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A study of distinct behavioural and cognitive correlates in favour of differentiating dominance, prestige, and leadership components in the explicit power motive

Felix Suessenbach

THE UNIVERSITY *of* EDINBURGH

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Declaration

I declare that this thesis is an original report of my research, has been written by me and has not been submitted for any previous degree. The experimental work is almost entirely my own work; the collaborative contributions have been indicated clearly and acknowledged. Due references have been provided on all supporting literatures and resources.

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(Felix Suessenbach)

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Finally, I am enormously grateful to the University of Edinburgh for providing me with everything I needed to successfully write this doctoral thesis.

A note on pronouns

I am using the pronoun “we” throughout this thesis to honour my supervisors’ contributions in terms of guidance, inspiration, and feedback. When referring to individual other people in examples, I am using gender neutral pronouns such as “they” or “them”.

Lay summary

People desire to have influence/power over other people to different degrees and in different ways. In this research we looked at three different desires (also called motives) to influence others: the dominance, prestige, and leadership (DoPL) motives. The dominance motive describes a desire to coerce others against their will to be able to make them do what one wants. The prestige motive describes a desire to gain others' admiration and respect for ones' skill and knowledge so that these others' voluntarily do what one requests. The leadership motive describes a desire to direct others and take initiative in one's group; others follow a leader because this helps them to achieve a common group goal. As a first step, we developed a questionnaire with which we could measure these DoPL motives. We showed that they were similarly related to a general desire to have influence on others but differently related to a range of personality characteristics that should be helpful to achieve the specific motive goal. For example, the dominance motive was most strongly related to anger and aggression. Across several studies we could show that the DoPL motives were also differently related to other relevant behaviours and characteristics. For example, the dominance motive was most strongly related to the amount of money people kept for themselves in an exchange game. The prestige motive was most strongly related to how much people valued morality (presumably because more moral people gain more admiration). The leadership motive was most strongly related to the employment ranks (e.g., normal employee, middle management, upper management) people held across a range of different professions. Further studies investigated the different roles the DoPL motives played regarding donation behaviour, excuses made in the 2016 US election, or the amount of effort people put in motive-relevant tasks. In conclusion, this research showed that it is important to distinguish between different desires to have influence on other people.

Abstract

This work represents a theoretical and empirical study of distinct subcomponents of the explicit power motive (broadly defined as conscious desires to attain control and prestige) matching distinctions between social hierarchies (e.g., hierarchies based on forced or voluntary deference). Three factor analytic studies showed a consistent three factor structure in existing and newly created questionnaire items matching the power motive definition and selected for being able to distinguish between different kinds of hierarchies. These factors represented distinct motives for dominance (i.e., the desire to coerce others), prestige (i.e., the desire to attain others' respect), and leadership (i.e., the desire to direct others): the DoPL motives. Several further studies were conducted to provide evidence for the DoPL motives' validity and their distinct properties. First, mostly in line with the theoretical predictions, the DoPL motives showed differential correlations with relevant personality characteristics such as the BIG 5 personality traits or self-reported anger/aggression. Second, the DoPL motives explained more than 80% of variance in two power motive scales, showing that they indeed represent constituent parts of the power motive. Third, whereas the leadership motive predicted full-time employees' rank across different fields of work, the prestige motive predicted participants' endorsement of moral concerns. Fourth, the dominance motive predicted the amount of money participants kept for themselves in two dictator games. Fifth, whereas the dominance motive was negatively, the leadership motive was positively related to charitable giving behaviour. Sixth, a sample of Donald Trump voters in the 2016 US election showed more agreement with accusations of unfair treatment of their candidate as a function of their dominance motive. This effect was stronger before as compared to after the election. Seventh, a study related to effort mobilisation in tasks ostensibly related to the DoPL motives found no significant effects. In conclusion, this work amplifies the importance of differentiating between subcomponents of the explicit power motive by showing their differential relationship to a range of behavioural and cognitive outcomes and other relevant characteristics.

1 Chapter 1: Prolog

1.1 Context of the research

People live in social hierarchies in which they have asymmetrical access to resources, attention, and control over others (e.g., Chase, Tovey, Spangler-Martin, & Manfredonia, 2002; Magee & Galinsky, 2008). Although there are clear benefits to hierarchical structures, as they satisfy a need for stability and make exchanges more efficient (Magee & Galinsky, 2008), having a higher rank is more beneficial than having a lower rank (e.g., Adler, Epel, Castellazzo, & Ickovics, 2000; Hill, 1984; Westphal & Zajac, 1995). This incentivises rising through the hierarchy. In the 1970s researchers postulated a general power motive (McClelland, 1975; Winter, 1973), defined as a desire for control and prestige, which is arguably at the core of this desire to improve one's standing in a hierarchy. However, others (e.g., Bischof, 2008; Henrich & Gil-White, 2001; Magee & Galinsky, 2008) have postulated that humans live in distinct kinds of hierarchies simultaneously. For example, hierarchies based on people's ability to make others do what they want, or based on the amount of prestige people receive from others for their skills and knowledge. Thus, a general power motive is insensitive to meaningfully different hierarchies and to date no research has investigated whether there are distinct motives related to them.

1.2 Aim and scope

This thesis investigates whether the general power motive can be decomposed into distinct motives related to desires to rise in social hierarchies, which are primarily based on being able to make others comply to one's will and on garnering others' respect and admiration for one's skills and knowledge. This investigation will involve distinguishing these motives, showing their relationship to the power motive as well as their relationship to the aforementioned hierarchies. The latter will be achieved by demonstrating the motives' distinct relationships with behaviours and personality traits that would theoretically be useful to rise in the respective hierarchy. Note, that this research, with the exception of one study (Chapter 5), will not directly

investigate hierarchies but only the motives underlying it. Moreover, this research will only investigate conscious but not unconscious motives (see explicit-implicit distinction in Chapter 2.3.2).

1.3 Significance of the research

This research marks an important addition to recent theories about hierarchies as it takes two competing theories regarding hierarchies into account: the dominance vs prestige theory (Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013; Henrich & Gil-White, 2001; Maner & Case, 2016) and the power vs status theory (Blader & Chen, 2012; Magee & Galinsky, 2008; Mannix & Sauer, 2006). It shows that while dominance and power seem to be underpinned by different motives, status and prestige seem to be driven by the same desire, thus showing that these two competing theories can indeed complement each other. Moreover, this research reveals that the power motive is too heterogeneously defined and that motivational psychologists would benefit from assessing its individual components. Further, it opens up possibilities for researchers interested in hierarchy differentiation as it supplies them with a tool to measure the driving forces in distinct hierarchies. The many validation studies reported here not only demonstrate this tool's viability but also show many interesting findings regarding these motives themselves. The motivational framework applied here allows for precise distinctions within these motives, such as conscious and unconscious motives, which are related to different kinds of behaviour and cognition. In general, we believe that understanding the driving forces that make people want to move within human hierarchies is important for a comprehensive theory of these omnipresent social structures.

1.4 Overview of the thesis

In Chapter 2, we give an overview of the historical development of research into the power motive and hierarchy differentiation, outline some important distinctions within the two areas and argue for a synthesis of these two strands of research. In

Chapter 3, we take this theoretical argument one step further and show that when combining the two strands of research three subcomponents of the power motive emerge: namely distinct motives for dominance, prestige, and leadership (DoPL). In Chapter 4, we define these DoPL motives and report the development of questionnaire scales (the DoPL scales) to measure these motives. Moreover, we show the DoPL motives' occurrence in the relevant nomological network and demonstrate that two established scales to measure the power motive can be decomposed into differently weighed combinations of the DoPL motives. Chapters 5 through 7 report further validation studies, specifically providing evidence for the discriminant validity of the DoPL scales. In Chapter 5, we test the relationship between the leadership motive and employees' rank positions across various companies. Moreover, we investigate the relationship between the prestige motive and the endorsement of moral values. In Chapter 6, we test the relationship between the dominance motive and selfish behaviour in two dictator games. In Chapter 7, we investigate the relationship of the DoPL motives with charitable giving behaviour. In Chapter 8, we report a study conducted around the US election 2016 in which we tested whether voters for Donald Trump and Hillary Clinton would be more likely to buy into excuses to explain an anticipated or actual defeat as a function of their dominance motive. In Chapter 9, we report an attempt to show a relationship between effort mobilisation and the DoPL motives in tasks ostensibly related to the DoPL motives. In Chapter 10, we provide a discussion of all of these findings, point out the limitations of this research and give an outlook for future research.

2 Chapter 2: Literature review

2.1 General background

Since the 1970's, there has been a general growth in democratic values and equality throughout Europe and the Western world, extending to non-European countries such as Russia or Turkey. However, in the present year of 2017 the tide seems to be turning. Autocratic leaders, which enjoy strong support in part of their population and which do not hesitate to forcefully silence their critics, yet again rule countries such as Turkey, Russia, and Hungary. Even the United States, the self-proclaimed leaders of the free world, elected Donald Trump into presidency, a man with documented racist and sexist tendencies who seemingly tries to undermine the judiciary (e.g., by firing FBI director James Comey) and has repeatedly attacked critical media outlets. The revitalised strength of these socially regressive forces highlights two prominent features of the human experience. First, it shows people's desire for powerful leaders as well as their willingness to give up control and submit to very strict hierarchical structures. Second, especially in case of said leaders and their benefactors, it shows a strong human desire for having control over other people. Although this seems to draw a negative picture of power (at least from a liberal/democratic viewpoint), not all power must be negative and not all leadership must mainly benefit the leader. Throughout recent history spiritual leaders, revolutionaries, and politicians such as Martin Luther King Jr., Mahatma Ghandi, and Nelson Mandela have provided examples for strongly positive uses of control. Since these both kinds of leaders deliberately held their positions at the top of the hierarchy, it seems reasonable to assume they were all driven by some kind of desire for power over other people. Given these vastly different leaders, it begs the question whether this desire can manifest itself in distinctly different kinds of ways and whether these ways relate to different kinds of hierarchies?

This question certainly is not limited to prominent global leaders as power and hierarchies are ubiquitous in our social world, whether in a football team, in schools, at university, at different levels of management in a company, or in the relationship between parents and their children. The omnipresence and impact of these

phenomena strongly suggests the need for, and potential benefits of, a scientific inquiry into them. Any such attempt must begin with a clear description and understanding of the constructs in question. Thus, we will first briefly describe the concept of power, which provides the basis for both a motive to attain it and hierarchies (Chapter 2.2). However, this description will be restricted to a functional level (i.e., what do we need to know about power to investigate its incentives/motive and related hierarchies). We will then introduce the concept of the "power motive" which may underlie individuals' desire for control/influence/power (Chapter 2.3.1). As the power motive is at the core of this thesis, we will provide a more in-depth overview regarding its varying conceptualisations and modes of measurement throughout its history. Importantly, although the power motive is mostly proposed to be unidimensional, we will highlight aspects of its historical development that indicate the existence of distinct components. We will also introduce the terms explicit and implicit motives, which are important as this investigation is only concerned with motives at a conscious/explicit level (Chapter 2.3.2). Next, we will briefly define the term "social hierarchy" (Chapter 2.4.1) and describe recent theories regarding distinct kinds of hierarchies relating to dominance and prestige, as well as power and status (Chapter 2.4.2). Finally, we will argue that synthesising research into the power motive and research into social hierarchies is not only necessary to answer the above stated research question but also beneficial to both fields of research (Chapter 2.5).

2.2 What do we need to know about power?

The concept of power has made its way into our daily language and is a popular theme in movies, books, and other media. Moreover, nearly everyone has an intuition of the nature of power, however, if one wants to pinpoint what precisely constitutes power one quickly finds that there are indeed many different conceptualisations of it. This is not least because many related but slightly different terms could be subsumed under power, such as "leadership", "dominance", "prestige", "status", "hierarchy", "influence", "control", or "autonomy" (Schmalt & Heckhausen, 2008; Schopler, 1965; Winter, 1973). To provide some structure to the power concept, researchers

have attempted to categorise different kinds of power. Arguably, the most famous of such categorisations is French and Raven's (1959; Raven, 1974) six bases of power. These consist of influence on others through rewards (reward power), punishment (coercive power), by means of norms and laws (legitimate power), identification with the person of power (referent power), needed skills and knowledge (expert power), and possessing information crucial to the other person (informational power). A broader approach describes even as many as 64 different forms of power, consisting of an 8*8 grid of base/means of power and scope/goals of power (Lasswell & Kaplan, 1950). However, even this "tour de force" (Winter, 1973, p. 7) of power classifications has been criticised for falling short of describing all aspects of power. For example, it neglects the influence person A has on person B by sheer anticipation of person A's intention (may it be harmful or beneficial; Winter, 1973).

To overcome this problem, Winter (1973) broadly defined power as "the capacity to produce effects (consciously or unconsciously intended) on the behaviour or feelings of another person" (p. 10). He suggested, within this broad definition, to explore which distinctions relate to measurably different effects and to evaluate the importance of these differences. Using this rationale he investigated and defined a general power motive (see Chapter 2.3.1) with the intent to consider distinctions if they provide meaningfully different predictions (e.g., personalised vs socialised power; Winter & Stewart, 1978). In this research, we are employing a similar rationale by trying to cast a wide net on potentially power-related terms such as "dominance", "prestige", and "leadership". Moreover, when investigating distinctions within the power motive, we will be guided by theoretical concerns (e.g., which different kinds of power motives would make evolutionary sense), by whether these distinctions can actually be measured (e.g., whether questionnaire items measuring each distinction load on the same or different factors), and by whether these distinctions predict meaningful and different kinds of behaviour.

2.3 Power motive

2.3.1 Background

In general, the term "motive" describes a relatively stable personality disposition, theorised to be mostly rooted in a person's individual learning experience in their childhood, and is often contrasted with motivation, which describes a state rather than a disposition (Bischof, 2008; Heckhausen & Heckhausen, 2008; McClelland, 1987). The function of motives is to energise, direct, and maintain behaviour (Heckhausen & Heckhausen, 2008). The power motive in particular has been the subject of many decades of psychological inquiry and has been investigated from many angles and using different methods. Below we provide a summary of the historical development of this investigation and highlight subtle distinctions across and within conceptions of the power motive by different researchers employing different methods.

The first systematic classification of something like a power motive was introduced by Murray as early as 1938. Murray and his colleagues at the Harvard clinic set themselves the ambitious goal to develop a comprehensive framework of personality classifications (Murray, 1938). The initial concepts for their theory of personality were informed by their own experiences, patients, friends, and historical as well as fictional characters. These concepts were then refined, redefined, or discarded on the basis of interviews and the experimental testing of, for the most part, a group of 51 males, mostly college students. The tests involved among others ability tests such as tests for memory and learning as well as projective tests such as thematic apperception tests (TAT) or the Rorschach Tests. Murray states that the result of this classification could only be regarded as a preliminary framework, which included at its final stage 20 needs, 8 latent needs, 4 inner states, and 12 general traits. Motives are synonymous to needs, which Murray (1938) describes as an "organic potentiality or readiness to respond in a certain way under given conditions" (p. 61) or "a force which (if uninhibited) promotes activity which (if competent) brings about a situation that is opposite (as regards its relevant properties) to the one that aroused it" (p. 42). Through successive activation a need gets more and more engrained in an individual's personality. The need that seems to best resemble a desire for power was

called n Dominance (need for Dominance) and is described among other things as a desire to control, command and seduce others, and to act as to influence, govern, persuade, punish and magnetise others. However, other needs postulated by Murray could also fall under a definition of the power motive such as n Aggression (e.g., the desire to fight opposition with means such as aggression, punishment or ridicule) or n Autonomy (i.e., the desire to be independent from others' controlling influence).

Strongly influenced by Murray's (1938) work, Jackson (1967) developed a questionnaire scale to measure n Dominance as part of a comprehensive set of scales to measure personality, called the Personality Research Form (PRF). Jackson's definition of n Dominance was largely based on Murray's, however, a notable distinction was that Jackson's definition did not include Murray's suggested component of "magnetising, gaining hearing, being imitated or setting the fashion" (Murray, 1938, p. 152). This aspect was somewhat covered in the PRF's Social Recognition scale, whose defining features describe a desire for recognition and social approval. Jackson (1967) validated his n Dominance scale by a) showing that self- and peer-ratings of the presence or absence of dominance-related attributes correlated highly with the n Dominance score and b) showing moderate to high correlations between n Dominance scores and vocational interests to pursue careers such as army officer, public administrator, and personnel manager. A revised version of this PRF dominance scale is still used today and can be regarded as one of the most widely used tools to measure the power motive. In summary, Murray's (1938) first description of a power-related need (n Dominance) grew out of an effort to categorise a range of needs and personality traits, which was based on very little theory but mostly on the subjective clustering of multiple methods and insights by Murray and his colleagues. Jackson then formalised this first approach by Murray by developing reliable questionnaire scales for n Dominance and other needs and provided a preliminary validation. Importantly, whereas Murray's definition of n Dominance included desires to gain others attention, Jackson categorised this behaviour in a separate need called Social Recognition.

