, D_4=0) and negative (D_3=0, D_4=1) contexts with neutral contexts. Adding the fixed effects improved the model fit, $\Delta\text{-2LL}_{zygomaticus}$ = 10.84, df = 8, p < .001, $\Delta\text{-2LL}_{currogator}$ = 31.10, df = 8, p < .001.

We again looked at responses in neutral contexts first. Estimates of power (D_1, D_2) indicated that neither high (vs. control) nor low (vs. control) power increased smiling or frowning in response to neutral images, $\text{coeff}_{D1zygomaticus}$ = -0.00, SE = 0.10, p = .994, 95% CI [-0.20, 0.20], r = -.00, $\text{coeff}_{D2zygomaticus}$ = -0.06, SE = 0.10, p = .588, 95% CI [-0.26, 0.15], r = -.02, $\text{coeff}_{D1currogator}$ = 0.09, SE = 0.09, p = .359, 95% CI [-0.10, 0.27], r = .04. $\text{coeff}_{D2currogator}$ = 0.12, SE = 0.09, p = .190, 95% CI [-0.06, 0.31], r = .06.

As smiling primarily occurred in positive contexts and frowning in negative contexts (see descriptive statistics in Appendix Tables A9 and A10), we probed the effects of power on smiling in positive contexts and on frowning in negative contexts. To this end, dummy variables representing contexts were coded such that 0 represented positive contexts for the zygomaticus data (neutral: D_3 = 1, positive: D_3 = 0) and 0 represented negative contexts for the corrugator data (neutral: D_3 = 1, negative: D_3 = 0). In this coding scheme dummy variables representing power (D_1, D_2) provide estimates of the effect of high (vs. control) and low (vs. control) power on smiling in positive contexts and on frowning in negative contexts (full details on all variance estimates and crucial hypothesis tests are provided in Tables 11 and 12).

Consistent with the self-report data showing that high power elevated mood in positive contexts, high power increased smiling in positive contexts, $coeff_{D1} = 0.18$, SE = 0.10, *p* = .076, 95% CI [-0.02, 0.39], *r* = .08, although this effect was marginally significant. Although low (vs. control) power dampened mood in positive contexts (see previous section), low power did not decrease smiling in positive contexts, $coeff_{D2} = 0.13$, SE = 0.10, *p* = .211, 95% CI [-0.07, 0.34], *r* = .05. Examining the frown-data, neither high nor low power increased or decreased frowning in negative contexts, consistent with participants' self-reported mood, $coeff_{D1} = 0.15$, SE = 0.09, *p* = .111, 95% CI [-0.03, 0.33], *r* = .07, $coeff_{D2} = -.04$, SE = 0.09, *p* = .652, 95% CI [-0.23, 0.14], *r* = -.02.

Table 11.

Studies 4: Multi-level model predicting variations in zygomaticus (smile) activation, with control power in positive contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	0.00	0.04	-0.79	0.79	0.18*	0.08	0.01	0.34	405.35	2.11	.10
D_1: High Power (1=high, 0=control)					**0.18†**	**0.10**	**-0.02**	**0.39**	**522.57**	**1.78**	**.08**
D_2: Low Power (1=low, 0=control)					**0.13**	**0.10**	**-0.07**	**0.34**	**522.57**	**1.25**	**.05**
D_3: Neutral Context (1=neutral, 0=positive)					-0.27*	0.11	-0.49	-0.05	311.09	-2.40	-.13
D_4: Negative Context (1=negative, 0=positive)					-0.33**	0.11	-0.55	-0.11	311.09	-2.95	-.16
D_1xD_3: High Power x Neutral Context					-0.19	0.14	-0.45	0.08	360.00	-1.35	-.07
D_1xD_4: High Power x Negative Context					-0.18	0.14	-0.45	0.09	360.00	-1.32	-.07
D_2xD_3: Low Power x Neutral Context					-0.19	0.14	-0.46	0.08	360.00	-1.36	-.07
D_2xD_4: Low Power x Negative Context					-0.19	0.14	-0.46	0.08	360.00	-1.39	-.07
Variance Components											
Residual	0.65***	0.01	0.63	0.67	0.65***	0.01	0.63	0.67	-	-	-
Random Intercept Variance											
Participant	0.02***	0.01	0.01	0.04	0.02***	0.01	0.01	0.04	-	-	-
Stimuli	0.04***	0.02	0.02	0.09	0.04***	0.02	0.02	0.09	-	-	-
Random Slope Variance											
Neutral Context	0.25***	0.02	0.21	0.29	0.25***	0.02	0.21	0.29	-	-	-
Negative Context	0.22***	0.02	0.19	0.27	0.21***	0.02	0.19	0.27	-	-	-
Fit Statistics											
ML deviance (number of parameters)	22454.04(6)				22443.20(14)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power at baseline/in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table 12.

Studies 4: Multi-level model predicting variations in corrugator (frown) activation, with control power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	0.00	0.03	-0.05	0.05	0.08	0.07	-0.06	0.21	499.25	1.12	.05
D_1: High Power (1=high, 0=control)					**0.15**	**0.09**	**-0.03**	**0.33**	**512.79**	**1.60**	**.07**
D_2: Low Power (1=low, 0=control)					**-0.04**	**0.09**	**-0.23**	**0.14**	**512.79**	**-0.45**	**-.02**
D_3: Positive Context (1=positive, 0=negative)					-0.22*	0.09	-0.40	-0.05	354.06	-2.54	-.13
D_4: Neutral Context (1=neutral, 0=negative)					-0.21*	0.09	-0.38	-0.03	354.06	-2.36	-.12
D_1xD_3: High Power x Positive Context					-0.13	0.12	-0.37	0.11	360.00	-1.06	-.06
D_1xD_4: High Power x Neutral Context					-0.06	0.12	-0.30	0.18	360.00	-0.52	-.03
D_2xD_3: Low Power x Positive Context					0.31*	0.12	0.07	0.55	360.00	2.54	.13
D_2xD_4: Low Power x Neutral Context					0.17	0.12	-0.07	0.41	360.00	1.36	.07
Variance Components											
Residual	0.77***	0.01	0.74	0.79	0.77***	0.01	0.74	0.79	-	-	-
Random Intercept Variance											
Participant	0.04***	0.01	0.02	0.08	0.04***	0.01	0.02	0.08	-	-	-
Stimuli	0.00†	0.00	0.00	0.01	0.00†	0.00	0.00	0.01	-	-	-
Random Slope Variance											
Positive Context	0.16***	0.03	0.11	0.21	0.16***	0.03	0.11	0.21	-	-	-
Neutral Context	0.11***	0.03	0.06	0.17	0.11***	0.03	0.06	0.17	-	-	-
Fit Statistics											
ML deviance (number of parameters)	23569.89(6)				23571.12(14)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power at baseline/in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Discussion

The findings of Studies 3 and 4 broadly echo previous results. Consistent with Studies 1-2, we found that high power elevated mood in positive contexts, whilst low power dampened mood in neutral contexts and positive contexts, although the former effect was marginal. Furthermore, manipulating high and low power did not elevate or dampen mood in negative contexts—a consistent finding across all our studies. However, Studies 3 and 4 found no significant effect of high power in neutral contexts, nor any effects of low or high power on mood variability; although these effects were all in the expected direction.

Study 4 supplemented our findings with behavioural measures of mood—smiling and frowning. Consistent with the self-report data, high and low power participants did not differ in the amount they frowned in negative contexts. Furthermore, high power participants expressed their elevated mood in greater smiling in positive contexts. However, low power participants' dampened mood did not result in less smiling in positive contexts. If anything, the direction of the effect implied they smiled somewhat *more* ($coeff_{D2} = 0.13$), suggesting that low power may lead to a dissociation between felt and expressed experiences. This would be consistent with the fact that self-reported mood predicts smiling in people with high power, but not in people with low power (M. A. Hecht & LaFrance, 1998).

Although the findings do not conform unequivocally to our predictions, the observed effects are consistently in the expected direction, suggesting that the actual effect of power may be small, and therefore not arise in all samples. In the next section we leverage the benefits of meta-analysing our entire sample (Studies 1-4) to bring clarity to the findings.

3.5. Studies 1-4: Meta-Analysis of All Samples

In what follows, we analyse overall variations in mood across all studies (Studies 1-4). In doing so we seek to reconcile seemingly inconsistent findings across studies and provide a more robust test of our hypotheses (Cumming, 2012, 2014)[2]. Our combined analysis of 19,710 observations derived from 1,042 participants had more than 90% power to detect a small effect of power on mood (high vs. medium/control, low vs. medium/control). A random slope and intercept model with homogeneous variances was fitted to the mood data (descriptive statistics are provided in Appendices, Tables A4-A10). Random effect coefficients allowed intercepts to vary across participants, stimuli and samples, and slopes between contexts (negative vs. neutral/baseline vs. positive). Fixed effect dummy coefficients compared high (D_1=1, D_2=0) and low (D_2=0, D_2=1) with medium/control power, and positive (D_3=1, D_4=0) and negative (D_3=0, D_4=1) contexts with baseline/neutral contexts. Adding these fixed effects improved the model fit, Δ-2LL = 135.21, df = 8, p < .001. Variance estimates and relevant study- and meta-level fixed effects of power are presented below (Tables 13 and 14).

Mood in Different Contexts. Across samples high (vs. medium/control) power elevated mood at baseline/in neutral contexts, coeff_{D1} = 0.12, SE = 0.06, p = .046, 95% CI [0.00, 0.23], r = .06, and low (vs. medium/control) power dampened mood at baseline/in neutral contexts, coeff_{D2} = -0.29, SE = 0.06, p < .001, 95% CI [-0.41, -0.18], r = -.14.

To investigate the effects of high and low power in different contexts we recoded the context dummy variables so as to provide simple effects of power in positive (neutral: D_3 = 1, positive: D_3 = 0) and negative contexts (neutral: D_4 = 1, negative: D_4 = 0; see Tables A18 and A19 for full variance estimates). Looking at positive contexts, high power elevated mood, coeff_{D1} = 0.24, SE = 0.06, p < .001, 95% CI [0.13, 0.35], r = .11, and low power dampened

[2] Where exclusions were made, results are unchanged on inclusion (see Table A2 and A3).

mood, $coeff_{D2}$ = -0.20, SE = 0.06, $p < .001$, 95% CI [-0.32, -0.09], $r = -.10$. Turning to negative contexts, we found no effect of high power or of low power on mood, $coeff_{D1}$ = 0.08, SE = 0.07, $p = .241$, 95% CI [-0.05, 0.21], $r = .03$, $coeff_{D2}$ = -0.03, SE = 0.07, $p = .619$, 95% CI [-0.16, 0.10], $r = -.01$,

Lastly, as in previous analyses, we probed the interactions between power and context (D_1xD_3, D_2xD_3, D_1xD_4, D_2xD_4). The effects of high and low power in positive contexts were no different to those at baseline/in neutral contexts, $coeff_{D1xD3}$ = 0.12, SE = 0.08, $p = .129$, 95% CI [-0.03, 0.27], $r = .04$, $coeff_{D2xD3}$ = 0.08, SE = 0.08, $p = .286$, 95% CI [-0.06, 0.23], $r = .03$. This is consistent with the fact that high power elevated and low power depressed mood both at baseline/in neutral contexts and in positive contexts (see prior analysis). The effect of high power was also no different in negative contexts (vs. at baseline/in neutral contexts), $coeff_{D1xD4}$ = -0.05, SE = 0.09, $p = .571$, 95% CI [-0.23, 0.13], $r = -.02$. The effect of low power on mood was weaker in negative contexts than at baseline/in neutral contexts, $coeff_{D2xD4}$ = 0.25, SE = 0.09, $p = .005$, 95% CI [0.07, 0.43], $r = .07$, as was suggested by the fact that low power depressed mood baseline/in neutral contexts but not in negative contexts (see prior analyses).