Independent from this research line, Veroff (1957) investigated the first explicitly labelled "power motive". This motive was mainly based on Adler's (1927) idea of

desires for power arising from experiences of being controlled during ones' childhood as well as Adorno and colleagues' (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950) thoughts on authoritarian personalities (see Veroff, 1992). It was defined as a "disposition directing behaviour toward satisfactions contingent upon the control of the means of influencing another person(s)" (Veroff, 1957, p. 1) and was created to parallel McClelland and colleagues' (McClelland & Atkinson, 1948; McClelland, Clark, Thornton, & Atkinson, 1949) research on hunger and achievement motives. Instead of using self-report questionnaire items, McClelland utilised content-coded stories participants had written in response to TAT pictures (e.g., a captain on a boat behind a steering wheel). The coding system was developed by comparing stories from participants in neutral conditions with participants whose relevant motive was aroused (e.g., if they were hungry or felt the need to excel in something). The idea being that stories written in the arousal conditions would be ridden by unconscious desires for food or achievements. To develop his coding system Veroff (1957) compared stories written by students in a neutral condition with stories written by students who were waiting for their election results determining whether or not they would become student leaders. However, this particular arousal method possibly resulted in a coding system biased towards a fear of powerlessness (Schmalt & Heckhausen, 2008; Veroff, 1992), which was substantiated by findings of high power motives (as measured with Veroff's coding system) in participants with little money, little education, and coming from broken homes (Veroff, Atkinson, Feld, & Gukin, 1960).

Following Veroff's work, Uleman (1972) developed another coding system in the McClelland tradition. Similarly to Veroff, Uleman was inspired by the works of Adler (1927), but also Murray (1938), and White (1959) who argued that the root of power is one's feeling of efficacy. In order to derive his coding system, Uleman (1972) conducted an arousal study on 42 members of a student fraternity. The students were paired up and told to play two card games and a match-stick game, however, unknown to one of the students (the "participant") the other student (the "experimenter") was given additional instructions. The "experimenter" was instructed to frustrate the "participant" by beating them in all of the three games and was thus given clues on how to win in all of them. Every student wrote five stories in

response to TAT pictures just before the game was actually played; differences between the stories of the aroused group (the “experimenter” group) and the non-aroused group (the “participant” group) thus constituted the basis for Uleman's (1972) coding system. Because of this more active arousal method, Uleman's (1972) coding system was more focused on a hope to gain power rather than Veroff's (1957) fear of powerlessness. Both coding systems include a prestige-component, for example in Veroff's (1957) system, instances of a character trying to convince another or provide unsolicited teaching should be scored as power motivated. In Uleman's (1972) system, a power scoring was warranted if characters in the story were particularly wealthy or famous or actively sought to give other people advice. In summary, based on McClelland’s arousal methodology (McClelland & Atkinson, 1948; McClelland et al., 1949) both Veroff (1957) and Uleman (1972) developed coding systems to measure the power motive. However, whereas Veroff’s coding system seemed to reflect more of a fear of powerlessness Uleman’s coding system described a more forceful hope to gain power.

Another student of McClelland, David Winter (1973), attempted to encompass all of these different conceptualisations of power. After briefly reviewing literature on power he acknowledged that the many conceptualisations of power including Murray's (1938) might aim at different kinds of power and concluded that the common theme between all of these conceptualisations of power was the “the capacity to produce effects (consciously or unconsciously intended) on the behaviour or feelings of another person” (Winter, 1973, p. 10). He used this very broad definition to guide the development of his initial coding system. Using the McClelland arousal methodology he compared stories written to TAT-like pictures by students who had either watched the inauguration speech of John F. Kennedy (arousal group) or a film about a businessman explaining some equipment (non-arousal group). He then revised this initial coding system by incorporating elements of Veroff's (1957) and Uleman's (1972) coding systems including their ideas of the power motive being related to prestige in terms of wealth, fame, and unsolicited helping behaviour/advice giving. He further cross-checked the revised coding system with his arousal study as well as Veroff's (1957) and Uleman's (1972) arousal studies and found that this revised coding system, unlike any coding system before,

successfully distinguished between the arousal and the non-arousal group across all these studies.

Table 2.1. Examples of research findings regarding the power motive.

The power motive positively predicted…	Type of motive	Published in
Alcohol consumption, pretending to have better grades, reading sport and sex magazines in student a sample.	Implicit	Winter, 1973
Basal testosterone levels in males.	Implicit	Stanton & Schultheiss (2009)
Choosing power-relevant occupations (e.g., psychotherapist, journalist, or business management) in females.	Implicit	Jenkins (1994); Winter (1988)
Self-reported preference for choosing power-relevant occupations.	Explicit	Jackson (1967)
Making utilitarian choices (e.g., killing someone to save five others) in hypothetical moral dilemmas. This was even more pronounced if the utilitarian choice benefitted the power-motivated person directly.	Explicit	Suessenbach & Moore (2015)
The amount of money kept for oneself in a dictator game.	Explicit	Baumert, Schlösser, & Schmitt (2014); Schönbrodt & Gerstenberg (2012)
The likelihood of rejecting offers in the ultimatum game.	Explicit	Baumert et al. (2014)

Based on this coding system Winter (1988) defined the power motive as "a concern for having impact on others, arousing strong emotions in others, or maintaining reputation and prestige" (p.510), which is the predominant definition of the power motive today (e.g., Heckhausen & Heckhausen, 2008; Schönbrodt & Gerstenberg, 2012; Suessenbach & Moore, 2015). Many research findings have since supported the validity of this coding system showing that, for example, highly power motivated students held more positions of power at the university, preferred competitive sports, appeared more convincing and influential in discussion groups, or possessed more

status-signalling objects like sports cars or expensive watches (Winter, 1973; see Table 2.1 for more exemplary findings regarding the power motive). In summary, in an effort to combine previous research on the power motive, Winter (1973) developed a coding system for TAT-like stories employing the McClelland arousal methodology and incorporating the earlier coding systems by Veroff (1957) and Uleman (1972). Based on this encompassing coding system he defined the power motive as a desire for control and gaining prestige, whose function is to energise, direct, and maintain behaviour related to achieve these goals.

2.3.2 Implicit and explicit motives

The two different ways to measure the power motive – and in fact all other motives – by using self-report questionnaire items or coding the content of stories to TAT-like pictures have caused some friction within the motivational psychology community. This was due to inconsistencies in results between the two approaches (although they were supposed to measure the same motive; e.g., Fineman, 1977) and consistently low correlations between motives measured by these two different methods (e.g., Child, Frank, & Storm, 1956; Heckhausen & Heckhausen, 2008; McClelland, Atkinson, Clark, & Lowell, 1953). Nonetheless, in their seminal paper McClelland, Koestner, and Weinberger (1989) argued that the two methods indeed measure the same motive but measure different kinds of motive expression. Originally, McClelland and colleagues proposed that motives measured with self-report questionnaires predict specific choice behaviour in response to specific situations whereas motives measured with the TAT method would predict more spontaneous behavioural trends over a longer timeframe. As such, they proposed that whereas the former method predicts whether, for example, somebody chooses a power profession (e.g., lawyer, politician) the latter method predicts how much power behaviour they then show in this profession. Schultheiss (2001) later improved and refined this theory based on a dual process account (e.g., Evans & Over, 1996; Frankish & Evans, 2009). More precisely, he proposed that there are implicit and explicit motives, which underlie two independent systems, an experiential system (ES) and a verbal-symbolic system (VSS).

Implicit motives (i.e., the motives assessed through content coding of TAT-like fantasy stories) are proposed to be underpinned by the ES, which is characterised by an immediate processing of stimuli without the need of symbolic mental representations. This refers to stimuli which can be described as unconditioned in a Pavlovian sense (e.g., the sight of a snake; Pavlov & Anrep, 2003) eliciting emotional-motivational responses (e.g., a fear reaction) but also stimuli that have been conditioned to elicit emotional-motivational responses. This extends to unconscious instrumental learning, which is characterised by internalising, through trial-and-error or even just through observation and imitation, the behaviours instrumental to achieving a desired emotional-motivational response. Schultheiss (2001) argued that, when confronted with a conditioned stimulus, people feel an urge to display the learnt behaviour to achieve the desired goal state. He concluded that the stimuli and correspondent urge can remain completely unconscious (hence the term implicit) whereas the goal states (e.g., fear or happiness) may reach one's awareness. Following this logic it seems sensible to assume that a simple, non-verbal stimulus such as a TAT picture (e.g., showing a captain on a ship) can unconsciously arouse motives (e.g., the power motive) which triggers motive-relevant behaviours (e.g., dominating another person), which in lack of the possibility of actually doing so are thus represented in a person's fantasy story.

Explicit motives (i.e., the motives assessed by self-report measures such as questionnaires) are proposed to be underpinned by the VSS, which is characterised by processing spoken or written language. This system is argued to be phylogenetically younger as well as developmentally older than the ES (e.g., babies make simple stimulus-reaction connections before they understand language). Whereas knowledge in the ES is stored as unconscious stimuli-reaction contingencies in the limbic system, knowledge in the VSS is stored as conscious mental representations in the declarative memory (hippocampus). This latter knowledge is acquired by fitting and connecting it to already existing language-based concepts and contexts. Lasting mental representations of the VSS could therefore be helpful when working on tasks whose rewards will only be given in the future (see delay of gratification studies; e.g., Mischel, 1996) but might also lead to putting much effort into tasks with an expected reward at the end, which then turn out to be

non-rewarding. Schultheiss (2001) argued that there would have been no evolutionary need for two systems to evolve to do the same task. Since the phylogenetically older ES already covers the immediate connections of stimuli with motivational-emotional states, the function of the VSS's role would therefore be to consciously (hence the term explicit) represent the self, one's role in a social group as well as the needs of this social group. He argues that this dissociation lies at the core of the consistently reported low correlations between implicit and explicit motives. Following this logic it seems sensible to assume that reading questionnaire items regarding oneself (e.g., "I want to be a leader") arouse the conscious self-concept of a person (e.g., conscious goals to gain power), which then guide a person to provide an answer to the question in line with their consciously retrieved self-concept (e.g., the explicit power motive).

In summary, motives assessed through TAT-like fantasy stories and self-report questionnaires have been labelled implicit and explicit motives, respectively. Consistently reported low correlations between these motives can be explained by two independent systems underlying them, the ES and VSS. Whereas the ES is based on simple and unconscious stimulus-reaction contingencies, the VSS is constituted of mental representations of language-based knowledge. Implicit motives are therefore aroused by non-verbal stimuli such as pictures or facial expressions and represent an immediate urge to attain a positive emotional-motivational state (e.g., happiness) by eliciting the corresponding learned behaviour. Explicit motives, on the other hand, are aroused by symbolic stimuli such as written text or verbal instructions and represent a desire to act in line with one's consciously retrieved self-concept.

2.4 Social hierarchies

2.4.1 Background

Humans and other animals live in social hierarchies in which they have asymmetrical access to resources, attention, and influence on others (e.g., Chase et al., 2002; Magee & Galinsky, 2008). The higher an individual ranks in a hierarchy the more such benefits do they obtain. Ranks are determined by the extent individuals are

perceived to possess attributes related to relevant social dimensions (e.g., their potential to threat or having valuable skills). This definition stresses two important points. First, rank ordering does not necessarily depend on the actual possession of socially relevant attributes, but the perceived ones. A person who can, at least temporarily, pretend to possess amazing healing skills might be highly respected for this and thus at the top of this hierarchy even though the person has only faked this skill. Second, humans are not only ranked within a single hierarchy. For example, a person who is physically threatening but also unintelligent can be highly ranked in a physical dominance hierarchy but low ranked in terms of knowledge. As the ability to form social hierarchies is argued to be highly evolutionarily beneficial, such hierarchies are proposed to have appeared very early in the human/primate history (Neuberg, Kenrick, & Schaller, 2010). A large part of these evolutionary benefits can be explained by three important functions hierarchies still hold in our daily lives: providing desired social order, aiding cooperation, and providing individual incentives (Cheng & Tracy, 2014; Halevy, Chou, & Galinsky, 2011; Magee & Galinsky, 2008).

Social hierarchies satisfy an inherent need for social order. For example, researchers found that in task-related contexts people preferred dominance asymmetries even when they were the submissive partner (Tiedens, Unzueta, & Young, 2007). Moreover, in another study Tiedens and Fragale (2003) showed that in an interactive task participants spontaneously assumed complimentary body postures in response to confederates' body postures (e.g., dominant if confederates were submissive and submissive if confederates were dominant) and if done so felt more comfortable and liked their confederate more. Besides providing social order, the desire for hierarchies might also be due to it facilitating cooperation between individuals. In line with this researchers found a coordination advantage between pairs of participants whose statuses were experimentally manipulated (i.e., low and high status) as opposed to equal status participants (de Kwaadsteniet & Dijk, 2010). Moreover, better performances were found in an interdependent group task if groups consisted of a mix of high and low power primed individuals as opposed to groups with only high or only low power primed individuals (Ronay, Greenaway, Anicich, & Galinsky, 2012).

Most essential for the research in this PhD thesis, hierarchies hold many important incentives. For example, researchers could show that having a higher rank in a hierarchy is more beneficial than having a lower rank in terms of general health (Adler et al., 2000), reduced stress as long as hierarchies are stable (Knight & Mehta, 2017), reproductive success in males (Hill, 1984), or higher salaries and higher job satisfaction (Tannenbaum, Kavcic, Rosner, Vianello, & Weiser, 1974). These benefits arguably create an incentive to attain a higher rank in the hierarchy and to show hierarchy-enhancing behaviour such as trying to get control over other people or attaining other's admiration. Allport (1937) has argued that it would be evolutionarily beneficial for functionally autonomous motives to develop, which incentivise people to show such behaviour (e.g., wanting to control others) without necessarily focussing on the long-term goals (e.g., increasing one's rank in a hierarchy to reap its benefits) in order to keep these behaviours refreshed in one's memory. It seems reasonable to assume that the aforementioned power motive (e.g., Winter, 1973) represents exactly this kind of functionally autonomous motive related to hierarchies.

In summary, social hierarchies describe rank differences along perceived socially relevant attributes, which are characterised by asymmetrical access to resources, control, and attention. The prevalence of these hierarchies is arguably due to several important functions hierarchies fulfil such as establishing desired social order, facilitating coordination and cooperation, and providing incentives to attain higher ranks. The latter incentives might be underpinned by a motive to attain control over others and attain prestige and reputation (i.e., the power motive).

2.4.2 Bases of social hierarchies: Power vs status & dominance vs prestige

As highlighted in the definition of social hierarchies, they can be regarded as multidimensional constructs, allowing a person to be low ranked on one, and high on another. Early theories considered several bases for hierarchies such as "force and force threat", "wealth", "prestige" and "friendship-love-affection" (Goode, 1978, p. 3), or "traditional" grounds (e.g., birth right), "charisma", or "legality" (e.g., by

making and adhering to laws; Weber, 2009, p. 79). However, recently researchers argued that there are only two bases of hierarchies, one determined by an actor's ability to make others do what the actor wants and one determined by the voluntary deference of others to an actor as a function of the others' admiration and respect (Bischof, 2008; Henrich & Gil-White, 2001; Magee & Galinsky, 2008). Nonetheless, researchers are divided across two theoretical approaches to describe this dichotomy of hierarchies using different labels and emphasizing somewhat different aspects: power vs status and dominance vs prestige approach.

The first approach differentiates between hierarchies based on power and status (e.g., Blader & Chen, 2012; Fragale, Overbeck, & Neale, 2011; Magee & Galinsky, 2008; Mannix & Sauer, 2006) where power is defined as having asymmetrical access over valued resources and status is defined as having the respect and admiration in the eyes of others[1]. This approach has grown out of an attempt to organise research regarding hierarchies described by Magee and Galinsky (2008) as "in sorting through the history of research on hierarchy, our analysis has revealed a focus on status and power as the primary dimension of hierarchy differentiation even if those terms were not always used." (p. 364) This categorisation effort observed research on hierarchies from many angles, for example, it included research on power (Emerson, 1962), status (Berger, Rosenholtz, & Zelditch, 1980), stratification (Baron, 1984), social exchange (Blau, 1964) and authority (Weber, 2009). As such, it highlights the wide applicability of this approach. Nonetheless, the power vs status approach suffers from two major weaknesses. First, as this approach was born out of a mere categorisation effort of existing findings regarding hierarchy, it lacks a clear theoretical framework and thus, for example, does not explain how and why these two kinds of hierarchies came to existence. Second, as power is conceptualised as having asymmetrical access to resources it confounds both the base and the outcome of a hierarchy (Cheng et al., 2013). Nonetheless, we hold that the power vs status framework can still provide useful insights when using a slightly different

[1] To avoid confusion we will use these definitions for power and status throughout this thesis. However, note that many researchers have defined status differently, as a measure of rank position in terms of influence or prominence (Bai, 2017; Cheng et al., 2010). Moreover, the term power is not

conceptualisation of power. Thus, instead of regarding power as asymmetrical access to resources we propose regarding power as some formalised right to asymmetrical access such as when being the manager of a company.[2] In line with our definition of social hierarchies, it follows then that the more primary others perceive these rights to be, the higher is the individual's rank in the power hierarchy and the more actual asymmetrical access to resources will they obtain.

The second approach to differentiate between two types of hierarchies is embedded in a more comprehensive theoretical framework. This approach differentiates between hierarchies based on dominance and prestige (e.g., Cheng et al., 2013; Henrich & Gil-White, 2001; Maner & Case, 2016). Dominance is defined as attaining a higher social rank through intimidation and coercing others. Prestige is similarly defined as status but with a stronger focus on admiration and respect for valued skills and knowledge instead of just general admiration and respect. The dominance vs prestige approach is based on the evolutionary assumption that having a higher rank in a hierarchy increases the chances of survival for oneself and one's offspring. The historically oldest way to achieve a higher rank was through threatening or physical violence, dominance, which can be observed in humans as well as many animals (Cheng & Tracy, 2014; Wrangham & Peterson, 1996). Prestige hierarchies are assumed to have developed specifically in humans. This is explained by an evolutionary benefit for others to keep in close proximity to individuals from which they could learn valuable skills and knowledge. However, as there would be a competition for this individuals' attention, people would try wooing this person with their admiration, respect, and voluntary deference, in short, prestige. Having prestige, in turn, would become evolutionarily beneficial for the person who has it, thus suggesting that natural selection would favour people who have the ability to respect and admire others as well as people who are actually respected and admired (Henrich & Gil-White, 2001).