Table 13.

Studies 1-4: Multi-level model predicting variations in mood, with medium/control power at baseline/in neutral contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.35**	1.14	2.12	6.83	4.31**	0.72	2.20	6.42	3.50	6.01	.95
D_1: High Power (1=high, 0=medium/control)					**0.12***	**0.06**	**0.00**	**0.23**	**1309.10**	**2.00**	**.06**
D_2: Low Power (1=low, 0=medium/control)					**-0.29*****	**0.06**	**-0.41**	**-0.18**	**1256.02**	**-5.04**	**-.14**
D_3: Positive Context (1=positive, 0=baseline/neu)					0.18	0.12	-0.05	0.41	1708.90	1.52	.04
D_4: Negative Context (1=negative, 0=baseline/neu)					-0.81***	0.14	-1.08	-0.54	1462.54	-5.90	-.15
D_1xD_3: High Power x Positive Context					**0.12**	**0.08**	**-0.03**	**0.27**	**1454.12**	**1.52**	**.04**
D_1xD_4: High Power x Negative Context					**-0.05**	**0.09**	**-0.23**	**0.13**	**1430.15**	**-0.57**	**-.02**
D_2xD_3: Low Power x Positive Context					**0.08**	**0.08**	**-0.07**	**0.23**	**1423.22**	**1.07**	**.03**
D_2xD_4: Low Power x Negative Context					**0.25****	**0.09**	**0.08**	**0.43**	**1392.20**	**2.79**	**.07**
Variance Components											
Residual	1.04***	0.01	1.01	1.06	1.03***	0.01	1.01	1.06	-	-	-
Random Intercept Variance											
Participant	0.21***	0.02	0.18	0.25	0.20***	0.02	0.17	0.24	-	-	-
Stimuli	2.45***	0.37	1.82	3.29	1.37***	0.25	0.95	1.96	-	-	-
Study	1.27	1.24	0.19	8.58	2.37	1.94	0.48	11.77	-	-	-
Random Slope Variance											
Positive Context	0.31***	0.03	0.26	0.36	0.30***	0.03	0.26	0.36	-	-	-
Negative Context	0.60***	0.04	0.53	0.69	0.61***	0.04	0.53	0.70	-	-	-
Fit Statistics											
ML deviance (number of parameters)	54814.22(7)				54730.19(15)						

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium/control power at baseline/in neutral contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992).

Table 14.

Studies 1-4: Summary of results. Variations in mood within negative, baseline/neutral, and positive contexts as a function of high (vs. medium/control) and low (vs. medium/control) power.

	Negative Context					Baseline/Neutral Context					Positive Context				
Parameter/Study	Coeff.	SE	95% CI		*r*	Coeff.	SE	95% CI		*r*	Coeff.	SE	95% CI		*r*
High Power (1=high, 0=medium/control)															
Study 1a & 1b	0.03_a	0.09	-0.14	0.20	.01	0.44_b^{***}	0.10	0.25	0.64	.14	0.30_b^{***}	0.08	0.14	0.46	.13
Study 2	-0.02_a	0.18	-0.38	0.34	-.00	0.10_a	0.11	-0.12	0.32	.06	0.33_a^{*}	0.16	0.01	0.65	.08
Study 3 & 4	0.09_a	0.12	-0.14	0.32	.04	0.04_a	0.09	-0.13	0.22	.02	$0.17_a^{\dagger}$	0.09	-0.01	0.35	.10
Study 1-4	0.08_a	0.07	-0.05	0.21	.03	0.12_a^{*}	0.06	0.00	0.23	.06	0.24_a^{***}	0.06	0.13	0.35	.11
Low Power (1=low, 0=medium/control)															
Study 1a & 1b	-0.02_a	0.09	-0.20	0.15	-.01	-0.82_b^{***}	0.10	-1.02	-0.62	-.24	-0.25_c^{**}	0.08	-0.42	-0.09	-.11
Study 2	0.16_a	0.20	-0.22	0.55	.02	-0.26_b^{*}	0.11	-0.48	-0.05	-.17	0.06_a	0.17	-0.27	0.40	.01
Study 3 & 4	0.01_a	0.11	-0.21	0.23	.00	-0.18_a^{*}	0.09	-0.35	-0.01	-.07	$-0.16_a^{\dagger}$	0.09	-0.33	0.02	-.09
Study 1-4	-0.03_a	0.07	-0.16	0.10	-.01	-0.29_b^{***}	0.06	-0.41	-0.18	-.14	-0.20_b^{***}	0.06	-0.32	-0.09	-.10

NB: ****p* < .001, ***p* < .01, **p* < .05, †p < .10. Coefficients above 0 indicate more positive mood, and coefficients below 0 indicate more negative mood, relative to medium power, which serves as a reference group. Coefficients not sharing a common subscript within rows are significantly different (*p* < .05). Effect sizes are derived from *t*-values and degrees of freedom obtained through Satterthwaite's approximation. See Tables A16-A18, for details on all variance estimates.

Variability in Mood between Contexts. Looking at how much individuals' mood varied between contexts of opposing valence (Tables 14 and 15), we excluded responses at baseline/in neutral contexts and examined the interactions involving dummies representing different levels of power (low: D_1=1, D_2=0; high: D_1=0, D_2=0) and different contexts (negative: D_3=0, positive: D_3=1; D_1xD_3 and D_2xD_3). Across studies participants with high (vs. medium/control) power exhibited greater, $coeff_{D1xD3}$ = 0.18, SE = 0.10, *p* = .064, 95% CI [-0.01, 0.37], *r* = .05, and participants with low (vs. medium/control) power less variability in their mood, $coeff_{D2xD3}$ = -0.19, SE = 0.10, *p* = .049, 95% CI [-0.38, -0.00], *r* = -.06, although the former effect was only marginally significant.

Table 15.

Studies 1-4: Multi-level model predicting variations in mood, excluding responses at baseline/in neutral contexts. Crucial hypothesis tests are highlighted in bold: interactions between high and low power and context.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	2.46*	0.72	0.42	4.50	2.46*	0.72	0.42	4.50	3.75	3.43	.87
D_1: High Power (1=high, 0=medium)					0.07	0.07	-0.07	0.21	1130.37	0.99	.03
D_2: Low Power (1=low, 0=medium)					-0.01	0.07	-0.15	0.13	1100.79	-0.15	-.00
D_3: Context (1=positive, 0=negative)					3.06***	0.20	2.67	3.46	84.37	15.36	.86
D_1xD_3: High Power x Context					**0.18†**	**0.10**	**-0.01**	**0.37**	**1176.40**	**1.85**	**.05**
D_2xD_3: Low Power x Context					**-0.19***	**0.10**	**-0.38**	**0.00**	**1144.71**	**-1.97**	**-.06**
Variance Components											
Residual	1.04***	0.01	1.02	1.06	1.14***	0.02	1.11	1.17	-	-	-
Random Intercept Variance											
Participant	0.44***	0.03	0.39	0.49	0.50***	0.03	0.44	0.57	-	-	-
Stimuli	1.46***	0.26	1.03	2.07	0.66	0.12	0.47	0.94	-	-	-
Study	1.27	1.24	0.19	8.58	2.37***	1.87	0.50	11.11	-	-	-
Random Slope Variance											
Context	0.78***	0.05	0.69	0.89	0.85***	0.05	0.75	0.96	-	-	-
Fit Statistics											
ML deviance (number of parameters)	43252.21(6)				42291.21(11)						

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the interaction between low- and high-power and context dummy variables (highlighted in bold) denote greater/lesser variability relative to medium power. Responses at baseline/in neutral contexts are not included in the model. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992).

Table 16.

Studies 1-4: Summary of results. Variations in mood between positive and negative contexts as function of high (vs. medium/control) and low (vs. medium/control) power.

Parameter/Study	Coeff.	SE	95% CI		*r*
High (vs. Medium/Control) Power * Context (Neg. vs. Pos.)					
Study 1a & 1b	0.29*	0.11	0.08	0.49	.10
Study 2	0.38†	0.21	-0.04	0.80	.13
Study 3 & 4	0.08	0.16	-0.24	0.40	.03
Study 1-4	0.18†	0.10	-0.01	0.37	.05
Low (vs. Medium/Control) Power * Context (Neg. vs. Pos.)					
Study 1a & 1b	-0.23*	0.11	-0.44	-0.01	-.09
Study 2	-0.09	0.23	-0.55	0.36	-.03
Study 3 & 4	-0.16	0.16	-0.47	0.15	-.05
Study 1-4	-0.19*	0.10	-0.38	-0.00	-.06

NB: ****p* < .001, ***p* < .01, **p* < .05, †*p* < .10. Coefficients above 0 indicate greater variability in mood, and coefficients below 0 indicate lesser variability in mood, relative to medium power, which serves as a reference group.

3.6. Summary

The present chapter presented the empirical work. Five studies tested the predictions derived from the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) Models of power. Power was operationalised via chronic (Studies 1a, 1b and 2) and temporary (Studies 3 and 4) feelings of power; contextual valence (negative vs. neutral vs. positive) via imagined situations (Studies 1a and 1b), everyday experiences (Study 2), music (Study 3) and images (Study 4). Meta analysing the results across studies (Studies 1-4), high power elevated mood and low power depressed mood at baseline/in neutral contexts and in positive contexts. Neither high nor low power influenced mood in negative contexts. High power increased, and low power decreased variability in mood between contexts of opposing valence (although the former effect was marginally significant). The next chapter will discuss the strengths and limitations, and implications of the findings.

CHAPTER 4: GENERAL DISCUSSION

4.1. Overview

Chapter 4 discusses the empirical work. The findings are first summarised. Moving on, potential strengths and limitations are addressed. The findings are then discussed in reference to prominent theories of power. Avenues for future research are highlighted throughout.

4.2. Summary of the Current Research

Previous data paint an unclear picture of the relationship between power and mood. Some studies report that power elevates mood (e.g., Langner & Keltner, 2008) whilst others report no effect on mood (e.g., Galinsky et al., 2003). Informed by theoretical models of power (Guinote, 2007a; Keltner et al., 2003), the present research tested the relationship between power and mood within, and across, contexts. We posed two questions: Does high power elevate mood and low power depress mood (Keltner et al., 2003)? And does power increase variability in mood across contexts of opposing valence (Guinote, 2007a)?

Five studies were conducted, employing different operationalisations of power (individual differences, priming, role assignment) and context (imagined contexts, ecological assessment/circadian rhythm, music- and image-induction), and sampling a large number of stimuli of differing valence (negative vs. neutral vs. positive). Two initial studies (Studies 1a and 1b) looked at the relationship between chronic feelings of power and mood in imagined contexts, finding that high power was associated with elevated mood, and low power with depressed mood at baseline and in positive contexts. No differences between levels of power were found in negative contexts. Studies 1a and 1b also found that high power was associated with greater variability in mood, and low with lesser variability in mood between imagined contexts of opposing valence (negative vs. positive). A third study (Study 2) sampled mood in everyday life, replicating most, but not all, of the previous findings. A final two studies (Studies 3 and 4) examined the relationship between momentary feelings of power and mood in response to music and images, also largely corroborating the effects observed in Studies 1a and 1b.

Meta-analysing all the available data (Studies 1-4), we found that high power elevated mood at baseline/in neutral contexts and in positive contexts, but not in negative contexts. Meanwhile, low power increased negative mood at baseline/in neutral contexts and in positive contexts, but not in negative contexts. Overall, high power (marginally) increased variability in mood, and low power decreased variability in mood, between contexts of opposing valence.

Broadly speaking, the findings are consistent with the view that high power elevates mood and low power depresses mood (Keltner et al., 2003). However, the results offer crucial caveats, highlighting the importance of contextual factors. In particular, power may only bolster mood in neutral and in positive contexts, but not in negative contexts. That is, power may only exert an effect on mood in contexts that are perceived as hedonically neutral, or pleasant/enjoyable. The findings also support the idea that high power increases and low power decreases variability in mood (Guinote, 2007a). In what follows we will discuss the strengths and limitations of the research, before returning to explore the implications of the findings.

4.3. Strengths and Limitations

This section discusses pertinent strengths and limitations of the research. We begin with a discussion of the statistical and methodological approach; including statistical power and meta-analyses, analysing across operationalisations of power, and potential floor effects in negative contexts. Lastly, we provide an interpretation of observed effect size(s).

Statistical and Methodological Approach

The present research adopts ‘new’ data-analytic and methodological approaches (Cumming, 2012, 2014) in an attempt to increase replicability (see Open Science Collaboration, 2015). The research follows recommendations to reduce researcher degrees of freedom, by reporting all measures and exclusions (Ioannidis, 2005; Pashler & Wagenmakers, 2012). Results are also provided on inclusion (see Appendix, Tables A1-A4). Efforts were made to ensure that researcher-beliefs did not affect outcomes (see Gilder & Heerey, 2018). In Study 3 the experimenter was fully blind to the conditions, and in Study 4 the experimenter did not interact with participants following the role-assignment procedure. Further strengthening our methodological approach, the research meta-analyses data across a large number of participants ($N = 1046$), ensuring a high (>90%) probability of detecting a small effect of power on mood (J. Cohen, 1992).

The present results suggest that the size of the relationship between power (high vs. low) and mood is small-to-medium ($r \approx .20$), requiring a relatively large (>200) sample to be reliably detected (80%). As previous samples were insufficiently powered (~50%) to reliably detect a small-to-medium effect ($N<100$; but see Bombari et al., 2017; Smith & Hofmann, 2016), the present findings suggest that variations in statistical power may, to some degree, account for the inconsistent findings in the literature (Berdahl & Martorana, 2006; Bombari, Schmid Mast, & Bachmann, 2017; Côté & Moskowitz, 2002; M. A. Hecht & LaFrance, 1998; Keltner et al., 2003; Langner & Keltner, 2008; Pamela K. Smith & Hofmann, 2016;

Wojciszke & Struzynska-Kujalowicz, 2007; c.f. Anderson & Berdahl, 2002; Fast et al., 2012; Galinsky et al., 2003; Guinote et al., 2012; Overbeck & Droutman, 2013; Rucker & Galinsky, 2008; Pamela K. Smith & Bargh, 2008; Pamela K. Smith & Trope, 2006; Weick & Guinote, 2008, 2010).

Meta-analysing data derived from individual-difference measures (i.e., chronic feelings of power; Studies 1-2) and momentary states (i.e., temporary feelings of power; Studies 3-4) prompts discussion. Creating tertiles in Study 1-2 may have reduced our statistical power (MacCallum, Zhang, Preacher, & Rucker, 2002). However, because this method allows us to analyse across all available samples and thereby maximize statistical power, we maintain that this is a worthwhile trade-off. The fact that feelings of power differed in the expected manor within all samples (see Table A11), and that it is a common meta-analytic approach to combine information from continuous and categorical variables that tap into the same underlying construct (e.g., Harter, Schmidt, & Hayes, 2002; Ozer, Best, Lipsey, & Weiss, 2003), also supports our cumulative approach.

If causal claims are to be made, it is important that the overall effect of power on mood (Studies 1-4) is not solely driven by a correlation between power and mood (Studies 1-2). This seems unlikely. Differences in mood between low and medium power in Studies 1-2 were replicated when experimentally manipulating low power in Studies 3-4. Although differences in mood between high and medium power did not reach conventional levels of significance in Studies 3-4, the effects were in the expected direction and, crucially, were not significantly different from the effects observed in Studies 1-2 (Table 11; see also Table A20 for model estimating differences in the effects of high and low power between Studies 1-2 and Studies 3-4). As such, the meta-analytic results likely reflect a causal relationship between power and mood.

It is important to address the possibility that the null effects of power observed in negative contexts may reflect floor effects. That is, responses to self-report measures can, in extreme (e.g., exceedingly negative) contexts, fail to provide adequate response-options for participants to express their feelings. In such cases, null effects between groups may no longer reflect phenomena of interest but rather a failure to accurately capture differences at scale-endpoints (for in-depth discussion see Groth-Marnat, 1997). An examination of individuals' responses (see Tables A4-A8) indicates that it is unlikely that participants were constrained by the self-report measures in negative contexts (at least no more than they were constrained in positive contexts). There was ample room for participants to express greater negative mood in negative contexts, if desired. In fact, participants had less 'headroom' to express changes in mood in positive contexts. Thus, floor or ceiling effects cannot account for the patterns of results observed in the present studies.

Previous research provides some indication that the effects of high and low power are not necessarily linear (Côté & Moskowitz, 2002; M. A. Hecht & LaFrance, 1998; Wojciszke & Struzynska-Kujalowicz, 2007). With this in mind, the present research attempted to pry apart the effects of high and low power by making comparisons with medium/control levels of power. This approach counters a trend of comparing high and low levels of power and framing results in terms of high power (du Plessis et al., 2016). Estimating the independent effects of high (vs. medium) and low (vs. medium) power on mood suggests the effects were small (rs = .06 to .14), and may not arise in all samples. However, it is important to note that comparing between the two ends of the power spectrum (high vs. low; see Tables A20-A23) revealed a more sizable effect of power on mood at baseline/in neutral and positive context (rs = .23 and .25, respectively), but not in negative contexts (r = .06).

When considering effect sizes, it is important to note that the choice and presentation of the stimuli representing positive, neutral and negative contexts may have resulted in conservative estimates of the effects of power on mood. Such stimuli provide strong mood cues, likely prompting unambiguous responses, minimising differences between individuals (Fiske et al., 2010). More subtle cues may allow for greater differences to manifest between individuals. Similarly, as our studies (bar Study 2) randomly sampled contexts of differing valence in relatively swift succession, carry-over effects may have weakened the effects of power. Future studies may wish to examine how more subtle and/or enduring contexts affect the relationship between power and mood.

In sum, the statistical and methodological approach lends some major strengths to the programme of research, affording reliable estimates of the relationship between power and mood. The approach allows for independent estimates of high *and* low power, whilst also highlighting a sizeable effect of high *versus* low power on people's mood. In the next section we discuss the generalisability of the research.

Generalisability

The present research answers potential concerns regarding stimuli sampling and external validity (Judd et al., 2012). Psychological research often aggregates responses across a handful of stimuli representing a category of interest. That is, researchers assume that the chosen stimuli adequately represent most (if not all) instances of the category of interest, and generalise accordingly. However, this is not necessarily the case. Just as participant-sampling should be taken into account when generalising to wider populations, so should stimuli-sampling. Failure to take into account variation between stimuli can undermine generalisability and can increase the likelihood of a Type 1 error (Rietveld & Van Hout, 2007; Wickens & Keppel, 1983). By utilizing numerous operationalisations of power and context, and by modelling a large number (i = 114) of stimuli representing positive, negative and neutral contexts the present research appreciates these limitations and provides the most generalisable estimate of the effects of power on mood so far.

Our conclusions derive primarily from European samples (and one U.S. sample), and may therefore not generalise to East-Asian cultures. Collectivist cultures have different beliefs about the emotional effects of power (Mondillon et al., 2005), and these beliefs may reflect differing goals and expectations associated with power. In vertical societies, power is likely to be viewed as a means to attain personally desirable goals, whereas in collectivist societies power is likely to be viewed in terms of responsibility towards others (Torelli & Shavitt, 2010). As feelings of responsibility and obligation are related to negative mood (Deci & Ryan, 2010), and in some cases ‘burn-out’ (Maslach, Schaufeli, & Leiter, 2001), power may have differential effects on mood across cultures. Indeed, there is some indication that power does not increase life satisfaction and authenticity in eastern cultures (Datu & Reyes, 2015). Thus, although the present research takes an important step towards understanding the effects of power on mood, further research is needed to examine whether the findings generalize to different cultures.

4.4. Implications

The next section discusses how the present findings inform our understanding of power. The findings are first discussed in relation to theoretical predictions (Guinote, 2007a; Keltner et al., 2003). We first discuss how the findings relate to the relationship between power, variability and reliance on subjective experiences. Points of integration between the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) Models of Power are highlighted. Lastly, a number of real-world and societal implications are discussed.

The findings largely support the Approach-Inhibition Theory of Power (Keltner et al., 2004), demonstrating a link between power and a prominent hallmark of the approach-inhibition systems; positive and negative mood (e.g., Gray, 1987). Power elevated mood at baseline/in neutral and positive contexts, suggesting that power reliably activates the approach-system in these contexts. This aligns well with the fact that power prompts greater approach motivation and action in neutral/positive situations; that is, situations with approach-related goals and without threats (e.g., Galinsky et al., 2003; Guinote, 2007c; Maner et al., 2010; Smith & Bargh, 2008). Crucially, the findings also point to the moderating role of contextual factors.