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synonymous to the power motive. As such we do not define the power motive as a desire for having asymmetrical resources but as desire for control and prestige (Winter, 1973).

[2] This slight modification of power seems to be legitimate as most research regarding power involves hierarchies in organisations in which scholars investigate positions of power with formal rights such as different levels of management (e.g., Magee & Galinsky, 2008; Mannix & Sauer, 2006).

These two approaches show substantial overlap, some differences and in some cases, can complement each other. Both approaches agree that power/dominance is a property of actors used to compel others to do things. Both approaches also agree that status/prestige is a state granted by others accompanied by a voluntary deference of others to this person of high status or prestige. However, whereas power refers to influencing others through reward and punishment (Magee & Galinsky, 2008), dominance only refers to influence through coercion/punishment (Henrich & Gil-White, 2001). In the dominance vs prestige approach, prosocial behaviour is only related to prestige, as, for example, it signals a higher level of morality (often a valued dimension; Cheng & Tracy, 2014), but not dominance. Contrary to that, in the power vs status approach, prosocial behaviour can be related to both power (the reward part) and status (for the same reason as prestige). Despite, or maybe because of the differences in these two approaches they can also complement each other in their shortcomings. For example, whereas the dominance vs prestige approach is perfectly suited the power vs status approach seems poorly suited to explain the spontaneous emergence of power/dominance hierarchies in groups of strangers who cannot assess their respective access resources (Cheng et al., 2013) or right to access resources. Nonetheless, if power is regarded as a formal right to asymmetrical access to resources, in line with our suggestion above, the power vs status approach becomes more suitable to explain rank differences such as between team member and leader. Whereas in the power vs status approach the team leader is afforded a higher rank in the hierarchy due to their perceived right to asymmetrical access to resources. In the dominance vs prestige approach the team leader would only be afforded with a higher rank if the team members where afraid of punishment (dominance) or if they attributed valuable skills to the team leader (prestige). Neither necessarily needs to be the case, however the team leader would arguably still be perceived to be hierarchically superior. Hence, there are nuanced differences between the dominance vs prestige and power vs status approaches, which might make the dominance vs prestige approach more suitable to explain the natural emergence of hierarchies and the power vs status approach more suitable to explain formalised hierarchies (e.g., a leadership position in companies).

In summary, in order to categorise different kinds of hierarchies researchers have distinguished between two bases of influence in hierarchies. The first base is called power or dominance and describes a property of an actor to be able to influence others in a way they want either through reward and punishment (in case of power) or through coercion (in case of dominance). The second base is called status or prestige and describes a voluntary deference of others to an actor as a function of their admiration and respect for the actor (in case of status) and specifically for the actor's skills and knowledge in a valued domain (in case of prestige).

2.5 Synthesis of research into the power motive and hierarchies

Research into the power motive and hierarchy differentiation have been largely independent, which may stem from the power motive's definition - a desire for control and prestige - confounding different types of hierarchies. Nonetheless, we argue that synthesising these approaches would be beneficial in several ways. If behaviour and cognition related to increasing one's rank in a hierarchy are fuelled by functionally autonomous motives (cf. Allport, 1937) and if there are different kinds of hierarchies, then it would seem reasonable to assume that different kinds of functionally autonomous motives underlie behaviour and cognition related to these different kinds of hierarchies. In line with this, Bischof (2008) has theorised that it would be evolutionarily beneficial if "Machtstreben" and "Geltungsstreben" (translates to power & prestige striving, respectively) had developed as distinct and functionally autonomous motives. Nonetheless, to the best of our knowledge this has never been empirically investigated, moreover, it has not been connected to research into the power motive. Embedding this research into the motivational psychology framework holds several advantages. First, based on the distinction between implicit and explicit motives, much clearer predictions could be made regarding the behaviour and cognition of hierarchy-relevant motives. Second, and most importantly for this research, it would answer the question of whether there are distinguishable components of the power motive related to different kinds of hierarchies and whether those predict meaningfully different behaviours and cognitions. If this were the case, then this would demonstrate that a unidimensional

conceptualisation of the power motive is insufficient and motivational psychologists would benefit from assessing its individual components. Finally, investigating whether there are distinct motives underlying different kinds of hierarchies might shed light on the validity of the power vs status and the dominance vs prestige approaches by determining whether power and dominance or status and prestige underlie the same or different motives.

Although no research has directly addressed these questions, some researchers have used methods that tapped into these motives. For example, Cheng, Tracy, and Henrich (2010) developed a questionnaire to measure people's dispositional dominance and prestige strategies. Whereas the dominance-strategy items showed a great resemblance with motive items (e.g., "I enjoy having control over others."), the prestige-strategy items described a state of having prestige rather than a desire to gain prestige (e.g., "Members of my group respect and admire me."). Maner and Mead (2010) utilised a subset of the Achievement Motive Scales (AMS; Cassidy & Lynn, 1989) to measure dominance and prestige desires. Here, at face-value, the prestige scale seemed to be accurate (e.g., "I want to be an important person in the community.") although it matched more a definition of status than prestige as it was not focused on skills and knowledge. However, the dominance scale did not seem to measure dominance desires as defined by Henrich and Gil-White (2001) nor as measured by Cheng and colleagues (Cheng et al., 2010) but seemed to be more concerned with leadership desires (e.g., "I would make a good leader."). Blader and Chen (2011) used a concern for status scale (e.g., "I wish to have high status") which potentially matched with a status definition, however, as all items contained the word "status" it seemed to be highly dependent on what a layperson considers status to be. Thus, none of the existing questionnaire scales have fully captured the essence of motives in line with definitions of power/dominance and status/prestige hierarchies.

In summary, we propose that distinct functionally autonomous motives underlie different kinds of hierarchies and that these motives relate to different kinds of behaviour and cognition, which would be functional to rise in the respective hierarchy. Moreover, we propose that these motives can be regarded as components of a general power motive, thus combining the research areas of hierarchy

differentiation and motivational psychology. This synthesis is beneficial in several ways as it shows whether a unidimensional power motive confounds important motivational differences or whether the conceptualisation of hierarchies based on power vs status or dominance vs prestige can be substantiated by distinct motives for each type of hierarchy.

3 Chapter 3: Preliminary exploratory factor analysis

3.1 Introduction

In this chapter we describe our first study to empirically bridge the gap between theories of different kinds of social hierarchies (power vs status; dominance vs. prestige; e.g., Henrich & Gil-White, 2001; Magee & Galinsky, 2008) and research into the power motive (Winter, 1973). As a first step we created a large questionnaire item pool with items relating to the power motive and then selected items that fitted either to a broadly defined power/dominance (i.e., "Desiring asymmetrical access to resources or gaining influence through coercion") or status/prestige (i.e., "Desiring respect and admiration from others, preferably for one's skills and knowledge") categories. For this initial item pool we selected the most frequently used scales to measure the power motive (Mayer, Faber, & Xu, 2007), scales that have shown to relate to different components of the power motive in a cluster analysis (Schönbrodt & Gerstenberg, 2012), and scales which were immediately relevant to the dominance vs prestige distinction (Cheng et al., 2010). Moreover, we added some newly created items to be able to measure the above stated categories in their full breadth. Note that this item pool was not an exhaustive collection of all questionnaire items which could have been used to measure the power motive (e.g., Achievement Motive Scales (AMS), Cassidy & Lynn, 1989). However, the items in the scales not included appeared at face-value very similar to the ones we selected, thus, we believe our initial item pool to provide a good cross section of questionnaire items measuring the power motive. The aim in this study was to investigate these items' underlying factor structure by an exploratory factor analysis (EFA) in order to see how many distinct motives can reasonably assumed to underlie these items.

3.2 Method

Participants

Recommendations for minimum sample sizes in EFAs depend on how many questionnaire items determine a factor and the items' communality (MacCallum, Widaman, Zhang, & Hong, 1999). As questionnaire items were related to the same concept, the power motive, we assumed moderate item communality and potentially few items determining a single factor. Thus, we opted for a minimum sample size of n = 500, which is at the higher end of what is recommended in this case (MacCallum et al., 1999). Hence, for this first EFA we collected 527 participants of which we excluded 20 participants for answering with "somewhat disagree", "disagree" or "strongly disagree" to our attention checking question "It is better to do good than to do bad". This attention checking question is adopted from Graham and colleagues' (Graham et al., 2011) Moral Foundation Questionnaire (MFQ, 2017; www.moralfoundations.org). In the remaining sample gender was split evenly, 51% males (M_{age} = 34.26, SD_{age} = 11.10). The sample was restricted to the United States and Great Britain with participants coming from a large variety of different professions (e.g., arts, management, university, IT, law, finance). Participants were paid 1 USD or the equivalent amount in GBP.

Material

We preselected 28 out of 59 questionnaire items from existing scales related to the explicit power motive, including the Personal Value Questionnaire (PVQ; McClelland, 1991), Personality Research Form (PRF dominance; Jackson, 1984), Unified Motive Scales (UMS power; Schönbrodt & Gerstenberg, 2012), GOALS inventory (Pöhlmann & Brunstein, 1997), scales by Cheng and colleagues (2010) as well as some items created by ourselves. Questionnaire items (see Table 3.1) were selected on the basis of matching broad definitions of power/dominance ("Desiring asymmetrical access to resources or gaining influence through coercion"; 15 items) or status/prestige ("Desiring respect and admiration from others, preferably for one's skills and knowledge"; 13 items). Some items were phrased as statements (e.g., "I

feel confident when directing the activities of others") others as goals (e.g., "Be respected and admired"). Statement items were answered on a 6-point Likert scale with the scale anchors "Strongly disagree", "Disagree", "Slightly disagree", "Slightly agree", "Agree" and "Strongly agree". Goal items were answered on a 6-point Likert scale with scale anchors "Not important to me", "Of little importance to me", "Of some importance to me", "Important to me", "Very important to me", "Extremely important to me" (cf. Schönbrodt & Gerstenberg, 2012). These anchors will be used throughout all reported studies.

Procedure

Participants filled in an online questionnaire through Amazon's MTurk. To avoid response bias due to similar items, focal questionnaire items (n = 28) were randomly intermingled with the 10-item scales of UMS achievement, UMS affiliation, UMS intimacy, UMS Fear of losing control, and UMS Fear of losing reputation (Schönbrodt & Gerstenberg, 2012). After completing the questionnaire, participants reported demographics and were fully debriefed.

3.3 Results

We first conducted a Maximum Average Partial test (MAP; Zwick & Velicer, 1986) as well as a Parallel Analysis (PA; Horn, 1965) on all of our focal items (n = 28) in order to assess the number, or a range, of factors that appropriately reflected the correlations between questionnaire items. MAP test and PA suggested a range of three to four factors, hence we first conducted a principal axis factor analysis with an oblique "promax" rotation (this was used for all EFAs throughout this thesis) on a four-factor solution. The resulting item-to-factor pattern showed three distinct factors comprised of high loadings of similar items within the same factor as well as one factor with high loadings of 8 out of the 9 goal items, mixed across power/dominance and status/prestige items (likely representing a method factor). One out of the three other factors matched our definition of prestige/status, the other two factors seemed to be related to distinct dominance and leadership desires, respectively (see

definitions in Chapter 4). This four-factor solution explained 44.8% of the variance in items.

In light of the possible method factor we next modelled a three-factor solution (see Table 3.1). This factor analysis yielded the same three factors representing status/prestige, dominance, and leadership desires, however, most of the goal items now loaded on factors with similar item content. The amount of variance explained by this three-factor solution remained virtually unchanged at 44.6%.

Table 3.1. Factor loadings of a three-factor solution including all 28 focal items with loadings < .25 omitted. Reverse scored items are marked with #. Items in italics were removed in the refined solution. Category denotes whether items were initially selected for matching a power/dominance (P) or status/prestige definition (S).

	Prestige	Leadership	Dominance	Category
I like it when others look up to me.	0.56			S
Be respected and admired by other people.	0.91			S
To be well-known to a lot of people.	0.61			S
A position with prestige.	0.55	0.26		S
Be held in high-esteem by those I know.	0.85			S
It is not important to me that others value my opinion.#	0.38			S
I feel sad if nobody recognises my unique talents and abilities.	0.49	-0.34	0.31	S
I am happy to do people favours as long as they respect me.	0.26			S
It is important to me to be considered an expert on some matters.	0.37		0.31	S
High social status.	0.44		0.32	S
I would like to be an executive with power over others.		0.58	0.30	P
I have little interest in leading others.#		0.80		P

I feel confident when directing the activities of others.		0.73		P
I do not enjoy having authority over other people.#		0.80		P
I enjoy having control over others.		0.54	0.39	P
The opportunity to exercise control over an organization or group.		0.55		P
To be in a leadership position in which others work for me or look to me for direction.	0.27	0.65		P
I try to control others rather than permit them to control me.		0.26	0.55	P
I am willing to use aggressive tactics to get my way.			0.64	P
Others know it is better to let me have my way.			0.75	P
I often try to get my own way regardless of what others may want.			0.83	P
I like to have the final say.			0.41	P
Opportunities to influence others.	0.51	0.44		P
I am more likely to help another person when other people are watching.			0.62	S
I often want to impress other people with my actions.	0.40		0.50	S
I like buying things which impress other people.			0.50	S
Be able to exert influence.	0.49	0.43		P
I do not have a forceful or dominant personality.#		0.46	0.30	P

To explore whether the factor structure could be further simplified, although not recommend by MAP test and PA, we conducted factor analyses with a two-factor

and a one-factor structure. The two-factor solution explained only 39.7% of the variance, however, almost all dominance and leadership related items loaded highly on one factor whereas almost all status/prestige related items loaded highly on another factor. Finally, a one-factor solution explained 36.6% of the variance with almost all items loading < .25 on this one factor. This suggests an underlying communality between all the items. Nonetheless, the three-factor solution seems to be most appropriate due to the match between the amount of factors suggested by MAP and PA, amount variance explained, and having factors onto which similar items load.

As a final step we refined the three-factor solution by removing six items that showed higher cross-loadings with a second factor, one item which, at face-value, seemed to be too strongly related to the achievement motive (Schönbrodt & Gerstenberg, 2012), one out of two items which were almost identical, and one double-barrelled item (see Table 3.1). The remaining items showed high loadings on their respective factor with mostly negligible cross-loadings on the other two factors (see Table A1.1 in Appendix 1). This three-factor structure and the respective questionnaire items thus became the basis for our next EFA (see Chapter 4).

3.4 Discussion

In this EFA we investigated how many factors underlie a set of questionnaire items measuring the explicit power motive and selected on the basis of matching a broad power/dominance or status/prestige definition. Corroborating results from MAP test, PA, explained variance, and face-value fit of items to factors indicated that a three-factor solution underlying these items was best. One of these factors seemed to describe a dominance motive close to the conceptualisation of Henrich and Gil-White (2001) and others (e.g., Cheng et al., 2010; Maner & Case, 2016); it comprised items related to using coercive measures (e.g., aggression) to achieve one’s will. A second factor seemed to describe a status/prestige motive close to the conceptualisation of Henrich and Gil-White's (2001) prestige but also Magee and Galinsky's (2008) status. As described earlier, these two terms are almost identical.

The third factor seemed to be strongly related to leadership content. This seems to be a strong theme among scales measuring the explicit power motive (e.g., PRF dominance: Jackson, 1984; UMS: Schönbrodt & Gerstenberg, 2012), which does not neatly fit to a dominance vs prestige framework but could be the expression of a desire for power (asymmetrical access or a right to asymmetrical access to valued resources).

In order to refine this three-factor solution we removed nine items from our analyses which yielded a clearer picture of the factors. Interestingly, two items we removed ("I often want to impress other people with my actions." & "I like buying things which impress other people.") were more strongly related to dominance than status/prestige motives. This suggests that boasting about one's achievements or collecting status symbols may be more related to dominance than status/prestige motives, potentially as one is trying to force others to admire oneself as opposed to voluntary admiration. This is consistent with the conceptualisation of prestige/status as a source of voluntary deference and substantiates the idea of treating displays of higher socio-economic status to be different from status/prestige (Anderson, Hildreth, & Howland, 2015).

4 Chapter 4: Development and preliminary validation of DoPL motive scales

4.1 General introduction

The three factors pertaining to dominance, prestige, and leadership (DoPL) desires, found in Chapter 3 emerged from items measuring the explicit power motive and matched definitions of distinct kinds of hierarchies. Hence, we regard these factors as constituent motive components of the power motive as well as distinct motives to enhance one's rank in a hierarchy and, as such, connecting these two strands of research. Whereas the dominance and prestige motives fit neatly into the dominance vs prestige approach of hierarchies (Cheng & Tracy, 2014; Henrich & Gil-White, 2001), the leadership motive somewhat relates to both the dominance vs prestige as well as the power vs status approach (Magee & Galinsky, 2008). In the following we provide a brief overview of the dominance and prestige motives including their occurrence within the theoretical framework of hierarchies based on power/dominance and status/prestige. Moreover, we provide a more extensive overview of how a distinct leadership motive might have evolved and how it relates to the dominance vs prestige and the power vs status approaches.