The (null) findings in negative contexts add to a comparatively small body of research investigating how power moderates responses in threatening and unpleasant contexts (for review see Deng et al., 2018), suggesting that inhibitory processes can occasionally be comparable across levels of power. For example, when social hierarchies are threatening to the powerful (e.g., when unstable or illegitimate), high and low power may inhibit action and risk-taking equally (Lammers et al., 2008; Maner et al., 2007). The present research suggests that this may reflect a general trend for the powerful to be equally attuned to threats and unpleasant features of the context (perhaps due to equal activation of the inhibition system). Although this at odds with the Situated Model of Power (power should lead to *greater* inhibition and negative mood in negative contexts; Guinote, 2007a), it is consistent with broader 'situated' views, in which cognition provides an on-line adaptive response to the environment (Barsalou, 1999), and with the fact that negative stimuli are typically stronger drivers of cognition than positive stimuli (Baumeister et al., 2001). All in all, the results highlight a need for further research to clearly define the role of the approach-inhibition systems in the effects of power, particularly with regards to the moderating role of contextual factors (i.e., safe/positive vs. threatening/negative).

Despite the fact that power did not lead to greater negative mood in negative contexts, the findings nevertheless suggest that power increases variability in mood, supporting a central prediction of the Situated Theory of Power (Guinote, 2007a). The findings also provide important qualifications showing that much of this greater variability may, in fact, derive from low (vs. medium/control) power rendering individuals' mood more uniform across contexts. This finding provide the first demonstration that high and low power may have differential effects on variability (affective or otherwise), aligning with a body of work suggesting that lacking power may be more psychologically impactful than having power (Rucker & Galinsky, 2008; P. K. Smith et al., 2008; Weick, Wilkinson, & Guinote, 2011; Wilkinson et al., 2010). Related to the previous point, the findings support recent pushes for greater theoretical and empirical rigour in prying apart the effects of high and low power (du Plessis et al., 2016).

The findings also align well with previous research demonstrating that the cognitive and behavioural variability typically associated with power (e.g., Guinote et al., 2002) extends to mood as well (see also Guinote, 2008). As mood often drives judgement and behaviour (Lewis et al., 2008), this suggests that the variability associated with power may be partly accounted for by variability in mood. This is particularly likely in domains which rely heavily on affective experiences; for example attitudes towards others (e.g., moral judgements; Haidt, 2001) and representations of the self (R. E. Wilson, Thompson, & Vazire, 2017). The later would be curious to investigate as, contrary to previous observations (Kraus et al., 2011), may reveal that power can in some cases increase variations in self-representations across time and/or contexts.

The fact that high and low power individuals' mood was similarly dampened in negative contexts means the variability associated with power may be attributed to the mood-bolstering effects of power in positive contexts. Given that positive mood is a marker of approach motivation (Gray, 1987), one implication of these findings is that approach motivation may be one of the mechanisms through which power fosters greater variability in judgement and behaviour. Thus, greater behavioural variability associated with power is likely to be more noticeable across situations which differentially activate the approach system.

Lastly, as stronger and more unequivocal mood states are more likely to drive behaviour than weaker and more diffuse states (Lewis, Haviland-Jones, & Barrett, 2010), the present findings point to positive mood (and perhaps also approach motivation) as a route through which power may increase the correspondence between individuals' feelings and behaviour (see Guinote, 2010; Weick & Guinote, 2008; Woltin & Guinote, 2015). Indeed, participants with high power show a greater correspondence between positive mood and expressions of happiness (i.e., smiling), compared to those with low power (M. A. Hecht & LaFrance, 1998). Future research may wish to examine if a similar relationship extends to expressions of negative mood.

All in all, the findings point to approach motivation as a key process underlying the effects of power (Keltner et al., 2003). This line of reasoning also highlights points of integration across prominent models of power. Crucial predictions derived from theoretical models of power can, to some degree, be accounted for via power's effects on approach-related processes. That is, approach motivation leads to a greater attentional focus, increases attentional flexibility, and greater goal-focus, consistent with core tenants of the Situated Focus Theory of Power (Guinote, 2007a; Harmon-Jones, Harmon-Jones, & Price, 2013).

Moving beyond theoretical implications, the findings highlight a potential error in people's intuitions regarding the psychological benefits of power. On average, people believe that power will bring them happiness (Mondillon et al., 2005), and may even be 'intoxicating'. George Orwell in *1984* wrote: "*Always there will be the intoxication of power, constantly increasing and constantly growing subtler. Always, at every moment, there will be the thrill of victory, the sensation of trampling on an enemy who is helpless.*" (Orwell, 1949, p. 307). The present research suggests that power elevates mood in many contexts, however the effect of power was relatively small and would hardly justify to be called 'intoxicating'. These results echo recent work suggesting that people may overestimate the benefits of having power (Leach, Weick, & Lammers, 2017), and suggest that much of the hedonic utility of power may derive from how power interacts with opportunities and rewards in the environment.

In a broader sense, the findings may have implications for society at large. There is a growing sentiment that policy objectives should be aligned with, and informed by, research on mood and well-being (Diener, 2000). As there is some indication that the hedonic benefits of power may be outweighed by the detrimental effects of powerlessness ($r_{\text{HighPower}} = .06$, $r_{\text{LowPower}} = -.14$), the findings suggest that one way of elevating a population's well-being may be to attempt to flatten power differences. This 'bad is stronger than good' (Baumeister et al., 2001) view of power aligns with the fact that powerlessness typically evokes stronger behavioural signatures of negative affect than power evokes signatures of positive affect (Maier & Seligman, 1976; Miller & Seligman, 1975). Looking at country-level indices of power-inequality and well-being also supports this reasoning. Countries with greater differences between those who enjoy power and those who do not are associated with lower levels of well-being than countries with lesser differences (Berg & Veenhoven, 2010; see also Schneider, 2016). Although the aforementioned data may reflect objective differences in circumstances (e.g., levels of corruption; Gupta, Davoodi & Alonso-Terme, 2002), the present findings suggest that inequalities in feelings of power may, in some part, contribute to country-level differences in well-being. All in all, the present research points to power as a potentially important construct in explaining group-level differences in well-being.

In sum, the findings largely support the theoretical predictions of the Approach-Inhibition (Keltner et al., 2003) and Situated (Guinote, 2007a) Models of Power: that power elevates mood and increases variability in mood, respectively (although it is important to note that the effect of high power on variability was marginally significant). The fact that power did not affect mood in negative contexts suggests a need for further work to investigate how power affects responses to threats and unpleasant contexts (see also Deng et al., 2018). The findings highlight a point of overlap across prominent theories of power, and contribute to recent work (Guinote, 2017). Lastly, the findings point to discrepancies between how power is perceived and experienced, and highlight how power may contribute to group-level differences in well-being.

4.5. Conclusion

Identifying inconsistencies and limitations in the literature, the current programme of research set out to test multiple theoretical predictions regarding the links between power, mood and context. The Approach-Inhibition Theory (Keltner et al., 2003) suggests that power elevates mood, whilst the Situated Theory (Guinote, 2007a) suggests that power increases variability in mood across contexts of opposing valence (negative vs. positive).

Across five studies, employing different operationalisations of power and context, power elevated mood at baseline/in neutral contexts and in positive contexts, but not in negative contexts. Overall, power also increased variability in mood between contexts of opposing valence (negative vs. positive). However, some effects were marginally significant (e.g., effect of high [vs. medium/control] power on variability) and many only emerged at the meta-level, suggesting that the observed effects may not arise in all samples and may not capture a number of additional important variables.

Broadly speaking, the findings are consistent with the view that power elevates mood (Keltner et al., 2003), and increases variability in mood (Guinote, 2007a). Crucially though, the results highlight the importance of contextual factors, providing important indications of the role of approach-motivation and threat-related-inhibition in explaining the effects of power.

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APPENDIX

A.1. Excluded Participants

Table A1.

Excluded participants by sample and with supporting information.

Sample	Question	Participant #	Participant Response
Study 3			
	What do you think is the hypothesis that is being tested in this study?		
		1	When feeling powerful do your feelings change less when listening to different types of music
		2	There is a positive correlation between music and emotion
		3	How music can impact mood and specifically, the type of music which can impact mood.
		4	The effect of situational power over control of externally influenced emotions.
		5	Testing to see how levels of control reflect attitudes to music and social life.
		6	Whether a particular mindset/mood effects opinion of music.
		7	how power affects perception of music
		8	How being primed as powerful can influence the emotions attached to music
		9	If you describe an instance when you have a lot of control, then it will be harder to be influenced by different types of music? Whether possibly in another condition you have to describe an instance where you had less control and after that the music influences you more?
		10	If feelings of power are related to emotional experiences of music.
		11	How music affects mood
		12	How being in control effects your feelings towards music
		13	Participants will be more emotionally influenced by the music if they are made to feel powerful
		14	How music makes you feel compared to how you feel in power
		15	How does recall of specific social events effect how you interpret music

16 Whether different types of music can make us feel more powerful and in control. Perhaps a more controlling person will respond differently to the types of music that raise heartrate and make you feel more excited?

17 Possibly concerning the effect that soul (or one of the other questions about the music) has on mood

18 power will affect participant's mood after listening to music

What do you think was the purpose of recalling the event?

1 To have try a trigger negative feelings to start with.

2 To make you feel an emotions to do with powerlessness

3 To prime an experimental condition of either feeling in control or not based on the description of the experience and whether it left you feeling in control or not

4 To elicit sense of control.

5 To recall an emotion that led us to feel in control and powerful, for the purpose of emotion in the music conditions.

6 To recreate a particular mood, eg. make participant feel powerful.

7 to put me in a high power frame of mind

8 To prime the participant to a condition (powerful)

9 To prime you into feeling in control or not....?

10 To create/replicate a feeling of power for the participant.

11 to create strong feelings of power

12 It changes your perception of music

13 To make the participant feel powerful, which might affect how they react to the music.

14 place yourself in a high power mind set

15 To test whether recall of a situation of power would influence how you reponded to the different types of music

16 To put us in a position where we are thinking about being powerful and having control

17 Perhaps to ensure everyone was in the same 'powerful' mood to begin with

18 to get the participant in a powerful or non powerful state of mind

What do you think was the purpose of the music excerpts?

1	To trigger different feelings
2	To instill a certain mood and emotion
3	To assess whether and to what extent the musical extracts could affect the feeling of control or otherwise established through the prime.
4	To influence the emotions.
5	To see how different sources of music reflect different perceptions into emotion
6	To find out response to different styles and genres of music.
7	to evaluate them
8	To excite some kind of emotion or impression
9	To see if you are easily influenced? And possibly because there were so many to see if you got less positive throughout the task.
10	To influence the emotional state of the participant.
11	to distuiguish the feelings that music emerges
12	Mood stimuli
13	To make the participants feel different emotions
14	see if the music changed your mood
15	To test how they were differently responded to
16	To see how music may affect our emotions, either raising levels of excitement or calming us down
17	To manipulate mood
18	to alter the participant's mood

Study 4

What do you think is the hypothesis that is being tested in this study?