4.1.1 Dominance motive

Our conception of dominance is taken from Henrich and Gil-White (2001; see also Bischof, 2008; Cheng et al., 2010; Maner & Case, 2016) as being based on agonistic mechanisms such as physical force or threat displays and can be readily observed in many animal species and humans. Nonetheless, threats can also be on a purely psychological level and would often replace the use of physical violence in humans. As dominance behaviour is suited to increase one's rank in a hierarchy (Cheng & Tracy, 2014; Cheng et al., 2013), we assume a distinct motive for dominance to have developed and for this motive to have become functionally autonomous (cf. Allport, 1937; Bischof, 2008). Hence, we define the dominance motive as a desire or concern to coerce others into adhering to one's will, which can be achieved through

intimidation, aggression, physical force, or manipulating others. In line with Bischof (2008; see also Lersch, 1956) we propose that out of the three DoPL motives, the dominance motive is the most closely related to a desire for autonomy. More precisely, a highly dominance motivated individual would more strongly resist being influenced against their will by others (i.e., not dominated by others) compared to a low dominance motivated individual. This conceptualisation of the dominance motive is well in line with dominance in the dominance vs prestige approach of social hierarchies (Henrich & Gil-White, 2001) but only partly matches with power in the power vs status approach (Magee & Galinsky, 2008). The latter is because a desire for asymmetrical access (i.e., power) or a right to asymmetrical access to resources (see Chapter 2) could manifest itself in a desire to have the means to punish someone (a dominance incentive) but also to reward someone (not a dominance incentive).

4.1.2 Prestige motive

Compared to dominance, prestige is proposed to be a phylogenetically younger basis of hierarchies (Henrich & Gil-White, 2001). Similar to dominance, prestige is suited to increasing one's rank in a hierarchy (Cheng & Tracy, 2014; Cheng et al., 2013) and we propose that this also led to the development of a functionally autonomous prestige motive (Bischof, 2008; cf. Allport, 1937). We will thus define the prestige motive as a desire or concern to attain respect and admiration in the eyes of others, primarily for one's skills and knowledge in a valued domain. We say "primarily" because, though holding that in most cases the prestige motive relates to admiration for specific skills and knowledge, we propose that sometimes the motive can manifest itself as a general/unspecified desire for admiration and respect. Nonetheless, this motive can be distinguished from simply wanting to attain a higher socio-economic status (Anderson et al., 2015), the affiliation motive (the desire to be among friends; e.g., Schönbrodt & Gerstenberg, 2012), the desire to boast about accomplishments, or collecting status symbols. It should be noted that it would have been equally permissible to call this the status motive (cf. Magee & Galinsky, 2008); however, we want to avoid it being conflated with socio-economic status and also

stress its primary focus on admiration for skills and knowledge. As such, the prestige motive is well in line with definitions of prestige (Henrich & Gil-White, 2001) as well as Magee and Galinsky's (2012) definitions of status.

4.1.3 Leadership motive

Similar to dominance and prestige an evolutionary account for leadership has been proposed. Social group living presents considerable and varied coordination problems (e.g., when and where to gather food, defending the group, when and where to move), and natural selection may have favoured a mix of leadership and follower traits as a solution strategy (Van Vugt, 2006). According to evolutionary game theory (Maynard-Smith, 1982) a mix of leaders and followers can maximise the fitness of the group, as concerted actions are superior to uncoordinated ones (Van Vugt, 2006; this is a similar argument to the one we made for the existence of hierarchies in Chapter 2). The leadership traits Van Vugt (2006) proposed to have evolved to solve these coordination problems can be sorted into two categories: initiative taking and directing others.

The first set of traits Van Vugt (2006) discussed were regarding initiative taking, based on the simple assumption that in most cases someone has to step up to be a leader. Thus, he presented several studies indicating that initiative taking is a skill/behaviour often observed in leaders and related to leadership emergence. For example, individuals in executive positions at AT&T differed significantly from their subordinates in terms of energy and activity levels as well as preparedness to make decisions (Bray & Howard, 1983). In a group decision making task, individuals who spoke more often were rated higher in leadership abilities regardless of the perceived quality of their contributions (Sorrentino & Boutillier, 1975). Van Vugt (2006) asserted that among the variables associated with this initiative taking are extraversion, risk-taking, and self-esteem. Although it stands to reason that someone has to assume responsibility and take initiative to become a leader, the causal evidence for this is lacking. Thus, to substantiate this argument further studies are needed to show the causal role of initiative taking for leadership emergence including moderating variables.

The second set of traits Van Vugt (2006) discussed related to directing others and were theorised to hinge on three qualities: (social) intelligence, generosity, and competence. Regarding intelligence, research showed that leadership and intelligence are strongly related (e.g., Lord, De Vader, & Alliger, 1986), with verbal IQ potentially playing an important role as this would support the communication skills needed as a leader (Van Vugt, 2006). Social intelligence might aid directing others efficiently by virtue of empathetic recognition of when followers need which kind(s) of direction (e.g., Bass, 1990). Van Vugt (2006) argued that generosity induces follower motivation by leaders generously distributing attained goods (e.g., when distributing the meat after a hunt), which signals to followers that they can expect substantial portions in future coordinated actions. Finally, perceived competence is theorised as attracting followers by virtue of giving the appearance that a leader knows what they are doing; thus, presumably, increasing trust and decreasing uncertainty, both of which would work to increase group cohesion independently from dominance or prestige related behaviours. In line with this, Ho, Shih, and Walters (2012) found across several tasks that males were more likely than females, and vice versa, to emerge as leaders depending on whether a task was framed more masculine or more feminine (e.g., a paper folding task framed as building task vs art task). Perceived competence completely mediated these effects. In summary, Van Vugt (2006) argued that in order to solve coordination problems throughout human history, leadership traits evolved which can be categorised into initiative taking and directing others. Whereas initiative taking is supported by traits such as extraversion, self-esteem, and risk-taking, directing others is supported by (social) intelligence, generosity, and competence.

Assuming the existence of dominance and prestige hierarchies, is the concept of leadership redundant? Are individuals at the top of these hierarchies naturally the leaders of their group? We believe the answer is no to both of these questions. Although a person at the top of a dominance or prestige hierarchy possesses influence and attention, this does not automatically make this person a leader. We propose that actively taking charge and directing others to achieve a common group goal is what separates individuals with mere high rank positions from leaders. Nonetheless, the concept of leadership cannot be as clearly distinguished from

dominance and prestige as dominance and prestige can be distinguished from each other (e.g., Henrich & Gil-White, 2001). This is because the influence of a leader can arise from dominance and/or prestige but potentially also from other sources. For example, a group under imminent threat might prefer following a dominant leader (e.g., Winston Churchill in Britain during World War II) that can immediately enforce the necessary group cohesion (see also Samuelson, Messick, Rutte, & Wilke, 1984; Van Vugt & De Cremer, 1999). Moreover, a group might want to follow a person out of respect and admiration for their competence (e.g., Ho et al., 2012) or generosity (e.g., Boehm, 1999; Van Vugt, 2006). Notwithstanding this, it is also possible that there are other sources of influence. For example, a group might want to follow a person out of mere self-interest, as they believe she or he is the best person available to organise the group (Stogdill, 1975); this does not presuppose that the group admires or respects the person for their organisation skill. Moreover, another source of influence might be through the perceived legitimacy of a person to direct others (French & Raven, 1959). This source of influence would match our slightly modified understanding of power (cf. Magee & Galinsky, 2008; see Chapter 2) as a legitimate right to asymmetrical access to resources. For example, Raven and French (1958) showed that participants in a group task accepted directions from a leader even if this leader only appeared to be democratically elected but was not actually elected by the group (i.e., participants did not know the election was rigged). Nonetheless, although hypothetically these other sources of influence could be independent from dominance and prestige, whether they are independent in practice is a question that awaits further investigation.

In summary, we propose that being a leader is not a mere by-product of being at the top of a dominance or prestige hierarchy but involves actively taking charge/initiative and the will/skill to direct others. Nonetheless, at least some of the sources of influence a leader can tap into are related to dominance and prestige processes, thus making the distinction between leadership and both prestige and dominance less clear-cut as the distinction between only the latter two.

We acknowledge that this account of leadership is not yet as well worked out and substantiated by multiple sources of theoretical and empirical evidence as the

dominance vs prestige approach (Cheng & Tracy, 2014; Henrich & Gil-White, 2001). Thus, whether one can assume a distinct leadership hierarchy, akin to a dominance or prestige hierarchy is still an open question. Alternatively, leadership could also be regarded as a social dimension orthogonal to prestige and dominance, a desire to put one's hierarchy position into use to achieve a common group goal. In either case, we hold that a group supplies a leader with additional influence and attention as this serves the group's aim for coordinated activities (e.g., Van Vugt, 2006). Moreover, leadership might serve as a consolidation of one's rank position by legitimising it beyond dominance and prestige aspects (e.g., French & Raven, 1959). Thus, we propose that leadership is suitable for increasing a person's fitness. Moreover, in line with the ideas of evolved leadership traits (Van Vugt, 2006), we propose the development of a functionally autonomous leadership motive (cf. Allport, 1937). We define this leadership motive as a desire or concern to guide and direct activities of others, which is not necessarily tied to acting either in favour or against other people's will. The motive's satisfaction arises from "being in charge" and taking responsibility.

In this chapter we report three studies which aimed at developing a 30-item questionnaire to measure reliably three distinct dominance, prestige, and leadership motives (10 items per scale) as well as providing a preliminary validation of these scales. More precisely, in Study 1 we created a pool of questionnaire items in line with our definitions of the dominance, prestige, and leadership motives in order to capture these concepts in their full breadth. Based on an exploratory factor analysis (EFA) of these items showing the predicted three factor structure, we selected the best items in order to create a preliminary 10-item scale for each of the DoPL motives. In Study 2, we refined these three 10-item scales, provided short scales of 6 and 4-items for each motive, and assessed the model fit of these final scales in a confirmatory factor analysis (CFA). Moreover, in a set of preregistered correlation analyses we showed the final DoPL scales' validity within their nomological net. In Study 3, we demonstrated that two established scales to measure the explicit power motive, the Unified Motive Scales' power (UMS power; Schönbrodt & Gerstenberg,

2012) and the Personality Research Form's dominance scale (PRF dominance; Jackson, 1984), could be decomposed into differently weighed combinations of components of the DoPL scales.

4.2 Study 1

4.2.1 Method

Participants

As each of the three factors should be well determined (i.e., having many items loading highly on the factor) and having assumed higher communalities due to narrower concepts, we reduced our minimum sample size to n = 400 (MacCallum et al., 1999). Hence, for this EFA we collected data from 464 participants via Amazon's MTurk of which we excluded 15 participants for incorrectly answering our attention checking question (see Chapter 3). In the remaining sample, gender was split evenly, 50% males (M_{age} = 38.29, SD_{age} = 12.60). The sample was restricted to the United States and Great Britain with participants coming from a large variety of different professions. Participants were paid 1 USD or the equivalent amount in GBP.

Material & Procedure

The procedure was identical to the study reported in Chapter 3, though in the current study we used an item pool consisting of the 19 items from Chapter 3's refined solution and 36 self-developed items (57 items in total). These items were developed to measure the DoPL motives in their full breadth, thus we created several items fully covering the motives' definitions and several possible manifestations. Specifically, Wilt and Revelle (2015) have suggested that traits, such as the BIG 5, consist of affective (A), behavioural (B), cognitive (C) and desire (D) components. We argue that motives not only consist of pure desires (e.g., "I want to dominate others.") but also manifest themselves in affective (e.g., "I enjoy dominating others."), behavioural (e.g., "I often dominate others.") and cognitive (e.g., "Others should be dominated.") ways.

4.2.2 Results

As in Chapter 3, we first conducted a MAP test and PA on all 57 focal items to assess a number, or range, of factors that should be extracted. Both analyses suggested five factors, however, from judging the levelling of the MAP statistic

(.0246, 0.144, .0091, .0085, .0073) a factor solution with as few as three factors seemed plausible. Thus, we first conducted a factor analysis on a five-factor structure (see Table A2.1.1 in Appendix 2). The resulting item-factor pattern showed that most items loaded highly on their respective DoPL factor. Seven of nine goal items loaded highly on the fourth factor, which similarly to Chapter 3, is likely to represent a method factor. The fifth factor showed no consistent pattern with only three primary loadings > .40 and the rest of the loadings being weak cross-loadings of leadership and prestige motive items. This factor structure explained 46.1% of the variance. Next we tried a four-factor solution which again yielded the three DoPL factors and the previously found factor consisting mostly of cross-loadings of prestige and leadership items with only four primary loadings > .4. The goal items now loaded on their respective motive factors. These four factors explained 44.2% of the variance.

Next we conducted a factor analysis with our hypothesised three-factor solution, which still explained 43.4% of the variance. Most items loaded only (i.e., no cross-loadings > .25) on their respective factors, seven items loaded more highly on a theoretically different factor, another seven items loaded mostly highly on their respective factors but showed heightened cross loadings of > .25. We removed these 14 items and conducted another three-factor solution on the remaining 43 items. In this factor analysis all items (15 dominance, 18 prestige & 10 leadership items) loaded highly on their respective factor with no cross-loadings > .25 (see Table A2.1.2 in Appendix 2). As the DoPL motives are fairly narrow constructs, we decided that 10 items would be sufficient to capture these constructs fully. Hence we created a 10 item scale for each DoPL motive on the basis of items having high factor loadings, an even spread of affective, behavioural, cognitive, and desire aspects as well as a sufficient coverage of the underlying concept. A further factor analysis of these 10*3 core items showed that all items loaded highly and without cross-loadings > .25 on their respective factor. This was corroborated by MAP test as well as PA, which both suggested a three-factor structure. Additionally, we conducted several factor analyses in which we exchanged individual core items with additional “reserve” items (8 prestige items, 5 dominance items), which yielded essentially the same results. As in Chapter 3, we also conducted factor analyses

forcing a two and one-factor solution, which explained 39.2% and 33% of the variance, respectively (see Tables A2.1.3 and A2.1.4 in Appendix 2).

4.2.3 Discussion

Based on an initial factor analysis (Chapter 3) of questionnaire items related to the explicit power motive from several existing inventories as well as theoretical considerations regarding different bases of hierarchies, we defined distinct dominance, prestige, and leadership (DoPL) motives. We created 57 questionnaire items to represent these motives in their full breadth with an about equal numbers of items representing affective, behaviour, cognitive, or desire aspects. Of all factor solutions the three-factor solution seemed the most sensible. We picked 10 core items based on high factor loadings, an even spread across ABCD categories, and sufficient coverage of the motives' definition. These core items served as a preliminary version of the DoPL scales. However, this factor structure and the respective items needed to be confirmed in Study 2 with the potential of a core item being replaced by one of the reserve items (8 prestige, 5 dominance items). Moreover, we also wanted to examine whether the DoPL motives are not only statistically distinct but also relate differently to a range theoretically relevant outcomes, behaviours, and personality traits.

4.3 Study 2

4.3.1 Introduction

In Study 1 we created a preliminary version of the DoPL scales. In this study (Study 2), we wanted to demonstrate the reliability and validity of these scales in four ways: First, we wanted to replicate the three-factor structure in Study 1's refined item pool (n = 43) and, on the basis of this analysis, replace any core item of the preliminary DoPL scales which did not uniquely load on its respective factor in both Study 1 and Study 2. Note that this item selection was completely independent from the hypothesis tests described in Table 4.3.1. Second, we wanted to show that a three-factor structure holds for the final 10 item DoPL scales as well as short scales of six and four items per motive in both samples of Study 1 and Study 2. Third, we wanted to assess the model fit of these final scales by using several CFAs. Fourth, in order to show convergent and divergent validity of the DoPL scales, we wanted to correlate them with personality traits and other characteristics which constitute the scales' nomological network (Cronbach & Meehl, 1955). For this we had preregistered our sample size, all our hypothesis regarding the correlations of the nomological network (see Table 4.3.1) as well as the strategy to determine which questionnaire items would constitute the final DoPL scales (see also Appendix 2). This preregistration can be found on the Open Science Framework platform (https://osf.io/2w647/).

4.3.2 Method

Participants

To assess the scales' convergent and divergent validity we intended to conduct 57 correlation tests in which we aimed to detect even small effect sizes of $r = .20$ with $\beta = .80$. We determined that we would need approximately 400 participants when applying a Bonferroni-Holm correction for multiple testing. This sample size would also be sufficient for the EFA (see Study 1). Thus we collected 440 participants via Amazon's MTurk, restricted to Great Britain and the United States, 40 of whom were excluded due to answering incorrectly to either of our attention check questions "It is better to do good than to do bad" and "I have been on the moon". The remaining 400

participants (M_{age} = 36.98, SD_{age} = 11.69) consisted of 53% males and came from a large variety of different professions and received 1 USD or the equivalent amount in GBP for their participation.

Material & Procedure

We used the same 43 items (15 dominance, 18 prestige & 10 leadership items) as in the refined factor solution of Study 1. As previously done, all focal items where intermingled with items of the UMS (Schönbrodt & Gerstenberg, 2012). After participants filled in these items, we asked them to fill in the following validation scales in this fixed order: 1. Intermingled Big Five personality variables (John, Naumann, & Soto, 2008; Rammstedt & John, 2007), 2. Narcissism Admiration and Rivalry Questionnaire (NARQ; Back et al., 2013), 3. Social Dominance Orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994), 4. Intermingled Anger and Verbal Aggression scales (a H. Buss & Perry, 1992), 5. Self-reported altruism scale (SRA; Penner, Fritzsche, Craiger, & Freifeld, 1995), 6. One question about pornography consumption, 7. One question about the number of leadership positions. Details and preregistered hypotheses regarding these scales can be found in Table 4.3.1.

Table 4.3.1. A list of validation scales along with their hypothesised relationship with dominance (D), prestige (P), and leadership (L) motives. Note that in the interest of better understanding, we changed some of the wordings in the rationale as compared to the preregistration. However, the underlying rationale and resulting hypothesis are identical.

Variable	Operationalisation	Rationale	Predicted effects		
			D	P	L
Aggression	Scales for verbal aggression (5 items) and anger (7 items) from Aggression Questionnaire (AQ; Buss & Perry, 1992). Predictions are the same for both scales.	According to Bischof (2008) and Henrich & Gil-White (2001) dominance is attained by threatening & being aggressive towards others. Although being aggressive could foster other people's disregard (Henrich & Gil-White, 2001) some respect can also be gained by being aggressive especially when this aggression is directed to enemies of the group (Bischof, 2008). As these effects probably cancel each other out, a desire for prestige should not be related to aggression. A little aggression seems to be beneficial in a good leader.	++	0	+
Altruism	Self-reported altruism scale (SRA; 14 items) of Penner and colleagues' (1995) Prosocial Personality Battery.	According to Bischof (2008) and Henrich & Gil-White (2001) showing prosocial behaviour is beneficial for gaining prestige. A little prosocial behaviour might help a leader to inspire/reward collaboration. Whereas Bischof (2008) assumes a little prosocial behaviour in dominant individuals in order to consolidate a dominant position in what he calls a "Bindungsfalle", Cheng et al. (2010) point out that being prosocial might be dysfunctional in eliciting the fear needed to dominate others.	?	++	+
Agreeableness	Big Five Inventory (John et al., 2008), 9 items	A friendly, trustworthy nature (i.e. being highly agreeable) should be beneficial for a person to be liked, admired, and respected. In a leader, this trait could be equally seen as	-	+	0

		making one weak as well as a good leader. Therefore, these effects are likely to cancel each other out. Being friendly and trustworthy are opposite attributes of the ones needed to dominate other people.			
Extraversion	Big Five Inventory (Rammstedt & John, 2007), 2 items	Satisfying one's desire for dominance, prestige, and leadership requires being around other people; hence, a trait facilitating meeting other people would be beneficial. Nonetheless, whereas satisfying one's desire for prestige and leadership seems to require a bigger group, the desire to dominate others might already be satisfied by dominating a few others.	+	++	++
Conscientiousness	Big Five Inventory (Rammstedt & John, 2007), 2 items	Achieving the skills and abilities needed to attain prestige probably involves working conscientiously towards them. We do not see any immediate connection to leadership or dominance.	?	+	?
Openness	Big Five Inventory (Rammstedt & John, 2007), 2 items	Similarly, openness should be beneficial to acquiring the skills and abilities needed to gain prestige. We do not see any immediate connection to leadership or dominance.	?	+	?
Neuroticism	Big Five Inventory (Rammstedt & John, 2007), 2 items	Individuals striving for the recognition of others might define themselves by this said recognition and would therefore be dependent on other people's evaluation. Hence, their emotional stability would depend on others, which would predict low internal emotional stability. On the other hand low emotional stability might be dysfunctional to gain respect in the first place (Cheng et al., 2010). We assume the first effect to be stronger. However, they could also cancel each other out. Neuroticism is certainly not a good trait for a leader. There should be no immediate association to a need for dominance.	0	0(+)	-
Number of leading	List all leading positions	Naturally the number of leading positions should be strongly related to the desire to be a	0(+)	+	++

positions	you had in the last five years: (for example, captain of football team, organiser of study group, student representative etc.)	leader. Nonetheless, being a leader often also comes with some prestige; hence there should also be a relationship with a need for prestige. One way of dominating other people might be by being a leader. Yet, having a high dominance motive might also be counter-beneficial for achieving promotion into these positions. Hence, we predict a weak relationship with dominance.			
Social Dominance	Social Dominance Orientation (SDO) Pratto et al. (1994), 8 items	A person who wants to dominate other people would certainly support a society which allows people to dominate others. Leading other people also goes along with having a hierarchy; hence, we predict a small positive relationship between SDO and leadership motive. There should be no immediate relationship between SDO and the prestige motive.	++	0	+
Porn consumption	Measured by: On average, how many hours a week do you watch porn? (movies, magazines etc.)	Desiring dominance might be satisfied by fantasising about dominating a sexual partner, which could be most easily attained by watching porn (Hernandez, 2011; Wright, Sun, Steffen, & Tokunaga, 2015). However, as more porn shows males dominating females, this relationship might only exist for males. We see no immediate relationship to prestige or leadership.	+	0	0
Narcissism	NARQ_Admiration (9 items), Back et al., (2013)	As narcissistic admiration is defined as a "striving for uniqueness, grandiose fantasies and charmingness" and assumed to show in "self-assured, dominant, and expressive behaviors" (Back et al., 2013, p. 1016), this striving largely overlaps with the prestige motive but also somewhat with the dominance motive.	+	++	0(+)
	NARQ_Rivalry (9 items), Back et al., (2013)	Narcissistic rivalry is defined as a "striving for supremacy, devaluation of others and aggressiveness" (Back et al., 2013, p. 1016). This overlaps largely with the dominance motive. The supremacy aspect might also warrant a weak positive relationship with leadership. We hypothesise no relationship with prestige.	++	0	0(+)

Power motive	Unified Motive Scales (UMS; Schönbrodt & Gerstenberg, 2012),11 items[3]	As the DoPL motives are constituent parts of the explicit power motive, it should naturally correlate highly with all three of these motives. Nonetheless, at face-value, the conceptualisation of the power motive in the UMS is skewed towards the leadership motive hence this relationship should be the strongest.	++	++	+++
Affiliation motive	UMS (Schönbrodt & Gerstenberg, 2012),10 items	The rationale for the affiliation motive is similar to the rationale for extraversion. However, affiliation desires are a little more tailored to making friends than just being surrounded by others. Hence, the relationship regarding leadership and dominance should be weaker as compared to extraversion.	0(+)	++	+
Achievement motive	UMS (Schönbrodt & Gerstenberg, 2012),10 items	Both achievement and prestige motivation describe a desire to excel at various skills & abilities. The difference is that prestige motivated individuals are more motivated by the admiration which comes with having these skills whereas achievement motivated individuals are more involved with attaining excellency by itself. The relationship between these two motives should be strong nonetheless. A desire to do things better (and thus actually getting better) should also be somewhat beneficial for leading and dominating people.	+	++	+
Intimacy motive	UMS (Schönbrodt & Gerstenberg, 2012),10 items	A person with a strong desire for prestige arguably tries to get recognition from a lot of people, the admiration from one's partner included. To attain this admiration, being with someone and being good to this someone seems beneficial. Leadership seems unrelated to	-	+	0

[3] There were two changes in computing this power motive score as compared to the power motive score in the UMS (Schönbrodt & Gerstenberg, 2012). The UMS item "I like to have the final say" was rephrased as "I like it when I have the final say." and the UMS item "To be in a leadership position in which others work for me or look to me for direction" was split up into two items: "To be in a leadership position in which others work for me" and "I want to be in a position in which others look to me for direction."

		having an intimate relationship with someone. A person desiring to dominate others would benefit from being in a romantic relationship (because one would have permanent access to another person). Nonetheless, the desire for dominance would strongly counteract with being good to one's partner. As the latter part is more strongly represented in the intimacy motive, dominance and intimacy should actually be negatively correlated.			
Fear of losing control	UMS (Schönbrodt & Gerstenberg, 2012), 3 items	Both desires for dominance and leadership involve controlling others thus the fear of losing control should be related to them. The prestige motive is not immediately related to controlling others.	+	0	+
Fear of losing reputation	UMS (Schönbrodt & Gerstenberg, 2012), 2 items	The fear of losing reputation is the fear-component of the prestige motive and they should therefore be highly correlated. Prospective leaders might be somewhat concerned about their reputation in order to maintain or attain leading positions. Dominating others should not be related to a fear of losing reputation.	0	++	0(+)

Notation: +++ (r = 1 to .6); ++ (r = .6 to .35); + (r = .35 to .15); 0 (r = .15 to -.15); - (r= -.15 to -.35); 0(+) denotes non-significant effect but descriptively positive; ? if no clear prediction could be made.

4.3.3 Results

As in Study 1 we conducted a principal axis factor analysis with oblique "promax" rotation of 3 factors on all 43 items. Forty-two out of 43 items loaded most highly on their respective factor; one item ("I like it when I have the final say.") loaded more highly on another factor (leadership) than the intended factor (dominance). Two prestige motive items ("I want to be well known to a lot of people." and "I like it when others look up to me.") showed cross-loadings > .25 on the dominance and leadership factor, respectively. As the latter prestige motive item was one of the core items, it was replaced by another prestige motive item ("I am happy when I can present my achievement to others") of the same ABCD category for the final version of the DoPL scales.

We conducted another factor analysis on our final core items (10 items for each DoPL motive) which showed that all core items loaded highly (all items > .46) on their respective factor with no cross-loadings > .25 (see Table 4.3.3). This three-factor solution explained 54% of variance among items. Post-hoc MAP test as well as PA both confirmed that three factors underlie the pattern of correlations in this set of 30 questionnaire items. We cross-checked these 30 items with data from Study 1 and found essentially the same loadings of the items on their respective factor with no cross-loadings > .25. Moreover, in Study 2 both post-hoc MAP test and PA suggested a three-factor structure to underlie these items. As a next step, we selected questionnaire items for 6-item and 4-item short scales on the basis of high factor loadings, sufficient content covering and, where possible, an even spread across ABCD categories (see Table 4.3.3). To confirm that a three-factor structure still underlies these short scales, we conducted MAP tests and PAs on all the short scales, which all indicated a three-factor structure. Subsequent factor analyses of the 6 and 4-item scales for both Study 1 and Study 2, forcing a three-factor solution, showed that all items loaded highly on their respective factor with no cross-loadings > .25 (see loadings for Study 2 in Table 4.3.3). Cronbach's alpha was ≥ .80 in all scales across both Study 1 and Study 2 (see Table 4.3.2). Hence, we could replicate the

same three-factor structure in two independent samples for 10-item, 6-item and 4-item scales measuring the DoPL motives.[4]

Table 4.3.2. Cronbach's alpha across Study 1 and Study 2 for 10-item, 6-item and 4-item DoPL scales.

Scale type	Study 1			Study 2		
	Dominance	Prestige	Leadership	Dominance	Prestige	Leadership
10-item	.90	.86	.94	.90	.87	.96
6-item	.86	.82	.91	.86	.83	.94
4-item	.83	.80	.88	.83	.83	.92

[4] A translation of the 6 and 4-item scales into German showed the same three-factor structure as tested in a dataset provided by Lübke and Schönbrodt (under review).

Table 4.3.3. Showing the final version of the DoPL scales with primary factor loadings of the 10-item, 6-item and 4-item scales based on a principal axis factor analysis of data from Study 2. No cross-loadings were > .25. ABCD denotes the affective, behavioural, cognitive, and desire aspect (Wilt & Revelle, 2015), items with # are reverse scored.[5]

Motive	English	German	10 – Item loadings	6 – Item loadings	4 – Item loadings	AB CD
Dominance	I enjoy bending others to my will.	Ich genieße es, andere meinem Willen zu unterwerfen.	0.742	0.723	0.747	A
	I am willing to use aggressive tactics to get my way.	Ich bin bereit aggressive Strategien anzuwenden, um meinen Willen durchzusetzen.	0.743	0.748	0.744	B
	When people challenge me I want to put them down hard.	Wenn mich Leute herausfordern, will ich sie demütigen.	0.737	0.718	0.685	D
	I want to twist others around my little finger.	Ich will andere um meinen Finger wickeln.	0.817	0.783	0.787	D
	I often try to get my own way regardless of what others may want.	Ich versuche oft meinen eigenen Willen durchzusetzen, unabhängig davon was andere wollen.	0.697	0.712		B
	I try to control others rather than permit them to control me.	Ich versuche, andere unter meinen Einfluss zu bekommen, anstatt zuzulassen, dass sie mich	0.492	0.544		B

[5] Note, that we added the word resume to the original prestige motive item "I like it when others compliment me on my curriculum vitae." after finishing data collection for this thesis to ease understanding especially for non-academic American-English speakers.

		kontrollieren.				
	It's not good to dominate others.#	Es ist nicht gut andere zu dominieren.#	0.516			C
	I enjoy manipulating others.	Ich genieße es, andere zu manipulieren.	0.714			D
	Putting people in their place is often necessary.	Es ist oft notwendig andere Leute in ihre Schranken zu weisen.	0.731			C
	Getting others to do what I want.	Andere Leute dazu bringen, das zu tun, was ich will.	0.515			D
Prestige	I feel sad if nobody recognises my unique talents and abilities.	Es macht mich traurig, wenn niemand meinen besonderen Fähigkeiten und Talenten Beachtung schenkt.	0.631	0.595	0.610	A
	I am happy when I can present my achievements to others.	Es macht mich glücklich, wenn ich anderen meine erfolgreichen Leistungen präsentieren kann.	0.705	0.713	0.643	A
	Recognition from others.	Anerkennung von anderen Menschen.	0.856	0.854	0.915	D
	Be respected and admired by other people.	Von anderen Leuten respektiert und bewundert werden.	0.759	0.804	0.792	D
	Success means being respected.	Erfolg bedeutet respektiert zu werden.	0.654	0.583		C
	I often share with others when I achieved something great.	Ich erzähle oft anderen davon, wenn ich etwas Tolles erreicht habe.	0.493	0.494		B
	I like it when others compliment me on my curriculum vitae/resume.	Ich mag es, wenn mir jemand ein Kompliment zu meinem Lebenslauf macht.	0.572			A

	I am willing to work harder if this earns me more recognition from others.	Ich bin bereit härter zu arbeiten, wenn mir das mehr Anerkennung von anderen einbringt.	0.667			B
	Being unnoticed by others is a terrible thing.	Von anderen nicht beachtet zu werden ist eine schlimme Sache.	0.667			C
	I am happy to do people favours as long as they respect me.	Ich tue anderen Leuten gerne einen Gefallen, solange sie mich respektieren.	0.462			B
Leadership	I relish opportunities in which I can lead others.	Ich genieße Situationen, in denen ich andere anführen kann.	0.781	0.761	0.790	A
	I have little interest in leading others.#	Ich habe nur wenig Interesse daran, andere zu führen.#	0.900	0.850	0.824	D
	I feel confident when directing the activities of others.	Ich fühle mich in meinem Element, wenn es darum geht, die Tätigkeiten anderer zu leiten.	0.871	0.858	0.883	A
	I make a good leader.	Ich bin ein guter Anführer.	0.873	0.867	0.894	C
	I am often the leader.	Ich bin oft der Anführer.	0.793	0.769		B
	I avoid positions with responsibility over others.#	Ich vermeide Positionen, in denen ich Verantwortung über andere habe.#	0.873	0.841		B
	I like to be in charge of others.	Ich mag es, für andere verantwortlich zu sein.	0.726			D
	I do not enjoy having authority over other people.#	Ich mag es nicht anderen übergeordnet zu sein.#	0.861			A

	When things need to be changed in the group, I step up and do it.	Falls sich etwas in meiner Gruppe ändern muss, nehme ich das in die Hand.	0.593	B
	Strong leadership.	Starke Führung.	0.793	C

Confirmatory factor analyses

To assess the model fit and compare fits of the final 10, 6 and 4 items scales (see Table 4.3.3) we additionally conducted three confirmatory factor analyses (CFA). For each CFA we specified that each item should only load on its respective latent variable (dominance, prestige, or leadership), that the first item-loading for each latent variable was restricted to 1 and that latent variables were allowed to correlate with each other. The assessment of whether a model is a good fit is often done by using cut-off values for single or several model fit indices, such as the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), standardised root mean squared residuals (SRMR), or the root mean squared error of approximation (RMSEA). Which values mark an acceptable model fit is still a matter of debate amongst scholars; several such values have been proposed. For example, some scholars proposed values of RMSEA < .08 as an indication of reasonable model fit (Browne & Cudeck, 1992; MacCallum, Browne, & Sugaware, 1996), or RMSEA < .08, CFI >.090 and TLI > .090 (van de Schoot, Lugtig, & Hox, 2012). Others recommended slightly stricter values such as RMSEA < .07 (Steiger, 2007) or a combination of RMSEA < .06 and SRMR < .09 (Hu & Bentler, 1999).

Whereas the model fit for the 10 and 4-item scale models were at the boundary of what most scholars suggested as cut off values for acceptable fit, the 6-item scale model seemed to fit better and in line with most of these cut off values (e.g., van de Schoot et al., 2012; see Table 4.3.4). Nonetheless, these fit indices have to be interpreted with caution for two reasons, and especially regarding the 10-item scales model. First, as the 10-item scales model contained 63 free parameters and we had only tested 400 participants, we were well below the recommended minimum sample size for reliable fit index estimates (i.e., 10 participants per free parameter; Schreiber, Nora, Stage, Barlow, & King, 2006). Second, by showing that strict cut-off values can be misleading (e.g., both can lead to over-rejection of true models and under-rejection of false models) as well as by discussing similar issues regarding reliability estimates, Marsh, Hau, and Wen (2004) advocated not solely relying on strict cut-off criteria when evaluating the validity of models. They argued that researchers should

also consider the model complexity (cut-off values become more conservative for more complex models) and interpretability of estimates. In our case all items were significantly positively related to their respective latent variable (z-values > 6.8) and the three factor solution provided a better fit than any two factor or one factor solution as well as matching the underlying theory. In summary, whereas the 10 and 4-item scales CFA model performed, at best, at the boundary of acceptable model fit, the 6-item scale model showed acceptable model fit under moderately strict cut-off values (van de Schoot et al., 2012). Thus, whereas the 6-item DoPL scales seem to be sufficiently valid, the 10 and 4-item DoPL scales appear to be a somewhat noisy measurement tools (i.e., there is a substantial amount of variance that is not explained by the three factors). Nonetheless, these findings should not be over-interpreted in light of potentially low reliability in estimates and there being a generally good match of model coefficients with the underlying three factor theory. The validity of the DoPL scales should further be assessed by their convergent and divergent validity when predicting relevant personality traits and other characteristics.