1	The presence of an appointed authoritative figure and its influences on perception.
2	Effect of prior information and assumptions on human behaviour
3	The gorier the images the more excitement will be evoke from the participant.
4	we have a correlating physical response depending on emotional stimuli

What do you think was the purpose of the virtual committee?	
1	To further the guise of having to interact with others.
2	To see how I would act when talking to someone in an imaginary inferior position than I was in the virtual committee, when in reality there was nobody there.
3	To fool you.
4	to see how i reacted feeling below someone else
What do you think was the purpose of the images?	
1	To gauge perception.
2	One odd option would be to make me forget about the so called other participant and the texts about the three candidates in the virtual committee simulation, which could then be used to observe memory and reaction based on the short 1 minute per text read
3	To fool you
4	what muscles we may use or move when seeing emotion stimulating pictures as in what our physical response would be depending on an emotional picture. the pictures were obviously emotion stirring so to measure the physical response from them.

Table A2.

Study 3: Comparisons of effect sizes, derived from multi-level models, when including (vs. excluding) participants who correctly identified the aim of the study ($n_{excluded}$ = 18)

	Context								
	Negative			Baseline/Neutral			Positive		
	Coeff.	SE	*r*	Coeff.	SE	*r*	Coeff.	SE	*r*
	Suspicious Participants Included								
High (vs. Medium) Power	0.16	0.17	.07	-0.02	0.22	-.00	0.05	0.14	.02
Low (vs. Medium) Power	-0.18	0.16	-.08	-0.57	0.22	-.07	-0.31	0.13	-.16
	Suspicious Participants Excluded								
High (vs. Medium) Power	0.20	0.16	.09	0.14	0.21	.02	0.02	0.13	.01
Low (vs. Medium) Power	-0.16	0.16	-.07	-0.55	0.21	-.06	-0.32	0.13	-.16

Table A3.

Study 4: Comparisons of effect sizes, derived from multi-level models, when including (vs. excluding) participants who correctly identified the aims of the study ($n_{excluded}$ = 4)

	Context								
	Negative			Baseline/Neutral			Positive		
	Coeff.	SE	*r*	Coeff.	SE	*r*	Coeff.	SE	*r*
	Suspicious Participants Included								
High (vs. Medium) Power	0.03	0.16	.01	0.10	0.09	.09	0.30	0.12	.19
Low (vs. Medium) Power	0.20	0.16	.09	0.06	0.12	.05	0.00	0.12	.00
	Suspicious Participants Excluded								
High (vs. Medium) Power	0.07	0.16	.03	0.26	0.17	.09	0.26	0.15	.13
Low (vs. Medium) Power	0.20	0.16	.09	0.00	0.17	.00	0.00	0.15	.00

A.2. Descriptive Statistics

Table A4.

Study 1a: Means, standard deviations and sample sizes for mood by power (high, medium, low) and context (negative, baseline, positive).

	Context								
	Negative			Baseline			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	.72	1.23	68	1.29	0.88	68	2.03	0.97	68
Medium Power	.22	0.96	65	0.95	0.86	65	1.85	0.95	65
Low Power	.19	1.20	63	0.56	1.29	63	1.52	1.07	63

Table A5.

Study 1b: Means, standard deviations and sample sizes for mood by power (high, medium, low) and context (negative, baseline, positive).

	Context								
	Negative			Baseline			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	2.00	0.79	91	5.72	1.03	91	6.15	1.24	91
Medium Power	2.21	0.87	98	5.20	0.96	98	5.87	1.30	98
Low Power	2.14	0.85	86	4.04	1.24	86	5.52	1.45	86

Table A6.

Study 2: Means, standard deviations and sample sizes for mood by power (high, medium, low) and context (negative, baseline, positive).

	Context								
	Negative			Baseline			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	4.55	1.28	31	4.94	1.07	64	5.26	1.15	32
Medium Power	4.44	1.26	27	4.89	1.12	63	4.79	1.15	29
Low Power	4.63	1.04	29	4.64	1.25	63	4.93	1.08	31

Table A7.

Study 3: Means, standard deviations and sample sizes for mood by power (high, control, low) and context (negative, neutral, positive).

	Context								
	Negative			Neutral			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	4.56	1.61	58	5.74	1.56	58	6.19	1.47	58
Control Power	4.40	1.55	68	5.76	1.43	68	6.14	1.44	68
Low Power	4.22	1.51	71	5.20	1.37	71	5.83	1.52	71

Table A8.

Study 4: Means, standard deviations and sample sizes for mood by power (high, control, low) and context (negative, neutral, positive).

	Context								
	Negative			Neutral			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	2.66	1.42	63	5.17	0.89	63	6.96	1.33	63
Control Power	2.64	1.41	60	5.07	0.90	60	6.66	1.46	60
Low Power	2.84	1.50	61	5.12	0.97	61	6.65	1.39	61

Table A9.

Study 4: Means, standard deviations and sample sizes for zygomatic activation (μV) by power (high, control, low) and context (negative, neutral, positive).

	Context								
	Negative			Neutral			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	0.04	1.04	63	0.12	1.11	63	0.89	2.66	63
Control Power	0.01	1.38	60	0.12	1.52	60	0.64	2.42	60
Low Power	-0.07	1.12	61	0.05	1.07	61	0.83	2.78	61

Table A10.

Study 4: Means, standard deviations and sample sizes for corrugator activation (μV) by power (high, control, low) and context (negative, neutral, positive).

	Context								
	Negative			Neutral			Positive		
	Mean	SD	*n*	Mean	SD	*n*	Mean	SD	*n*
High Power	0.40	1.49	63	0.07	1.02	63	-0.05	0.80	63
Control Power	0.24	1.08	60	-0.04	0.82	60	-0.06	0.85	60
Low Power	0.17	1.10	61	0.07	2.08	61	0.27	2.24	61

Table A11.

Studies 1-4: Feelings of power in low, medium/controls and high power groups.

	Power			
Sample	Low	Medium/Control	High	Power main effect
Study 1a	$3.43_a(0.66)$	$4.58_b(0.21)$	$5.54_c(0.44)$	$F(2, 193) = 327.51$, $p < .001$, $\eta_p^2 = .77$
Study 1b	$3.30_a(0.75)$	$4.77_b(0.33)$	$5.92_c(0.41)$	$F(2, 272) = 564.56$, $p < .001$, $\eta_p^2 = .81$
Study 2	$3.67_a(0.52)$	$4.56_b(0.18)$	$5.36_c(0.41)$	$F(2, 187) = 286.76$, $p < .001$, $\eta_p^2 = .75$
Study 3	$2.60_a(1.40)$	$4.46_b(1.68)$	$7.57_c(1.08)$	$F(2, 194) = 193.21$, $p < .001$, $\eta_p^2 = .67$
Study 4	$3.54_a(1.51)$	$5.06_b(1.07)$	$7.51_c(1.17)$	$F(2, 181) = 156.17$, $p < .001$, $\eta_p^2 = .63$

NB: Observed means and standard deviations in parentheses. Higher values indicate greater feelings of power. Means not sharing a common subscript within rows are significantly different ($p < .05$).

A.3. Multi-level Models Probing Power in Positive and Negative Contexts

Table A12.

Studies 1a and 1b: Multi-level model predicting variations in mood, with medium power in positive contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.60***	0.48	2.60	4.59	3.81***	0.44	2.86	4.76	14.17	8.60	.92
D_1: High Power (1=high, 0=medium)					**0.30*****	**0.08**	**0.14**	**0.46**	**782.41**	**3.67**	**.13**
D_2: Low Power (1=low, 0=medium)					**-0.25****	**0.08**	**-0.42**	**-0.09**	**781.75**	**-3.06**	**-.11**
D_3: Baseline (1=baseline, 0=positive)					-0.73	0.74	-2.31	0.86	14.08	-0.98	-.25
D_4: Negative Context (1=negative, 0=positive)					-2.57**	0.63	-3.91	-1.22	14.13	-4.09	-.74
D_1xD_3: High Power x Baseline					0.14	0.12	-0.10	0.39	601.23	1.15	.05
D_1xD_4: High Power x Negative Context					-0.25*	0.11	-0.47	-0.04	645.82	-2.30	-.09
D_2xD_3: Low Power x Baseline					-0.57***	0.13	-0.82	-0.33	600.45	-4.57	-.18
D_2xD_4: Low Power x Negative Context					0.22†	0.11	0.00	0.44	643.92	1.95	.08
Fixed Effects (Study)											
Study					-2.06***	0.44	-3.01	-1.12	14.08	-4.66	-.78
Study x High Power					0.04	0.07	-0.10	0.18	458.62	0.58	.03
Study x Low Power					0.07	0.07	-0.07	0.21	458.81	1.03	.05
Study x Baseline					-0.01	0.73	-1.58	1.57	13.82	-0.01	-.00
Study x Negative Context					1.16†	0.62	-0.18	2.50	13.85	1.86	.45
Study x High Power x Baseline					-0.02	0.13	-0.27	0.23	649.78	-0.17	-.01
Study x High Power x Negative Context					0.42***	0.12	0.19	0.65	845.22	3.56	.02
Study x Low Power x Baseline					0.42**	0.13	0.17	0.67	649.83	3.25	.03
Study x Low Power x Negative Context					0.04	0.12	-0.19	0.28	845.78	0.37	.01
Variance Components											
Residual	0.46***	0.03	0.41	0.52	0.47***	0.03	0.42	0.53	-	-	-

Random Intercept Variance											
Participant	0.23***	0.03	0.18	0.30	0.18***	0.03	0.14	0.24	-	-	-
Stimuli	4.53**	1.43	2.43	8.43	0.69**	0.26	0.32	1.45	-	-	-
Random Slope Variance											
Baseline	0.62***	0.08	0.48	0.80	0.44***	0.07	0.32	0.61	-	-	-
Negative Context	0.39***	0.06	0.29	0.54	0.36***	0.06	0.26	0.50	-	-	-
Fit Statistics											
ML deviance (number of parameters)	5370.79(6)				5218.03(23)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power in positive contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A13.

Studies 1a and 1b: Multi-level model predicting variations in mood, with medium power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.60***	0.48	2.60	4.59	1.25*	0.44	0.30	2.20	14.13	2.83	.60
D_1: High Power (1=high, 0=medium)					**0.03**	**0.09**	**-0.14**	**0.20**	**877.81**	**0.36**	**.01**
D_2: Low Power (1=low, 0=medium)					**-0.02**	**0.09**	**-0.20**	**0.15**	**877.95**	**-0.29**	**-.01**
D_3: Positive Context (1=positive, 0=negative)					2.56**	0.62	1.22	3.89	14.00	4.10	.74
D_4: Baseline (1=baseline, 0=negative)					1.83*	0.74	0.26	3.41	14.02	2.49	.55
D_1xD_3: High Power x Positive Context					0.29*	0.10	0.09	0.49	783.93	2.81	.10
D_1xD_4: High Power x Baseline					0.42**	0.13	0.17	0.68	652.66	3.30	.13
D_2xD_3: Low Power x Positive Context					-0.23*	0.11	-0.44	-0.03	781.56	-2.20	-.08
D_2xD_4: Low Power x Baseline					-0.80***	0.13	-1.06	-0.55	652.20	-6.15	-.23
Fixed Effects (Study)											
Study					-0.93†	0.44	-1.88	0.01	14.01	-2.11	-.49
Study x High Power					0.12†	0.07	-0.02	0.25	451.19	1.67	.08
Study x Low Power					0.08	0.07	-0.06	0.22	451.47	1.16	.05
Study x Positive Context					-1.17	0.73	-2.74	0.40	13.75	-1.59	-.40
Study x Baseline					-1.16†	0.62	-2.49	0.17	13.75	-1.87	-.45
Study x High Power x Positive Context					-0.42***	0.11	-0.64	-0.20	1003.04	-3.67	-.01
Study x High Power x Baseline					-0.44**	0.13	-0.70	-0.19	698.17	-3.38	-.01
Study x Low Power x Positive Context					-0.05	0.12	-0.28	0.18	1003.55	-0.40	-.01
Study x Low Power x Baseline					0.37**	0.13	0.11	0.63	698.45	2.79	.02
Variance Components											
Residual	0.46***	0.03	0.41	0.52	0.47***	0.03	0.42	0.53	-	-	-
Random Intercept Variance											
Participant	0.23***	0.03	0.18	0.30	0.18***	0.03	0.14	0.24	-	-	-
Stimuli	4.53**	1.43	2.43	8.43	0.69**	0.26	0.32	1.45	-	-	-

Random Slope Variance												
Positive Context	0.62***	0.08	0.48	0.80	0.44***	0.07	0.32	0.61		-	-	-
Baseline	0.39***	0.06	0.29	0.54	0.36***	0.06	0.26	0.50		-	-	-
Fit Statistics												
ML deviance (number of parameters)	5420.22(6)				5218.03(23)							

NB: ***$p < .001$, **$p < .01$, *$p < .05$, †$p < .10$. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power in negative contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A14.

Study 2: Multi-level model predicting variations in mood, with medium power in positive contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.82***	0.04	4.74	4.94	4.89***	0.11	4.66	5.11	660.46	43.09	.86
D_1: High Power (1=high, 0=medium)					**0.33***	**0.16**	**0.01**	**0.65**	**614.18**	**2.05**	**.08**
D_2: Low Power (1=low, 0=medium)					**0.06**	**0.17**	**-0.27**	**0.40**	**753.78**	**0.37**	**.01**
D_3: Neutral Context (1=neutral, 0=positive)					-0.02	0.11	-0.24	0.19	382.50	-0.23	-.01
D_4: Negative Context (1=negative, 0=positive)					-0.36*	0.16	-0.69	-0.04	130.17	-2.20	-.19
D_1xD_3: High Power x Neutral Context					-0.23	0.15	-0.53	0.07	357.20	-1.52	-.08
D_1xD_4: High Power x Negative Context					-0.34	0.23	-0.79	0.11	125.37	-1.50	-.13
D_2xD_3: Low Power x Neutral Context					-0.33*	0.16	-0.65	-0.01	427.84	-2.00	-.10
D_2xD_4: Low Power x Negative Context					0.10	0.25	-0.40	0.59	122.31	0.38	.03
Variance Components											
Residual	0.89***	0.03	0.83	0.95	0.88***	0.03	0.83	0.94	-	-	-
Random Intercept Variance											
Participant	0.24***	0.05	0.17	0.36	0.24***	0.05	0.16	0.35	-	-	-
Stimuli	0.15***	0.03	0.11	0.21	0.16***	0.03	0.11	0.21	-	-	-
Random Slope Variance											
Neutral Context	0.07	0.04	0.02	0.24	0.06	0.04	0.01	0.25	-	-	-
Negative Context	0.32**	0.11	0.16	0.64	0.21*	0.09	0.09	0.51	-	-	-
Fit Statistics											
ML deviance (number of parameters)	9142.63(6)				9124.70(14)						

NB: ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power in positive contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A15.

Study 2: Multi-level model predicting variations in mood, with medium power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.80***	0.04	4.71	4.89	4.53***	0.13	4.27	4.79	1105.23	34.17	.72
D_1: High Power (1=high, 0=medium)					**-0.02**	**0.18**	**-0.38**	**0.34**	**939.18**	**-0.12**	**-.00**
D_2: Low Power (1=low, 0=medium)					**0.16**	**0.20**	**-0.22**	**0.55**	**1149.94**	**0.82**	**.02**
D_3: Positive Context (1=positive, 0=negative)					0.36*	0.14	0.07	0.64	292.19	2.48	.14
D_4: Neutral Context (1=neutral, 0=negative)					0.33*	0.13	0.08	0.58	692.63	2.60	.10
D_1xD_3: High Power x Positive Context					0.35*	0.20	-0.04	0.74	257.87	1.78	.11
D_1xD_4: High Power x Neutral Context					0.12	0.17	-0.22	0.46	588.56	0.70	.03
D_2xD_3: Low Power x Positive Context					-0.10	0.21	-0.52	0.33	275.32	-0.45	-.03
D_2xD_4: Low Power x Neutral Context					-0.43*	0.19	-0.80	-0.05	693.04	-2.25	-.09
Variance Components											
Residual	0.90***	0.03	0.85	0.96	0.89***	0.03	0.84	0.96	-	-	-
Random Intercept Variance											
Participant	0.25***	0.05	0.17	0.36	0.25***	0.05	0.17	0.36	-	-	-
Stimuli	0.15***	0.03	0.11	0.21	0.15***	0.03	0.11	0.21	-	-	-
Random Slope Variance											
Positive Context	0.08	0.06	0.02	0.34	0.03	0.05	0.00	0.76	-	-	-
Neutral Context	0.07	0.04	0.02	0.23	0.06	0.04	0.01	0.24	-	-	-
Fit Statistics											
ML deviance (number of parameters)	9158.32(6)				9133.72 (14)						

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium power in negative contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A16.

Studies 3 and 4: Multi-level model predicting variations in mood, with control power in positive contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	5.02***	0.17	4.67	5.37	6.40***	0.11	6.19	6.61	147.38	60.51	.98
D_1: High Power (1=high, 0=control)					**0.17†**	**0.09**	**-0.01**	**0.35**	**377.55**	**1.90**	**.10**
D_2: Low Power (1=low, 0=control)					**-0.16†**	**0.09**	**-0.33**	**0.02**	**376.83**	**-1.76**	**-.09**
D_3: Neutral Context (1=neutral, 0=positive)					-1.00***	0.26	-1.51	-0.49	77.58	-3.92	-.41
D_4: Negative Context (1=negative, 0=positive)					-2.89***	0.16	-3.21	-2.57	191.60	-17.83	-.79
D_1xD_3: High Power x Neutral Context					-0.16	0.11	-0.37	0.06	248.86	-1.46	-.09
D_1xD_4: High Power x Negative Context					-0.08	0.16	-0.39	0.23	381.12	-0.52	-.03
D_2xD_3: Low Power x Neutral Context					-0.03	0.11	-0.24	0.19	257.19	-0.24	-.02
D_2xD_4: Low Power x Negative Context					0.17	0.15	-0.14	0.47	381.63	1.08	.06
Fixed Effects (Study)											
Study					-0.26*	0.11	-0.47	-0.05	146.03	-2.43	-.20
Study x High Power					-0.11	0.09	-0.29	0.07	362.18	-1.22	-.06
Study x Low Power					-0.17†	0.09	-0.34	0.00	361.27	-1.93	-.10
Study x Neutral Context					0.57*	0.25	0.07	1.06	68.80	2.29	.27
Study x Negative Context					1.19***	0.14	0.92	1.46	102.60	8.78	.65
Study x High Power x Neutral Context					0.06	0.13	-0.19	0.31	742.84	0.45	.02
Study x High Power x Negative Context					0.19	0.16	-0.12	0.50	379.18	1.20	.06
Study x Low Power x Neutral Context					-0.16	0.12	-0.40	0.08	703.42	-1.28	-.05
Study x Low Power x Negative Context					-0.03	0.15	-0.33	0.27	378.55	-0.20	-.01
Variance Components											
Residual	1.09***	0.01	1.06	1.11	1.09***	0.01	1.06	1.11	-	-	-
Random Intercept Variance											
Participant	0.45***	0.04	0.38	0.54	0.44***	0.04	0.37	0.52	-	-	-
Stimuli	2.14***	0.36	1.53	2.99	0.20***	0.03	0.14	0.28	-	-	-

Random Slope Variance												
Neutral Context	0.35***	0.05	0.26	0.47	0.34***	0.05	0.26	0.46		-	-	-
Negative Context	1.39***	0.11	1.18	1.63	1.38***	0.11	1.17	1.61		-	-	-
Fit Statistics												
ML deviance (number of parameters)	42590.83(6)				42427.95(23)							

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from control power in positive contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A17.

Studies 3 and 4: Multi-level model predicting variations in mood, with control power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	3.60***	0.48	2.60	4.59	3.52***	0.12	3.28	3.75	201.94	30.10	.90
D_1: High Power (1=high, 0=control)					**0.09**	**0.12**	**-0.14**	**0.32**	**372.98**	**0.80**	**.04**
D_2: Low Power (1=low, 0=control)					**0.01**	**0.11**	**-0.21**	**0.23**	**372.47**	**0.09**	**.00**
D_3: Positive Context (1=positive, 0=negative)					2.89***	0.16	2.57	3.21	190.67	17.84	.79
D_4: Neutral Context (1=neutral, 0=negative)					1.88***	0.26	1.35	2.40	86.40	7.12	.61
$D_1 x D_3$: High Power x Positive Context					0.08	0.16	-0.23	0.39	377.46	0.53	.03
$D_1 x D_4$: High Power x Neutral Context					-0.01	0.14	-0.29	0.27	295.71	-0.06	.00
$D_2 x D_3$: Low Power x Positive Context					-0.16	0.15	-0.46	0.14	377.96	-1.07	.05
$D_2 x D_4$: Low Power x Neutral Context					-0.23	0.14	-0.50	0.05	304.75	-1.63	.09
Fixed Effects (Study)											
Study					0.89***	0.12	0.66	1.12	200.67	7.62	.47
Study x High Power					0.05	0.12	-0.18	0.28	365.06	0.43	.02
Study x Low Power					$-0.19^{\dagger}$	0.11	-0.41	0.03	364.52	-1.71	.09
Study x Positive Context					$-0.62^{\dagger}$	0.25	-1.12	-0.12	71.29	-2.46	.28
Study x Ba Neutral Context					-1.19***	0.14	-1.46	-0.92	102.36	-8.78	.66
Study x High Power x Positive Context					-0.19	0.16	-0.50	0.12	375.48	-1.21	-.06
Study x High Power x Neutral Context					-0.13	0.15	-0.43	0.17	494.26	-0.87	-.04
Study x Low Power x Positive Context					0.03	0.15	-0.27	0.33	374.85	0.20	.01
Study x Low Power x Neutral Context					-0.13	0.15	-0.41	0.16	475.66	-0.86	-.04
Variance Components											
Residual	0.46***	0.03	0.41	0.52	0.47***	0.03	0.42	0.53	-	-	-
Random Intercept Variance											
Participant	0.23***	0.03	0.18	0.30	0.18***	0.03	0.14	0.24	-	-	-
Stimuli	4.53**	1.43	2.43	8.43	0.69**	0.26	0.32	1.45	-	-	-

Random Slope Variance												
Positive Context	0.62***	0.08	0.48	0.80	0.44***	0.07	0.32	0.61		-	-	-
Neutral Context	0.39***	0.06	0.29	0.54	0.36***	0.06	0.26	0.50		-	-	-
Fit Statistics												
ML deviance (number of parameters)	5420.22(6)				5218.03(23)							

NB: ***p < .001, **p < .01, *p < .05, $^{\dagger}p$ < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from control power in negative contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

Table A18.