Table 4.3.4. Fit indices for final 10, 6 and 4 item versions of the DoPL scales with a total of 30, 18, and 12 items respectively (see Table 4.3.3).

Model: items per scale	Free parameters	CFI	TLI	RMSEA	SRMR
10-items	63	0.884	0.874	0.075	0.066
6-items	39	0.931	0.92	0.075	0.056
4-items	27	0.946	0.93	0.085	0.049

Preregistered correlations

To demonstrate convergent and divergent validity of the DoPL scales, we correlated them with a range of relevant personality traits and other characteristics (see Table 4.3.1 for preregistered hypotheses and Table 4.3.5 for results). The dominance motive correlated most highly and significantly with NARQ rivalry, r = .65, verbal aggression, r = .53, social dominance orientation, r = .38, anger, r = .35,

agreeableness, r = -.34, and pornography consumption, r = .25. The leadership motive correlated most highly with the number of leading positions in the last five years, r = .44, neuroticism, r = -.41, conscientiousness, r = .37, and altruism, r = .34. The prestige motive correlated highest with the fear of losing reputation, r = .58, and the fear of losing control, r = .37, the remaining correlations of the prestige motive were in the middle ground between the dominance and leadership motive. These observed correlations mostly corresponded to our hypotheses (see Table 4.3.5); however, we had predicted conscientiousness and altruism to correlate more highly with the prestige motive than the leadership motive. Moreover, contrary to our hypothesis, NARQ Admiration correlated equally highly and positively with all DoPL motives, r = .57-.58. Excluding 5 cases in which no clear prediction (marked with ? in Table 4.3.1) was made, 26 out of 52 correlations fell precisely in the preregistered predicted range (marked in bold in Table 4.3.5).

Table 4.3.5. Correlations between validation and DoPL scales in columns 1 to 3. Differences in correlations (marked with *) based on overlapping or non-overlapping 95% confidence intervals around r in columns 4 to 6. Checkmarks indicate correctly predicted sign and bold print the additional correctly predicted range of correlations.

	Dominance	Prestige	Leadership	D vs P	P vs L	D vs L
Dominance	1	0.42	0.53	-		-
Prestige	0.42	1	0.48	-	-	
Leadership	0.53	0.48	1		-	-
UMS power	0.71✓	0.62✓	**0.88**✓		*	*
UMS affiliation	0.35✓	**0.52**✓	0.57✓	*		*
UMS achievement	**0.27**✓	**0.54**✓	0.58✓	*		*
UMS intimacy	0	0.45✓	0.34	*		*
UMS fear of los. control	**0.22**✓	0.37	0.05		*	
UMS fear of los. reputation	0.19	**0.58**✓	0.24✓	*	*	
BFI agreeableness	**-0.34**✓	0.12	**0.12**✓	*		*
BFI extraversion	**0.25**✓	0.28✓	**0.53**✓		*	*
BFI neuroticism	**-0.12**✓	-0.03	-0.41✓		*	*
BFI openness	0.01	0.09	0.22			*
BFI conscientiousness	-0.02	**0.20**✓	0.37	*		*
NARQ admiration	0.57✓	**0.58**✓	0.58✓			
NARQ rivalry	0.65✓	0.31	0.17✓	*		*
Social dominance orient.	**0.38**✓	**0.05**✓	**0.15**✓	*		*
Verbal aggression	**0.53**✓	0.18	**0.22**✓	*		*
Anger	**0.35**✓	**0.09**✓	0.02	*		*
Altruism	0.06	0.17✓	**0.34**✓			*
Porn consumption	**0.25**✓	**0.01**✓	**0.01**✓	*		*
Number of leading positions	0.16✓	**0.26**✓	**0.44**✓		*	*

Correlations of > .15 are significant at p <.05; correlations of > .18 are significant at p <.01 after applying Bonferroni-Holm correction for multiple comparisons.

Furthermore, in additional exploratory analyses, we investigated whether we correctly predicted the sign of the correlation to account for slight distortions of correlation sizes due to the measurement tools' imperfect reliability. This somewhat weaker prediction was correct in 41 of 52 cases (marked with checkmarks in Table 4.3.5), which included 5 out 6 correlations for which we predicted a non-significant but descriptively positive relationship (marked as 0(+) in Table 4.3.1). When only considering the 35 correlations for which we had predicted significant relationships, 29 such correlations attained significance and showed a relationship in the predicted direction. Finally, to account for the shared variance among the three DoPL motives, we also conducted multiple regression analyses predicting all of the variables in the nomological network by the DoPL motives (see Table 4.3.6). These latter results were similar to the results of the preregistered correlations but provide additional information about shared variances and more subtle effects that only showed after a portion of the variance had been explained by another variable. For example, whereas the prestige motive was not significantly correlated with neuroticism, r = -.03, it was significantly positively related to neuroticism, b = .20, after controlling for influences of the dominance and leadership motives. In summary, exactly half of DoPL motives' correlations with relevant personality traits and characteristics fell precisely in the predicted preregistered range. Moreover, an additional third of correlations showed relationships in the predicted direction but outside the preregistered ranges. As 41 out of 52 correlations either precisely matched our prediction or showed a relationship in the predicted direction, we believe this provides first preliminary evidence for the divergent and convergent validity of the DoPL scales.

Table 4.3.6. Variables of the nomological network as simultaneously predicted by the DoPL motives in 17 independent linear regression analysis. For comparison reasons, all DVs and IVs were standardised. The model predicting number of leading positions (count data) is based on a quasi-Poisson distribution with log link function (intercept = -0.08; disperson parameter = 0.85). Only significant coefficients after Bonferroni correction (cut-off value: $p = .0029$) are displayed.

	Dominance	Prestige	Leadership	Adj.R^2
UMS power	0.29	0.20	0.64	.89
UMS affiliation		0.31	0.42	.40
UMS achievement	-0.14	0.37	0.47	.44
UMS intimacy	-0.36	0.44	0.32	.30
UMS fear of los. control		0.41	-0.24	.17
UMS fear of los. reputation		0.62		.34
BFI agreeableness	-0.60	0.21	0.34	.26
BFI extraversion			0.54	.28
BFI neuroticism		0.20	-0.55	.20
BFI openness			0.28	.05
BFI conscientiousness	-0.31		0.49	.20
NARQ admiration	0.29	0.33	0.27	.51
NARQ rivalry	0.74	0.14	-0.29	.47
Social dominance orient.	0.45			.15
Verbal aggression	0.58			.28
Anger	0.47		-0.23	.15
Altruism	-0.18		0.41	.13
Porn consumption	0.36			.08
Number of leading positions			0.46	.18[6]

4.3.4 Discussion

In this study we replicated the three-factor structure in the final versions of the DoPL scales, which included either 10, 6 or 4 items per scale. Moreover, whereas as the 6-item scales provided the best model fit in a CFA, the 10 and 4-item scales were at the boundary of what is regarded as acceptable model fit. Nonetheless, questionnaire items loaded highly with no substantial cross-loadings on their respective theoretical factors and all scales showed high internal consistency. Moreover, we could provide first evidence for the DoPL scales' divergent and convergent validity by placing them in their nomological network (Cronbach & Meehl, 1955). For this, we correlated the DoPL scales with a range of relevant personality traits and other characteristics for which we had preregistered hypotheses in line with our theory of these motives. Half these correlations fell precisely in our predicted preregistered range, for about four out of five we at least predicted the correct sign of the correlation. For example, out of the three DoPL motives, the dominance motive was the only motive negatively related to agreeableness and most strongly positively related to self-reported verbal anger, aggression, social dominance orientation, pornography consumption, and the rivalry component of narcissism. In line with our predictions, the leadership motive was most strongly positively related to the amount of leadership positions participants held in the last five years and negatively related to neuroticism. The prestige motive showed the predicted highest correlation with the fear of losing reputation and was, as predicted, significantly positively related to extraversion, conscientiousness, and self-reported prosocial behaviour. Moreover, it fell in the predicted middle position between dominance and leadership regarding social dominance orientation and the amount of leadership positions in the last five years. Interestingly, we predicted the highest relationship of the prestige motive with self-reported prosocial behaviour on the basis of a theoretically high association between the two (Bischof, 2008; Henrich & Gil-White, 2001); however, the descriptively highest relationship was between the leadership motive and prosocial behaviour. Post-hoc, this also makes sense as the leadership motive is concerned

[6] Calculated with the rsq function in R's (R Core Team, 2017) *rsq* package (Zhang, 2017, Version 1.0).

with taking responsibility and taking action. All of the three DoPL motives correlated highly and to the same extent with the admiration component of narcissism (Back et al., 2013). As this personality trait is concerned with "showing off", it is not surprising that it equally relates to prestige and dominance desires - showing off is a way of forcing others' admiration. Nonetheless, we were surprised by the high association with the leadership motive.

Finally, the relationships among DoPL motives and between the DoPL and other motives such as achievement, affiliation, and intimacy were mostly moderately high (except between dominance and intimacy) which might be explained by the same underlying approach element (i.e., the hope to gain something) in all of these motives (Elliot & Thrash, 2002; Schönbrodt & Gerstenberg, 2012). All DoPL motives correlated highly with the UMS power motive (Schönbrodt & Gerstenberg, 2012) with the leadership motive showing the strongest correlation (r = .88), likely to be explained by the focus on leadership in the UMS power scale. In summary, the DoPL motives correlated differently and, for the most part, in line with the underlying theory with a range of personality traits and other relevant characteristics, which provides first evidence of the scales' divergent and convergent validity.

4.4 Study 3

4.4.1 Introduction

As the DoPL scales were created in the framework of motivational psychology and especially in relation to the power motive (Heckhausen & Heckhausen, 2008; Winter, 1973), we wanted to investigate whether the final DoPL scales indeed constitute components of existing questionnaires for the power motive. We selected two established questionnaire scales measuring the explicit power motive: the power scale in the Unified Motive Scales (UMS power; Schönbrodt & Gerstenberg, 2012) and the dominance scale in the Personality Research Form (PRF dominance; Jackson, 1984). The UMS power is a relatively new scale which has been carefully crafted by selecting the best items out of a range of other explicit power motive scales. The PRF dominance is arguably the oldest, most widely used scale to measure the explicit power motive or dominance motive. Interestingly, the definition of PRF dominance does not include prestige aspects but this is captured by a related concept in a separate scale called "social recognition" (PRF social recognition). This scale is similarly defined as status/prestige (cf. Henrich & Gil-White, 2001; Magee & Galinsky, 2008) as it describes "concerns about reputation" (Jackson, 1984, p. 7) but unlike status/prestige it is partly comprised of wanting to conform to societal norms, for example, by "behaving appropriately" (Jackson, 1984, p. 7). We were interested in both first order correlations between these three scales and the DoPL scales as well as in the unique and shared variance among the DoPL scales when predicting the two explicit power motive scales. As the item content of both the UMS power and the PRF dominance scale seemed to be mostly centred on leadership (despite their labels), we hypothesised most of the variance (shared and unique) to be explained by the DoPL leadership scale.

4.4.2 Method

Participants

We collected data from 264 participants via the online website www.profilic.ac who were reimbursed 1 GBP base-rate payment plus winnings from a set of dictator games (see Chapter 6). There were no restrictions regarding who could take part in this study. However, most participants on prolific.ac are either US or UK citizens. The sample size was determined by a power analysis for effects in these dictator games. We excluded data from 14 participants for incorrectly answering our attention checking question "It is better to do good than to do bad", hence our analysis is based on 250 participants (139 males; M_{age} = 29.88, SD_{age} = 10.62).

Material & Procedure

After providing demographic information, participants filled in a questionnaire consisting of intermingled 10 item version of the DoPL scales (see Table 4.3.3), UMS power, UMS affiliation, UMS intimacy, and UMS achievement (Schönbrodt & Gerstenberg, 2012), PRF dominance and PRF social recognition[7] (Jackson, 1984). After that participants played four rounds of a dictator game (these results are reported in Chapter 6) and were then fully debriefed.

4.4.3 Results

Table 4.4.1 shows correlations between DoPL dominance (DoPL-dom), DoPL prestige (DoPL-pres), DoPL leadership (DoPL-lead), UMS power, PRF dominance, and PRF social recognition. As previously found, all DoPL motives correlated moderately with each other, r = .39 to r = .47, and highly with UMS power, r = .58 to r = .85. Whereas DoPL-lead correlated very highly with PRF dominance, r = .89, PRF dominance did not correlate as highly with DoPL-dom, r = .54, and DoPL-pres, r = .40. As expected PRF social recognition correlated highly with the related DoPL-

[7] We did not collect data on the outdated item "I don't try to 'keep up with the Joneses' ".

pres scale, r = .67, but showed only small to moderate correlations with all the other scales, DoPL-dom, r = .25, and DoPL-lead, r = .38.

Table 4.4.1. Correlation matrix of DoPL motives, two measures for explicit power motive (UMS power & PRF dominance) as well as PRF social recognition (PRF soc-reg).

	DoPL-dom	DoPL-pres	DoPL-lead	UMS power	PRF dominance	PRF soc-reg
DoPL-dom	[.87]	0.39	0.47	0.69	0.54	0.25
DoPL-pres		[.82]	0.44	0.58	0.40	0.67
DoPL-lead			[.92]	0.85	0.89	0.25
UMS power				[.90]	0.83	0.38
PRF dominance					[.88]	0.25
PRF soc-reg						[.82]

All correlations are significant at $p < .01$ after correcting for multiple comparisons with Bonferroni-Holm correction. Cronbach's α in brackets on diagonal.

To investigate how much variance the DoPL motives shared with the two established power motive scales UMS power and PRF dominance, we conducted two commonality analyses using R's *yhat* package (Nimon, Lewis, Kane, & Haynes, 2008; see Table 4.4.2 & Table 4.4.3). The DoPL motives explained 85% of the variance in UMS power and 82% in PRF dominance. Of this explained variance, DoPL-lead was the biggest contributor of both unique and shared variance (i.e., shared with other DoPL scales) for both UMS power and PRF dominance. However, whereas DoPL-dom and DoPL-pres had a sizeable unique contribution to explaining the variance in UMS power, their contribution to explaining the variance in PRF dominance was almost entirely shared with the respective other DoPL scales.

Table 4.4.2. Explained variance and commonality analysis of UMS power with the DoPL scales.

UMS power		
DoPL Overall R^2	85.36	
	Unique Variance	Total Variance
DoPL-dom	8%	39%
DoPL-pres	3%	34%
DoPL-lead	27%	72%

Table 4.4.3. Explained variance and commonality analysis of PRF dominance with the DoPL scales.

PRF dominance		
DoPL Overall R^2	81.92	
	Unique Variance	Total Variance
DoPL-dom	2%	29%
DoPL-pres	0%	16%
DoPL-lead	49%	80%

Note: "Unique Variance" shows the unique contribution of each DoPL scale, "Total Variance" shows the variance this scale explains including both unique and shared contributions. The shared contribution can be calculated by subtracting the unique variance from the total variance explained. For example, in the case of PRF dominance, DoPL-lead explains 80% of R^2, of which 49% are unique to DoPL-lead and 31% (80% - 49%) are shared with the other DoPL scales.

4.4.4 Discussion

To investigate whether the DoPL scales represent constituent parts of existing power motive scales, we tested their relationship with the UMS power (Schönbrodt & Gerstenberg, 2012) and the PRF dominance (Jackson, 1984) scales. Correlations between the DoPL scales and both explicit power motive scales were moderate to

very high, r = .40-.89, with DoPL-lead showing the highest correlations. This was corroborated by a subsequent commonality analysis which showed that DoPL-lead provided the most shared and unique variance in both explicit power motive scales. Notably, whereas DoPL-pres and DoPL-dom had sizeable amounts of shared and some unique variance in UMS power, their amount of shared variance in PRF dominance was much smaller as well as DoPL-pres providing 0% unique variance and DoPL-dom only 2% unique variance. Importantly, the DoPL scales explained 85% and 82% in the UMS power and PRF dominance scales, respectively. This shows that the DoPL scales indeed represent constituent components of the explicit power motive with DoPL-lead being by far the most influential component.

The strong relationship with DoPL-lead and the two power motive scales is not surprising since, at face-value, many of the power motive scales' items are concerned with leadership (e.g., "I feel confident when directing the activities of others" or "I have little interest in leading others" reverse scored). The small relationship between PRF dominance and DoPL-pres is also unsurprising as prestige or status aspects are not covered in PRF dominance's definition, but in the definition of a separate scale, PRF social recognition. This latter scale correlated highly, r = .67, with DoPL-pres and little to moderately with DoPL-dom and DoPL-lead. Nonetheless, even though this correlation was high, it explains only 45% of the variance in both variables, which in turn indicates that DoPL-pres and PRF social recognition have some differences after all. One of these differences might be that the PRF social recognition scale includes items aimed at social acceptance (e.g., "I will not go out of my way to behave in an approved manner." reverse scored), which seem to be more related to fitting in than with actively gaining others' respect and admiration. Somewhat counter-intuitively, the relationship between DoPL-dom and PRF dominance was only at r = .54, which is likely rooted in different definitions of dominance. Whereas PRF dominance focuses more on forceful leadership, DoPL-dom, in line with Henrich and Gil-White (2001), focuses more on coerced submission mostly through threat and fear.

Overall the UMS power scale seems to measure the explicit power motive more broadly than PRF dominance especially when it comes to the prestige or status

aspects. As most of the variance in the UMS power and the PRF dominance scales can be explained by the DoPL scales, we conclude that these scales indeed measure distinct components of the explicit power motive.