Studies 1-4: Multi-level model predicting variations in mood, with medium/control power in positive contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.15***	0.66	1.98	6.33	4.46***	0.72	2.34	6.57	3.49	6.21	.96
D_1: High Power (1=high, 0=medium/control)					**0.24*****	**0.06**	**0.13**	**0.35**	**1338.84**	**4.18**	**.11**
D_2: Low Power (1=low, 0=medium/control)					**-0.20*****	**0.06**	**-0.32**	**-0.09**	**1314.30**	**-3.58**	**-.10**
D_3: Baseline/Neutral (1=base/neu, 0=positive)					-0.06	0.12	-0.30	0.18	1422.29	-0.52	-.01
D_4: Negative Context (1=negative, 0=positive)					-0.98***	0.15	-1.26	-0.69	1094.60	-6.70	-.20
D_1xD_3: High Power x Baseline/Neutral					-0.09	0.08	-0.24	0.06	730.34	-1.17	-.04
D_1xD_4: High Power x Negative Context					-0.16†	0.10	-0.35	0.02	1151.35	-1.73	-.05
D_2xD_3: Low Power x Baseline/Neutral					-0.18*	0.08	-0.33	-0.03	741.77	-2.33	-.09
D_2xD_4: Low Power x Negative Context					0.18†	0.09	-0.01	0.36	1122.60	1.88	.06
Variance Components											
Residual	1.04***	0.01	1.02	1.06	1.04***	0.01	1.01	1.06	-	-	-
Random Intercept Variance											
Participant	0.31***	0.02	0.27	0.35	0.29***	0.02	0.26	0.33	-	-	-
Stimuli	2.43***	0.37	1.81	3.27	1.38***	0.25	0.97	1.98	-	-	-
Study	1.89	1.81	0.29	12.33	2.38	1.95	0.48	11.82	-	-	-
Random Slope Variance											
Baseline/Neutral	0.24***	0.03	0.18	0.31	0.24***	0.03	0.18	0.30	-	-	-
Negative Context	0.87***	0.05	0.77	0.98	0.87***	0.05	0.77	0.98	-	-	-
Fit Statistics											
ML deviance (number of parameters)	55106.16(7)				55013.91(14)						

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium/control power in positive contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992).

Table A19.

Studies 1-4: Multi-level model predicting variations in mood, with medium/control power in negative contexts providing the reference category. Crucial hypothesis tests are highlighted in bold: simple effects of high and low power.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects											
Intercept	4.18***	0.55	2.41	5.95	3.57*	0.71	1.47	5.68	3.44	5.02	.94
D_1: High Power (1=high, 0=medium/control)					**0.08**	**0.07**	**-0.05**	**0.21**	**1327.57**	**1.17**	**.03**
D_2: Low Power (1=low, 0=medium/control)					**-0.03**	**0.07**	**-0.16**	**0.10**	**1304.15**	**-0.50**	**-.01**
D_3: Positive Context (1=positive, 0=negative)					0.91***	0.14	0.63	1.19	1310.72	6.38	.17
D_4: Baseline/Neutral (1=base/neu, 0=negative)					0.67***	0.15	0.39	0.96	1429.30	4.59	.12
$D_1 x D_3$: High Power x Positive Context					0.16†	0.09	-0.02	0.34	1174.44	1.76	.05
$D_1 x D_4$: High Power x Baseline/Neutral					0.11	0.09	-0.06	0.29	927.30	1.24	.04
$D_2 x D_3$: Low Power x Positive Context					-0.16†	0.09	-0.34	0.02	1143.12	-1.73	-.05
$D_2 x D_4$: Low Power x Baseline/Neutral					-0.40***	0.09	-0.57	-0.22	936.59	-4.49	-.15
Variance Components											
Residual	1.04***	0.01	1.02	1.07	1.04***	0.01	1.02	1.06	-	-	-
Random Intercept Variance											
Participant	0.44***	0.03	0.39	0.50	0.44***	0.03	0.39	0.49	-	-	-
Stimuli	2.46***	0.37	1.83	3.31	1.46***	0.26	1.03	2.07	-	-	-
Study	1.23	1.21	0.18	8.51	2.32	1.93	0.46	11.79	-	-	-
Random Slope Variance											
Positive Context	0.79***	0.05	0.70	0.89	0.78***	0.05	0.69	0.89	-	-	-
Baseline/Neutral	0.45***	0.04	0.37	0.55	0.44***	0.04	0.36	0.53	-	-	-
Fit Statistics											
ML deviance (number of parameters)	55576.92(7)				55505.34(14)						

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the low- and high-power dummy variables (highlighted in bold) denote deviations from medium/control power in negative contexts. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992).

A.4. Multi-level Model Probing Differences in the Effects of Power in Study 1-2 vs. Study 3-4

Table A20.

Studies 1-4: Multi-level model predicting variations in mood, with control power in neutral contexts providing the reference category. Study coefficients represent Studies 1-2 (-1) vs. Studies 3-4 (1). Crucial hypothesis tests are highlighted in bold: simple effects of high and low power, and high and low power x context interactions.

	Model 1				Model 2						
Parameter	Coeff.	SE	95% CI		Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects (Power & Context)											
Intercept	5.00***	0.18	4.65	5.35	4.64***	0.18	4.28	5.00	104.64	25.58	.93
D_1: High Power (1=high, 0=control)					0.13*	0.06	0.01	0.25	1231.32	2.13	.06
D_2: Low Power (1=low, 0=control)					-0.33***	0.06	-0.44	-0.21	1164.55	-5.55	-.16
D_3: Positive Context (1=positive, 0=base/neu)					0.60**	0.18	0.23	0.96	121.80	3.24	.28
D_4: Negative Context (1=negative, 0=base/neu)					-1.19***	0.19	-1.57	-0.81	137.73	-6.22	-.47
D_1xD_3: High Power x Positive Context					0.10	0.08	-0.05	0.26	2375.46	1.29	.03
D_1xD_4: High Power x Negative Context					-0.08	0.09	-0.26	0.10	1818.93	-0.86	-.02
D_2xD_3: Low Power x Positive Context					0.16†	0.08	0.00	0.32	2376.83	1.94	.04
D_2xD_4: Low Power x Negative Context					0.34***	0.09	0.15	0.52	1835.38	3.61	.08
Fixed Effects (Study)											
Study					0.52**	0.18	0.16	0.88	104.64	2.87	.27
Study x High Power					**-0.06**	**0.06**	**-0.18**	**0.05**	**1231.32**	**-1.07**	**-.03**
Study x Low Power					**0.23*** **	**0.06**	**0.12**	**0.35**	**1164.55**	**3.92**	**.11**
Study x Positive Context					0.69***	0.18	0.33	1.06	121.80	3.75	.32
Study x Negative Context					-0.57**	0.19	-0.95	-0.20	137.73	-3.00	-.25
Study x High Power x Positive Context					**0.00**	**0.08**	**-0.16**	**0.16**	**2375.46**	**0.01**	**.00**
Study x High Power x Negative Context					**0.10**	**0.09**	**-0.08**	**0.28**	**1818.93**	**1.06**	**.02**
Study x Low Power x Positive Context					**-0.23** **	**0.08**	**-0.38**	**-0.07**	**2376.83**	**-2.78**	**-.06**
Study x Low Power x Negative Context					**-0.24** **	**0.09**	**-0.43**	**-0.06**	**1835.38**	**-2.59**	**-.06**
Variance Components											

Residual	1.04***	0.01	1.01	1.06	1.03***	0.01	1.01	1.05		-	-	-
Random Intercept Variance												
Participant	0.21***	0.02	0.18	0.25	0.20***	0.02	0.17	0.24		-	-	-
Stimuli	2.45***	0.37	1.82	3.29	1.20***	0.18	0.89	1.62		-	-	-
Random Slope Variance												
Positive Context	0.31***	0.03	0.26	0.36	0.30***	0.03	0.25	0.36		-	-	-
Negative Context	0.60***	0.04	0.53	0.69	0.60***	0.04	0.53	0.69		-	-	-
Fit Statistics												
ML deviance (number of parameters)	54814.81(6)				54681.81(23)							

NB: ***$p < .001$, **$p < .01$, *$p < .05$, $^{\dagger}p < .10$. Fit indices and model comparisons are based on maximum likelihood (ML) estimates, whereas regression coefficients are based on restricted estimates (REML; see Bryk & Raudenbush, 1992). Both methods yielded virtually identical results.

A.5. Multi-level Models Probing High vs. Low Power

Table A21.

Studies 1-4: Multi-level model predicting variations in mood, with low power at baseline/in neutral contexts providing the reference category, and excluding responses from medium power/control participants. Crucial hypothesis tests are highlighted in bold: simple effects of high (vs. low) power.

	Model						
Parameter	Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects							
Intercept	3.97**	0.73	1.88	6.06	3.70	5.44	.94
D_1: High Power (1=high, 0=low)	**0.42*** **	**0.06**	**0.30**	**0.54**	**823.77**	**6.89**	**.23**
D_3: Positive Context (1=positive, 0=base/neu)	0.56***	0.14	0.29	0.83	752.17	4.06	.15
D_4: Negative Context (1=negative, 0=base/neu)	-0.78***	0.16	-1.08	-0.47	590.90	-4.97	.20
D_1xD_3: High Power x Positive Context	0.02	0.08	-0.13	0.18	888.53	0.28	.01
D_1xD_4: High Power x Negative Context	-0.31**	0.09	-0.49	-0.12	863.44	-3.27	.11
Variance Components							
Residual	1.03***	0.01	1.00	1.06	-	-	-
Random Intercept Variance							
Participant	0.23***	0.02	0.19	0.28	-	-	-
Stimuli	0.97***	0.20	0.65	1.46	-	-	-
Study	2.49	1.95	0.54	11.55	-	-	-
Random Slope Variance							
Positive Context	0.32***	0.03	0.26	0.40	-	-	-
Negative Context	0.66***	0.06	0.55	0.78	-	-	-

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the high-power dummy variable (highlighted in bold) denote deviations from low power at baseline/in neutral contexts.

Table A22.

Studies 1-4: Multi-level model predicting variations in mood, with low power in positive contexts providing the reference category, and excluding responses from medium power/control participants. Crucial hypothesis tests are highlighted in bold: simple effects of high (vs. low) power.

	Model						
Parameter	Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects							
Intercept	4.48**	0.73	2.38	6.57	3.68	6.13	.95
D_1: High Power (1=high, 0=low)	**0.44*** **	**0.06**	**0.32**	**0.55**	**835.86**	**7.38**	**.25**
D_3: Baseline/Neutral (1=base/neu, 0=positive)	-0.48**	0.14	-0.76	-0.20	700.05	-3.39	.13
D_4: Negative Context (1=negative, 0=positive)	-1.31***	0.16	-1.62	-0.99	383.46	-8.19	.39
D_1xD_3: High Power x Baseline/Neutral	0.11	0.08	-0.05	0.27	494.24	1.40	.06
D_1xD_4: High Power x Negative Context	-0.33***	0.10	-0.52	-0.14	701.13	-3.34	.13
Variance Components							
Residual	1.03***	0.01	1.00	1.06	-	-	-
Random Intercept Variance							
Participant	0.31***	0.03	0.27	0.37	-	-	-
Stimuli	0.99***	0.20	0.66	1.47	-	-	-
Study	2.51	1.96	0.54	11.62	-	-	-
Random Slope Variance							
Baseline/Neutral	0.30***	0.04	0.22	0.40	-	-	-
Negative Context	0.95***	0.07	0.81	1.10	-	-	-

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the high-power dummy variable (highlighted in bold) denote deviations from low power in positive contexts.

Table A23.

Studies 1-4: Multi-level model predicting variations in mood, with low power in negative contexts providing the reference category, and excluding responses from medium power/control participants. Crucial hypothesis tests are highlighted in bold: simple effects of high (vs. low) power.

	Model						
Parameter	Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects							
Intercept	3.33*	0.72	1.24	5.43	3.62	4.61	.92
D_1: High Power (1=high, 0=low)	**0.11**	**0.07**	**-0.02**	**0.25**	**836.63**	**1.63**	**.06**
D_3: Positive Context (1=positive, 0=negative)	1.19***	0.16	0.87	1.50	475.57	7.42	.32
D_4: Baseline/Neutral (1=base/neu, 0=negative)	0.41*	0.17	0.08	0.74	638.13	2.44	.10
D_1xD_3: High Power x Positive Context	0.31**	0.10	0.13	0.50	726.72	3.28	.12
D_1xD_4: High Power x Baseline/Neutral	0.52***	0.09	0.34	0.70	600.07	5.59	.22
Variance Components							
Residual	1.03***	0.01	1.01	1.06	-	-	-
Random Intercept Variance							
Participant	0.47***	0.03	0.41	0.54	-	-	-
Stimuli	1.12***	0.22	0.76	1.64	-	-	-
Study	2.44	1.94	0.51	11.62	-	-	-
Random Slope Variance							
Positive Context	0.85***	0.07	0.73	0.99	-	-	-
Baseline/Neutral	0.52***	0.06	0.41	0.65	-	-	-

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the high-power dummy variable (highlighted in bold) denote deviations from low power in negative contexts.

Table A24.

Studies 1-4: Multi-level model predicting variations in mood, excluding responses from medium power/control participants, and responses at baseline/in neutral contexts. Crucial hypothesis tests are highlighted in bold: interactions between high (vs. low) power and positive (vs. negative) contexts.

	Model						
Parameter	Coeff.	SE	95% CI		*df*	*t*	*r*
Fixed Effects							
Intercept	2.46*	0.71	0.42	4.50	3.74	3.44	.87
D_1: High Power (1=high, 0=low)	0.08	0.07	-0.06	0.23	718.89	1.10	.04
D_3: Positive Context (1=positive, 0=negative)	2.88***	0.20	2.48	3.27	82.99	14.35	.84
D_1xD_3: High Power x Positive Context	**0.37*** **	**0.10**	**0.17**	**0.56**	**749.93**	**3.71**	**.13**
Variance Components							
Residual	1.13***	0.02	1.09	1.17	-	-	-
Random Intercept Variance							
Participant	0.53***	0.04	0.46	0.62	-	-	-
Stimuli	0.66***	0.12	0.47	0.94	-	-	-
Study	2.35	1.86	0.50	11.10	-	-	-
Random Slope Variance							
Positive Context	0.90***	0.07	0.77	1.04	-	-	-

NB: ***p < .001, **p < .01, *p < .05, †p < .10. Coefficients for the interaction between high-power and positive context dummy variables (highlighted in bold) denote greater/lesser variability relative to low power.

A.6. List of Stimuli

Table A25.

Study 1b: Imagined contexts

Valence	#	Stimulus
Negative		
	1	*You have been sued for negligence.*
	2	*You are splitting up from your spouse.*
	3	*You have lost a considerable amount of money playing poker.*
	4	*You join the gym but fail to lose any weight.*
	5	*Your bike has been stolen.*
	6	*Your mortgage application has been denied.*
	7	*Your house has halved in value over the last five years.*
	8	*You score in the bottom 10% of your class in an exam.*
Positive		
	1	*You buy a pair of shoes you like.*
	2	*You have inherited a considerable sum of money.*
	3	*You have been promoted.*
	4	*You get a free upgrade to business class on your flight.*
	5	*You have been given a clean bill of health by your doctor.*
	6	*You write a best-selling book.*
	7	*Your work contract is renewed.*
	8	*You are invited for a job interview.*

Table A26.

Study 3: Music excerpts

Valence	#	Stimulus
Negative		
	1	*Street Killer - Terry Devine-King*
	2	*Pouncer - Christopher Slaski*
	3	*Pursuit - Chris Blackwell*
	4	*Meteor - Nick Ingman / Terry Devine-King*
	5	*Scattered Ashes - Igor Dvorkin / Duncan Pittock*
	6	*Pure Dark - David O'Brien*
	7	*Apart - Paul Mottram*
	8	*Flooded - Evelyn Glennie*
	9	*Frozen Time - Terry Devine-King / Evelyn Glennie*
	10	*Lethal Injection - Oliver Ledbury*
	11	*Night Escape - Orlando Jopling*
	12	*Winter Woods - Oliver Ledbury*
Neutral		
	1	*Losing Your Winter Fur - Sue Verran / Tom Quick*
Positive		
	1	*Heroes Return - Luke Richards*
	2	*Heroic Destiny - Tim Devine / Daniel Warner*
	3	*Upside Stride - Dave Hartley*
	4	*Shout - Kes Loy*
	5	*Nicky Romero & Anouk - Feet On The Ground*
	6	*Afternoon Haze - Paul Mottram*
	7	*Frame Of Mind - Tom Quick*
	8	*Beacons - Richard Lacy / Terl Bryant*
	9	*We Are Reckless - Richard Lacy / Sulene Fleming / David Bird*
	10	*Pride - Patrick Hawes*
	11	*Drum Carnage - Chris Blackwell*
	12	*Elysium - Luke Richards*

Table A27.

Study 4: International Affective Picture System (IAPS) images

	Negative		Neutral		Positive	
#	Stimulus	IAPS	Stimulus	IAPS	Stimulus	IAPS
1	Pollution	9342	RollingPin	7000	Nature	5780
2	Mutilation	3051	Buttons	7001	EroticCouple	4695
3	Tumor	3261	Towel	7002	Family	2340
4	StarvingChild	9040	Disk	7003	Family	2154
5	Burial	9430	Spoon	7004	IceCream	7330
6	SadChild	2800	Mug	7009	Rollercoaster	8499
7	CarAccident	9911	Rubberbands	7012	Rafters	8400
8	Execution	9414	Whistle	7021	Kid	2035
9	Hospital	3220	Stool	7025	PolarBears	1441
10	Vomit	9320	Clothespins	7052	Baby	2070
11	AttackDog	1525	Zipper	7045	Baby	2071
12	Snake	1120	Mug	7035	Puppies	1710
13	Attack	6540	Shoes	7032	Pilot	8300
14	Attack	6563	Puzzle	7061	EroticCouple	4694
15	Mutilation	3071	Keyring	7059	EroticCouple	4660
16	HungMan	9265	Scissors	7014	EroticCouple	4668

A.7. Stimuli Pre-Test Results

Table A28.

Study 1b: Means, standard deviations and inferential statistics for Desirability, Gain/Loss and Controllability in the final set of imagined contexts.

	Negative		Positive		
Measure	Mean	SD	Mean	SD	
Desirability	1.74	0.74	6.51	0.60	$t(149) = 46.53$, $p < .001$
Gain/Loss	2.14	0.71	6.20	0.61	$t(149) = 41.74$, $p < .001$
Controllability	4.95	1.04	5.25	0.96	$t(149) = 2.40$, $p = .018$

NB: One-hundred and fifty (69 female; $M_{age} = 34.92$, $SD = 12.41$) participants recruited through *Amazon Mechanical Turk* rated 40 events on desirability, controllability and potential for gain/loss, from 1 (*very undesirable; completely controllable; lose a lot*) to 7 (*very desirable; completely controllable; gain a lot*).

Table A29.

Study 3: Means, standard deviations and inferential statistics for Valence and Arousal for the final set of music excerpts.

	Negative		Neutral		Positive		
Measure	Mean	SD	Mean	SD	Mean	SD	Main effect
Valence	3.52_a	1.30	5.50_b	1.40	6.55_c	0.89	$F(2, 38) = 41.98$, $p < .001$, $\eta_p^2 = .69$
Arousal	4.95_a	0.66	3.10_b	1.17	4.77_a	0.84	$F(2, 38) = 42.94$, $p < .001$, $\eta_p^2 = .69$

NB: Twenty (18 female, $M_{age} = 19.00$, $SD = 2.20$) students rated 75 music excerpts on valence and arousal from 1 (*negative; calm*) to 9 (*positive; excited*) using the Self-Assessment Manikin (Bradley & Lang, 1994). Means not sharing a common subscript within rows are significantly different ($p < .05$).

Table A30.

Study 4: Means and standard deviations for Valence and Arousal ratings for the final set of images.

	Negative		Neutral		Positive		
Measure	Mean	SD	Mean	SD	Mean	SD	Main effect
Valence	2.37_a	0.54	5.04_b	0.19	7.55_c	0.54	$F(2, 45) = 481.36$, $p < .001$, $\eta_p^2 = .96$
Arousal	5.38_a	1.11	3.03_b	0.48	5.84_a	0.81	$F(2, 45) = 48.10$, $p < .001$, $\eta_p^2 = .68$

NB: Means and standard deviations are derived from materials accompanying the International Affective Picture System (Lang, Bradley, & Cuthbert, 1999). Each image was rated on valence and arousal from 1 (*negative; calm*) to 9 (*positive; excited*) using the Self-Assessment Manikin (Bradley & Lang, 1994). Inferential statistics are calculated by treating stimuli ($n = 48$) as the sampling unit. Means not sharing a common subscript within rows are significantly different ($p < .05$).

A.8. References

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