4.5 General discussion

In the previous chapter (Chapter 3), we found that three factors provided the clearest picture to a set of questionnaire items, which were mostly taken from various questionnaires measuring the power motive and selected as a result of matching a broad definition of the two kinds of hierarchies. In this chapter, we expanded on these three factors, which we defined as the desire to coerce others into adhering to one's will (dominance motive), the desire to attain respect and admiration for one's skills and knowledge (prestige motive), and the desire to direct others and take responsibility in and for one's group (leadership motive). In two EFAs (Study 1 & 2), we explored the factor structure in a large pool of questionnaire items based on our definitions of the dominance, prestige, and leadership (DoPL) motives. A three-factor structure with most items loading on their theoretical factor provided the best solution. To create scales to measure the DoPL motives, we selected the best 10 items for each motive on the basis of these EFAs, but also created short scales with 6 and 4 items per motive. The model fit of these scales was mostly acceptable and we could provide first evidence for the scales' divergent and convergent validity by showing the scales' place in the relevant nomological network (Study 2). In Study 3, we could show that the DoPL scales represented constituent parts of two established scales that measure the explicit power motive, UMS power (Schönbrodt & Gerstenberg, 2012), and PRF dominance (Jackson, 1984).

Given the multitude of theories underlying this research and several resulting scales, researchers might puzzle over which scales to use in which context. Generally, the 6-item short scales for each DoPL motive should suffice for most applications as the DoPL motives are fairly narrowly defined and the 6-item scales still show a high internal consistency (see Table 4.3.2). In case researchers want to use the 10-item scales, we recommend intermingling the DoPL scales with UMS (Schönbrodt &

Gerstenberg, 2012) or related scales to prevent habituation to seemingly similar items. If researchers are strict proponents of the dominance vs prestige approach, or the power vs status approach, then just using the dominance and prestige scale, or the leadership and prestige scale, respectively, would be legitimate. Nonetheless, in both cases researchers would benefit from controlling for the respective missing component to arrive at a purer influence of dominance and leadership as well as prestige. Note though, as all DoPL motives are moderately correlated, this does come with the drawback of decreased statistical power. In other words, if all three DoPL motives are assessed researchers need bigger sample sizes. Finally, researchers interested in the explicit power motive would also benefit from using all three DoPL motives to distinguish between different aspects of the heterogeneously defined power motive (Winter, 1988).

As conceptualising a functionally autonomous leadership motive (cf. Allport, 1937) on the basis of an evolutionary account of leadership (Van Vugt, 2006) is a novel approach, this set of studies is the first step towards theoretically and empirically validating this motive. Van Vugt (2006) proposed several evolved leadership traits which can be categorised into initiative taking and directing others. Regarding initiative taking we found that extraversion was strongly positively related to the leadership motive (r = .53). Moreover, self-reported altruism (Penner et al., 1995) showed a moderately strong relationship with the leadership motive (r = .34), which could be regarded as taking and signalling responsibility for and to one's wider group (e.g., "I have offered to help a handicapped or elderly stranger across a street."). Regarding directing others, two findings might serve as a proxy for the competence variable assumed by Van Vugt (2006). Leadership correlated highly (r = .58) with the achievement motive (a desire to improve one's skill; Schönbrodt & Gerstenberg (2012) as well as moderately high (r = .37) with conscientiousness (a personality trait related to competence and dutifulness; Rammstedt & John, 2007). Originally, we had not made a hypothesis regarding this latter relationship; however, post-hoc it seems to match with our conceptualisation of leadership. Nonetheless, further empirical studies are necessary to confirm more of the assumptions we made regarding the leadership motive. For example, if directing others and taking responsibility is at the core of leadership, then a leadership motive representing this core should be

positively related to attaining leadership positions in a wide range of professions and among social groups (see Chapter 5). Moreover, to show that the dominance, prestige, and leadership desires are indeed distinct desires to attain influence, it is important to provide further studies showing their discriminant validity (Chapters 5 to 7). Further limitations will be discussed in Chapter 10.

5 Chapter 5: Peculiarities of the leadership and prestige motives

5.1 Introduction

In this study we wanted to extend our initial validation efforts by showing that the leadership motive is positively related to employment ranks across a wide range of professions. Moreover, we were interested in two peculiarities of the leadership and the prestige motive. In particular, we wanted to investigate whether there are gender differences in how the leadership motives predicts individuals' rank position in a company and whether the prestige motive would be positively related to higher levels of moral concerns.

5.1.1 Leadership motive & employment rank

Despite concerted efforts women are still underrepresented in higher leadership positions (Joy, 2008), even in egalitarian countries such as the United Kingdom (UK). For example, in 2016 in the UK women constituted about 46% of the workforce, however, men held about twice as many legislator, senior official, and manager positions than women (World Economic Forum, 2016). Two broad explanations have been proposed for this gender disparity, a) explanations based on discrimination against women, and b) explanations based on personality differences between genders. For example, stereotypes of how women ought to be (e.g., nice, caring) have been shown to contradict stereotypical attributes leaders ought to possess (e.g., decisive, dominant). In cases where women showed these stereotypical leader attributes, they earned disapproval due to the apparent role-incongruence (Eagly & Karau, 2002; Heilman & Eagly, 2008). Moreover, women seem to be held to stricter performance standards than men when it comes to promotions (Lyness & Heilman, 2006). However, alternative but complimentary explanations hold that differences in leadership positions might arise from mean personality differences such as that women have a lower power motivation (i.e., the desire to have influence on others; Winter, 1988) and generally regard achieving leadership roles as a less

important goal than men do (Gino, Wilmuth, & Brooks, 2015; Schuh, Hernandez, Frieg, & Dick, 2014). In summary, women in leadership positions are still under-represented even in egalitarian countries such as the UK. Scholars offered two kinds of explanation for this pertaining to either discrimination (e.g., women are held to higher performance standards) or individual differences (e.g., women have less desire for influence).

In Chapter 4 we argued that the desire to take responsibility and direct others evolved to become a functionally autonomous motive, the leadership motive. As individuals strive to satisfy their motives a higher leadership motive should be positively related to a higher leadership position/employment rank across a wide range of professions (hypothesis 1). However, if female leaders were indeed discriminated against, then these positions would be more difficult to attain for women, suggesting that women must compensate by being more highly motivated to actually achieve these positions. Thus, we predict a stronger relationship between the leadership motive and employment rank for women than for men (hypothesis 2). As higher leadership positions arguably provide more means of influencing others against their will (i.e., dominance incentive) and potentially elicits more respect from one's subordinates (i.e., prestige incentive) both the dominance and the prestige motive, respectively, should also show a positive relationship with employment rank (hypothesis 3 & 4). Nonetheless, these relationships are less straight forward than the one between leadership motive and employment rank and might thus be too subtle to be detected in this analysis. Following the idea of mean personality differences we predict higher mean leadership scores in men than women (hypothesis 5).

5.1.2 Prestige motive & moral concerns

Prestige is defined as the respect and admiration a person receives for having, or perceived to have, advanced skills and knowledge in a valued domain (e.g., Henrich & Gil-White, 2001; Cheng & Tracy, 2014; Magee & Galinsky, 2008). Historically these domains would have included hunting, combat, or healing (Henrich & Gil-White, 2001), although arguably still present, more modern ways to accrue prestige might be, for example, showing excellent skills in sports (Cheng et al., 2010) or

through academic success. In this study we focus on morality as a prestige-promoting valued domain (Cheng & Tracy, 2014). Morals provide a code of conduct or heuristics likely mainly developed through cultural evolution (i.e., cultural changes of belief over time) but also to some extent through biological evolution (Alexander, 2007; Baumard, André, & Sperber, 2013). When followed, sets of mutually agreed morals in a group/society are beneficial, as many morals relate to issues aiding to the maintenance and survival of this group (i.e., prohibitions to kill or steal; Alexander, 2007). Moreover, similar to hierarchies, as argued in Chapter 2, morals provide stability by increasing the predictability of others behaviour (e.g., trusting that most other people would not try to kill another person). Given the benefits groups/societies attain from sets of morals it seems plausible to assume that these groups would value (i.e., by paying them respect/grant prestige) members, which promote higher morals either through their behaviour (e.g., prosocial behaviour; Cheng & Tracy, 2014; this assertion will be followed up in Chapter 7) or maybe even just by spreading these moral ideas (e.g., a priest).

Of course, the extent to which something is morally right or wrong or what is a moral issue at all involves subjectivity and indeed different societies and groups assign different weight to different moral issues. In order to give structure to these different moral issues, researchers proposed the moral foundation theory (MFT; Graham et al., 2011; Haidt & Graham, 2007; Shweder, Much, Mahapatra, & Park, 1997), which clusters moral concerns along five domains of harm/care, fairness/reciprocity, in-group/loyalty, authority/respect, and purity/sanctity. In order to test this theory, Graham and colleagues (2011) developed a questionnaire measuring these five moral domains (Moral Foundation Questionnaire; MFQ) and showed that the five moral domains could be found and statistically distinguished across populations in several countries or regions such as the US, Canada, UK, East Asia & the Middle East. As anticipated, research showed that groups as well as cultures differed in their endorsement of these five moral domains. For example, whereas conservative voters in the US were more concerned with moral issues regarding in-group/loyalty, authority/respect, and purity/sanctity, democratic voters were more concerned with moral issues regarding harm/care and fairness/reciprocity (Graham et al., 2011). Eastern cultures seemed to be more concerned with moral issues regarding in-

group/loyalty and purity/sanctity than Western cultures (Graham et al., 2011; Graham, Meindl, Beall, Johnson, & Zhang, 2016). Notably though, when investigating which kind of moral problems people in the US and Canada encounter on a daily basis, Hofmann, Wisneski, Brandt, and Skitka (2014) found that moral issues regarding harm/care were by far the most prominent (50% of reported moral events) independent of political ideology and religiosity.

In summary, morality seems beneficial for societies and groups, hence, people acting in line with these morals and/or promoting them help their group and are likely to be rewarded with the group's respect and admiration in return. As this reward represents strong incentives valued by prestige motivated people, we predicted the prestige motive to be positively related to higher endorsement of moral concerns. Nonetheless, moral concerns can be structured across five moral domains which are differently valued across different groups. Assuming a spread of participants from different social groups (e.g., conservative vs liberal voters, older vs. younger participants, men vs women) through random sampling, we predicted a positive relationship in all five moral domains (hypothesis 6). We made no *a priori* predictions regarding the dominance and leadership motives.

5.2 Method

Participants

Participants for the analyses in this study came from three independent samples (sample A, B & C) totalling n = 935 participants (see Table 5.1 for individual sample sizes, age, and gender information). Sample A was collected through contacting individuals via email in the US, which were employed in professions such as Finance, Law, the Armed Forces, and Education.[8] Sample B was collected through the online platform www.profilic.ac restricted to individuals living in Great Britain and being in any type of full-time employment (e.g., sales assistant, manager, lecturer, accountant). This was the same sample as described in Chapter 7. Sample C

consisted of students from various degrees (e.g., politics, linguistics, English literature) at the University of Edinburgh. Whereas sample A's participation was not reimbursed, sample B's participants were reimbursed with 1.20 GBP and sample C's participants with 4 GBP for their participation.

Table 5.1. Demographic information for the three independent samples in this study.

Sample	*n*	Male/Female	M_{age}	SD_{age}
Sample A	274	190/84	36-45[9]	-
Sample B	550	250/300	36.69	10.00
Sample C	111	39/72	22.57	3.49

Procedure & Material

Employment rank, moral foundations and the DoPL motives were measured by questionnaires embedded in studies focussing on different research questions (sample A: the relationship between power and moral disengagement; sample B: the relationship between the DoPL motives and charitable giving; sample C: differences in implicit motives scores for dominance and prestige), which, with the exception of sample B (Chapter 7), will not be reported in this thesis. Any experimental manipulation in these studies was performed after questionnaire data had been obtained.

Employment rank was assessed by the number of yes answers of 11 yes-or-no questions regarding a person's influence in their company (Odey, 2016; see Table 5.2). Concerns regarding the five moral foundations were collected by the 30-item MFQ (Graham et al., 2011) with 6 items per moral foundation (e.g., "Compassion for those who suffer is the most crucial virtue." for the harm/care foundation). The DoPL motives were assessed by the 10-item DoPL scales in sample A and sample C and

[8] This sample was collected by F. Odey in his Bachelor thesis supervised by A. Moore (Odey, 2016). The analysis reported here is based on original hypotheses not reported in Odey's Bachelor thesis.
[9] This represents the median age bracket, as age was only assessed in age brackets of ten years. *SD* could not be calculated.

the 6-item DoPL scales in sample B. MFQ items and DoPL items were standardised within their respective sample.

Table 5.2. Eleven yes-or-no questions to measure individual's employment rank in a company (Odey, 2016).

#	Question
1	Are you an active member or employee of an organisation, corporation or society?
2	Do you hold responsibility over others within the organisation?
3	Do you have people reporting to you within the organisation?
4	Do you have direct influence over decisions being made by the part of the organisation that you work in?
5	Do you personally have responsibility for assessing the work of those reporting to you?
6	Do you personally make decisions about the promotion or hiring of others within the organisation?
7	Do you have direct influence over decisions being made by the organisation as a whole?
8	Do those that report to you have people working for them?
9	Do you have the final say on decisions being made?
10	Do your decisions influence the broad direction the organisation takes?
11	Do you hold the position of CEO, CIO, CFO, COO or any managing director or executive position?

Analysis strategy

Employment rank data came from samples A & B, moral foundations data came from all three samples. As employment rank represented count data, we initially conducted a multilevel model on the basis of a poisson distribution with by-sample random intercepts and by-sample random slopes for the DoPL motives, effect coded gender and the interaction between gender and the leadership motive. However, due to overdispersion of the poisson distribution we tried to fit models with the same random effect structure based on a quasipoisson and a negative binomial distribution. Neither of these two models converged, even when restricting random effect correlations to 0, which is recommended in case of non-convergence (Barr, Levy,

Scheepers, & Tily, 2013). Hence, we report separate generalised linear models based on a quasipoisson distribution for each sample A and sample B. Moral foundations were predicted by the DoPL motives in separate linear multilevel models with by-sample random intercepts and by-sample random slopes for all DoPL motives. Due to initial non-convergence of these models we restricted random effect correlations to 0 (Barr et al., 2013). All analyses were conducted with the statistical analysis programme R (R Core Team, 2017), utilising its base packages for the generalised linear models and the *lme4* package for all multilevel models (Bates, Maechler, Bolker, & Walker, 2016, version 1.1-12).

5.3 Results

5.3.1 Employment rank

We first conducted three Welch t-tests on the pooled samples A & B to test whether there were significant gender differences in the DoPL motives (see Table 5.3). Whereas men were marginal significantly higher in the leadership than women, $t(782.02) = -1.93$, $p = .05$, they were significantly higher in the dominance motive, $t(808.44) = -2.95$, $p = < .01$, and significantly lower in the prestige motive, $t(819.73) = 2.74$, $p < .01$. Thus, given this result we can neither affirmatively confirm nor disconfirm that men have a higher leadership motive than women (hypothesis 5). Whether this difference can be reliably found and whether its small size affects any outcomes in a meaningful different way awaits further investigation.

Table 5.3. Welch *t*-tests comparing mean DoPL motive scores across both male and female participants in pooled samples for sample A & B.

Motive	*t*	*p*	Cohen's *d*
Dominance	-2.95	< .01	.21
Prestige	2.74	< .01	.19
Leadership	-1.93	.05	.14

Across both samples A & B, the main effect of the leadership motive on employment rank was significant, $b_{A/B}$ = 0.33/0.39, $SE_{A/B}$ = 0.04/0.04, $t_{A/B}$ = 7.45/10.91, $p_{A/B}$ = <.01/<.01, indicating a positive relationship between a person's desire to lead and their position in a company (hypothesis 1). However, this main effect was qualified by a significant interaction of the leadership motive with gender in sample A, b = 0.41, SE = 0.09, t = 4.70, p = <.01, but not in sample B, b = 0.09, SE = 0.07, t = 1.44, p = .15 (see Figure 5.1). Hence, whereas the desire to lead seemed to be more strongly related to women's employment rank than to men's in sample A this was only descriptively the case in sample B (hypothesis 2). In both samples men reported to have higher employment ranks than women, $b_{A/B}$ = -0.41/-0.16, $SE_{A/B}$ = 0.09/0.07, $t_{A/B}$ = -4.68/-2.39, $p_{A/B}$ = <.01/.02. Moreover, in both samples the dominance motive, ps > .16, and the prestige motive, ps > .16, were unrelated to the employment rank (see Table 5.4; hypothesis 3 & 4). In summary, as predicted men held higher employment positions than women. Both men's and women's employment ranks were positively related to their leadership motives. Whereas in sample A this relationship was stronger for women than men, this could not be replicated in sample B. Hence, there is some evidence for this interaction but it awaits further replication.

Table 5.4. Quasipoisson linear regression models for sample A & B with log link function predicting employment rank from standardised DoPL motives, effect coded gender variable (men = -.5; women = .5) and the interaction between the leadership motive and gender. Dispersion parameters were 1.54 and 2.12, respectively.

	Sample A				Sample B			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	1.73	0.04	40.63	<.01	1.38	0.03	42.40	<.01
Dominance	-0.05	0.04	-1.40	.16	0.02	0.03	0.69	.49
Prestige	-0.05	0.04	-1.41	.16	-0.04	0.03	-1.17	.24
Leadership	0.33	0.04	7.45	<.01	0.39	0.04	10.91	<.01
Gender	-0.41	0.09	-4.68	<.01	-0.16	0.07	-2.39	.02
Leadership*gender	0.41	0.09	4.70	<.01	0.09	0.07	1.44	.15

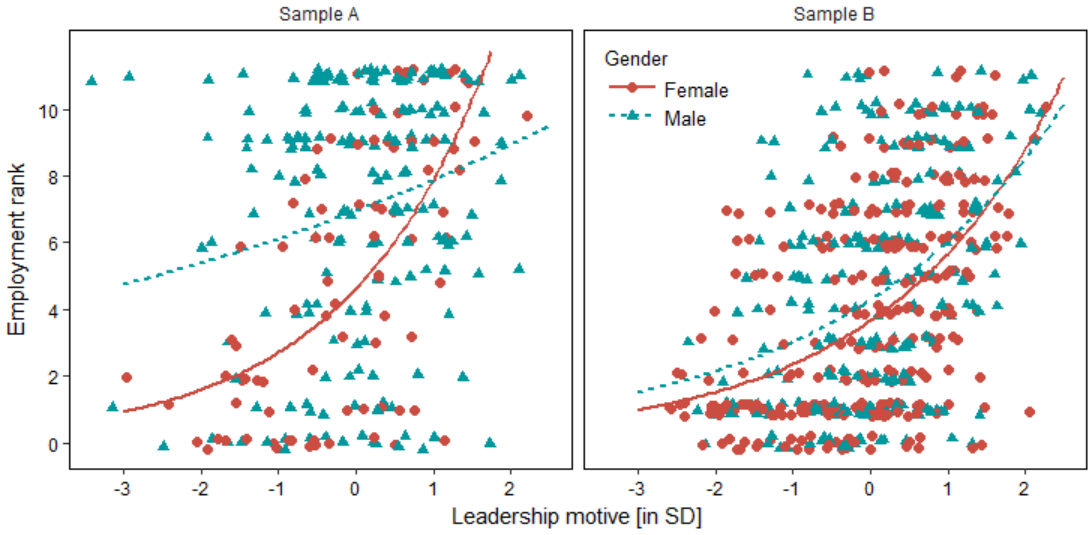

Figure 5.1. Employment rank plotted in relationship with the leadership motive for women and men in sample A and sample B. Best fitting lines based on model coefficients in Table 5.4 given average scores for dominance and prestige motives. Data jittered for better visualisation.

5.3.2 Moral foundations

Across our three samples the prestige motive was significantly positively related to higher moral concerns regarding harm/care, b = 0.21, SE = 0.03, t = 6.03, authority/respect, b = 0.19, SE = 0.03, t = 5.44, and purity/sanctity, b = 0.14, SE = 0.04, t = 3.84. Although descriptively positive, the relationships between the prestige motive and moral concerns regarding fairness/reciprocity and in-group/loyalty did not attain significance (ts < 1.15). The dominance motive was significantly negatively related to moral concerns regarding harm/care, b = -0.27, SE = 0.06, t = -4.71, and fairness/reciprocity, b = -0.15, SE = 0.04, t = -4.28, as well as marginal significantly positively related to moral concerns regarding in-group/loyalty, b = 0.11, SE = 0.06, t = 1.72. The leadership motive was significant negatively related to moral concerns for harm/care, b =- 0.08, SE = 0.03, t = -2.36, and significant positively related to moral concerns for in-group/loyalty, b = 0.12, SE = 0.03, t = 3.47, authority/respect, b = .13, SE = 0.03, t = 3.71, and purity/sanctity, b = .10, SE = 0.03, t = 2.97 (see Table 5.5). Adding gender in interaction with the leadership motives into the 5 models yielded no significant interactions. In summary, as

predicted (hypothesis 6) the prestige motive was positively significantly related to 3 (harm/care; authority/respect; purity/sanctity) out of 5 moral foundations, however, only showed descriptive positive relationships with the other 2 (fairness/reciprocity; in-group/loyalty). In an additional analysis we found that whereas the dominance motive was negatively significantly related to 2 (harm/care; fairness/reciprocity) out 5 moral foundations, the leadership motive was negatively related to 1 moral foundation (harm/care) and positively related to 3 moral foundations (in-group/loyalty; authority/respect; purity/sanctity).

Table 5.5. Moral foundations predicted by standardised DoPL motives across samples A, B, & C in linear multilevel models with by-sample random intercepts and by-sample random slopes for the DoPL motives. As moral foundations were standardised within each sample all intercepts were 0 with *p*s < .01 and thus omitted in this table.

Moral foundation	Predictor	*b*	*SE*	*t*	
Harm/care					
	Dominance	-0.27	0.06	-4.71	**
	Prestige	0.21	0.03	6.03	**
	Leadership	-0.08	0.03	-2.36	*
Fairness/Reciprocity					
	Dominance	-0.15	0.04	-4.28	**
	Prestige	0.10	0.09	1.14	
	Leadership	-0.05	0.03	-1.47	
In-group/Loyalty					
	Dominance	0.11	0.06	1.72	.
	Prestige	0.08	0.07	1.15	
	Leadership	0.12	0.03	3.47	**
Authority/Respect					
	Dominance	0.05	0.03	1.59	
	Prestige	0.19	0.03	5.44	**
	Leadership	0.13	0.03	3.71	**
Purity/Sanctity					
	Dominance	0.00	0.06	0.06	
	Prestige	0.14	0.04	3.84	**
	Leadership	0.10	0.03	2.97	**

Note that the lmer function in R's *lme4* package does not provide *p*-values, however, based on the assumption that a *t*-distribution with df > 30 is approximately normally distributed $t > |1.96|$ corresponds to $p < .05$ (*); $t > |2.58|$ corresponds to $p < .01$ (**); $t > |1.65|$ corresponds to $p < .10$ (.).

5.4 Discussion

In this study we were interested in two separate research questions a) the relationship between the leadership motive and employment ranks in a company particularly when taking into account gender differences and b) the relationship between the prestige motive and endorsing moral concerns. In line with our predictions for the first research question we found that the leadership motive was strongly related to both women's and men's employment ranks across two independent samples. In other words, participants with higher leadership desires tended to have more people working under them and more influence on final decisions than participants with lower leadership desires. In line with the notion that female employees might be at a disadvantage for attaining higher leadership positions (e.g., Eagly & Karau, 2002; Heilman & Eagly, 2008; Lyness & Heilman, 2006), we assumed they needed to compensate for this with a higher motivation to attain these positions (i.e., a higher leadership motive); hence assuming a stronger relationship between the leadership motive and employment rank in women than in men. This hypothesis was confirmed in the first sample but could not be replicated in the second. Hence, although there seems to be some evidence for this gender difference, further research is necessary to answer this research question. It is possible that different results in the two samples are based on national idiosyncrasies as the first sample was collected in the US whereas the second was collected in the UK. For example, it may be that women aspiring to lead experience more discrimination in the US than in the UK. In line with this assertion we found that, although generally men ranked significantly higher in their employment position in both samples, this effect was larger in the US sample as compared to the UK sample. Nonetheless, based on a recent survey, at least in legislator, senior official, and manager positions the US have a more balanced gender ratio than the UK (World Economic Forum, 2016). Thus, it remains an open question.

Schuh and colleagues (2014) found that differences in power motivation explained some of the differences in holding leadership positions across genders. As the DoPL motives represent subcomponents of the power motive a more fine grained analysis was possible here, however, whereas we found mean differences in dominance and

prestige motives, these motives did not predict employment rank. The difference between men and women in the leadership motive was only marginally significant and whereas Schuh and colleagues found effect sizes from *d* =.34 to .60, the difference in the leadership motive in this study was only *d* = .14. Thus, although not explicitly tested here, it seems unlikely that mean differences in the leadership motive for both genders explained mean differences in employment ranks.

Regarding the second research question, we had predicted that the prestige motive would be positively related to endorsing moral concerns as this was proposed to be a highly valued domain and would thus provide a person with other's respect and admiration (e.g., Cheng & Tracy, 2014). In line with this hypothesis we found that, on average across three independent samples, the prestige motive was positively related to 3 out of 5 moral foundations (i.e., moral concerns for harm/care, authority/respect, and purity/sanctity) but not significantly to the remaining two foundations (fairness/reciprocity, in-group loyalty). As it is not possible to distinguish whether a non-significant finding is due to a true null effect or insufficient power, these findings do not necessarily contradict our hypothesis, especially taking into account that both non-significant effects pointed towards our predicted direction. Nonetheless, as the combined sample size of this study was $n > 900$ the effect sizes of the non-significant moral foundations would have to be rather small, maybe negligible, if the effect indeed existed. Note though, at least in Western cultures, about 50% of moral events are concerned with issues of harm and care (Hofmann et al., 2014), thus, showing high moral concerns in this domain is arguably most important to gain prestige; the prestige motive was indeed highly positively related to the harm/care moral foundation. We had made no predictions regarding the relationship between moral concerns and the dominance and leadership motive, which showed negative (in case of the dominance motive) as well as positive and negative (in case of the leadership motive) relationships with some of the moral foundations. However, a discussion of these exploratory findings goes beyond the scope of this doctoral thesis.

It is important to point out that, although our hypothesis might imply causal relationships, these cannot be assessed within this study. Thus, we cannot say

whether a higher leadership motive actually influences the attainment of a higher employment rank or is a result of it. Equally, purely based on this data, it is entirely possible that higher concerns for morality cause a higher desire for prestige, although we have struggled to find a parsimonious explanation for this. A difficult but interesting approach for further research could involve manipulating participants' leadership and prestige motives and assessing the effect of this manipulation on leadership positions and moral concerns. Moreover, it would be interesting to see whether higher moral concerns in highly prestige motivated people also translate into moral behaviour such as prosocial behaviour (e.g., Cheng & Tracy, 2014), which we will investigate in Chapter 7.

In conclusion, this study provides further evidence for the DoPL scales' validity by showing a strong relationship between the leadership motive and employees' rank in a company (which should, by definition, be a strong incentive for highly leadership motivated people). In an additional inquiry we found that this relationship might be stronger in women than in men, however, as results were not uniform further research is needed to confirm this effect. Moreover, we could show that the prestige motive was positively related to various moral concerns, a potentially highly valued domain in a society (e.g., Cheng & Tracy, 2014) whose attainment would represent an incentive for highly prestige motivated people. Nonetheless, this latter result is not as clear-cut since, although positively related to some moral concerns, the prestige motive showed no significant relationship with others.

6 Chapter 6: Dominance motive and dictator games

6.1 Introduction

In Chapter 5 we provided evidence for the discriminant validity of the leadership and prestige motives. In this study we wanted to extend this effort by showing the discriminant validity of the dominance motive. An experimental paradigm that seemed particularly suitable for this purpose is the dictator game (DG), hence we investigated the role of the dominance motive, controlling for prestige and leadership motives, in two DG studies: one conducted in the lab and one conducted online.

The DG was first introduced by Kahneman, Knetsch, and Thaler (1986) as an economic decision problem in which one person, a proposer, was endowed with a certain amount of money (e.g., 20$), which they needed to split with another person, the receiver, who had no other choice than accepting this split. The DG has since been widely used and in a meta-analysis of 328 DGs with many varying parameters, Engel (2011) found that only 36% of proposers gave nothing, about 17% of proposers split the money equally, and 34% proposers gave a proportion between nothing and an equal split. Initially, this distribution was somewhat surprising from an economical point of view, especially given that results generally held for one-shot DGs in which both splits and payouts were anonymous (e.g., Forsythe, Horowitz, Savin, & Sefton, 1994; Frohlich, Oppenheimer, & Bernard Moore, 2001), as the rational economic choice should be to always keep all of the money (Camerer, 2003). This economically irrational behaviour has been attributed to underlying concerns of fairness/social norms of reciprocity (Diekmann, 2004; Kahneman et al., 1986), or simply altruism (Andreoni & Miller, 2002). Nonetheless, researchers also investigated a plethora of other moderating variables (see Camerer, 2003; Engel, 2011; for reviews). For example, they found that the proportion given in a DG slightly increased with decreased anonymity, probably due to reputational concerns (e.g., Dana, Weber, & Kuang, 2007) and that this proportion was largely unaffected by the total amount of money participants played for (e.g., Engel, 2011; Forsythe et al., 1994), suggesting findings with small stakes can be generalised to bigger stakes. However, personality differences in participants have also shown to relate to DG

behaviour. Most importantly for our research were findings showing that the proportion given in DGs was negatively related to participants' general power motive, which was proposed to be due to higher dominance in highly power motivated people (Baumert et al., 2014; Schönbrodt & Gerstenberg, 2012). As the DoPL scales' dominance motive represents a desire to coerce others into adhering to one's will, we hypothesised that it should be negatively related to the proportion given in a DG. This behaviour should satisfy the two related needs within the dominance motive, first, influencing receivers against their will (as we can assume the receiver wants to earn some money) and second, gaining autonomy from others' influence by earning money. Moreover, we hypothesised that if participants played as receivers but received no money from proposers (thus were influenced against their will), this would arouse the dominance motive even more and thus would increase its effect in a subsequently played DG as proposer.

We proposed that, as compared to the prestige and leadership motives, the dominance motive would be the most influential predictor, however, we also considered weaker influences of the prestige and leadership motives. Regarding the prestige motive, we hypothesised a positive relationship with the proportion given in the DGs. This was based on the assumption that this kind of altruistic behaviour would signal a higher level of morality, a highly valued domain, (e.g., Cheng & Tracy, 2014; see Chapter 5) and thus might be driven by reputational concerns. Nonetheless, note that we did not expect big effects sizes as the study conducted in the lab was partly anonymous. More precisely, participants only sometimes saw their potential game partners shortly before the study and also did not know with whom exactly they would play. Moreover, the study conducted online was completely anonymous.

Regarding the leadership motive, we hypothesised differential effects for males and females. Gender differences regarding leadership have been investigated from many angles (e.g., Burke & Collins, 2001; Eagly, Johannesen-Schmidt, & van Engen, 2003), however, there seems to be some consensus that, although effect sizes are small, male leadership tends to be more self-centred and assertive as compared to female leadership. For example, Eagly and Johnson (1990) found in a meta-analysis

that male leadership styles were more autocratic than democratic (i.e., not involving vs involving subordinates in decision making processes) as compared to females'. In a 20 day event-sampling study of workers in a wide range of occupations researchers found that agentic behaviour (e.g., voicing an opinion, giving information, setting goals) was more influenced by being in a leadership role than by gender, however, communal behaviour (e.g., listening attentively to others, providing help) was more influenced by gender than by being in a leadership role, with females being more communal (Moskowitz, Suh, & Desaulniers, 1994). Hence a female leader would be both communal and agentic, or if these strategies would cancel it each other out, neither, whereas a male leader would only be agentic. Behaviour in the DG is not directly related to any main component of the leadership motive, which is guiding others and taking responsibility for one's group, however, in the absence of these components we hypothesised spill-over effects from a general leader personality. More precisely, we assumed that highly leadership motivated males would execute more selfish and assertive behaviour whereas females would not do this. Hence, we predicted a negative relationship between the amount of money given in a DG with the leadership motive in males but not in females. Note though that, as we controlled for the dominance motive, much of this effect would be shared and thus we only expected small effect sizes.

In summary, across both a lab-based and an online-based DG we predicted a negative relationship between the proportion given in these DGs and the dominance motive. Moreover, and only investigated in the online DG, we predicted this effect to be bigger when participants received no money in previous DGs (dominance-arousal condition). We hypothesised a weaker positive relationship between the prestige motive and the proportion given as well as a weaker negative relationship between the leadership motive and the proportion given in males but not in females.

6.2 Method DG1

Participants

As we did not know which effect sizes to expect we decided somewhat arbitrarily to collect 50 participants (20 males; M_{age} = 23.76, SD_{age} = 5.12) in this first lab-study and to use effect size estimates from this study in a further study. All participants were students doing various degrees at the University of Edinburgh and were reimbursed with 4 GBP as a base-rate plus their DG winnings.

Material and Procedure

Participants filled in the 10-item DoPL scales intermingled with the affiliation, achievement, intimacy, and power motive scales of the Unified Motive Scales (UMS; Schönbrodt & Gerstenberg, 2012) online, prior to coming into the lab in order to make sure all participants could start at the same time. Once at the lab, the experimenter led all participants to individual cubicles. Note, that we invited four participants at a time, however, if we could not find four participants the experimenter pretended some participants were already in the other cubicles from a previous study. No participants raised any suspicions regarding this. After giving written consent the participants read instructions on a computer describing the DG as "an economic exchange game" which was played with one of the other three participants at the lab, however not disclosing which one. It was explained that an amount of 2 GBP had been allocated to one person, who thus became the proposer. This person could propose any proportion of these 2 GBP to the other participant, the receiver. Whether a participant played as proposer or receiver was ostensibly randomly selected, however, every participant played as proposer. After the experimenter had made sure everybody had understood the instructions, participants allocated any proportion (or nothing) of the 2 GBP to the ostensible receiver. After this they completed a set of other tasks for a different study interested in the implicit dominance and prestige motive. These findings will not be reported in this thesis. At the very end participants were fully debriefed and paid.

6.3 Method DG2

Participants & sample size rationale

In the lab-based study the smallest significant effects were the main effects for the leadership and prestige motives, which explained 3% unique variance each. To find this effect size with a statistical power of $\beta = .80$ and $\alpha = .05$ (two-tailed) we would need $n = 250$ participants. Thus, we collected data from 264 participants through the online website www.prolific.ac of which we excluded 14 participants for incorrectly answering our catch question yielding the desired sample of 250 participants (139 males; $M_{age} = 29.88$, $SD_{age} = 10.62$). This is the same sample as described in Study 3, Chapter 4. Participants were paid a base-rate of 1 GBP as well as the amount of money won in the first DG they played as proposer. We preregistered this sample size rationale along with our hypothesis regarding main and gender effects and the respective models (https://osf.io/crsbq/). All models with an * mark preregistered models.

Material and Procedure

After providing standard demographic information participants filled in the 10-item version of the DoPL scales intermingled with the 10-item version of the UMS power, affiliation, achievement and intimacy motives (Schönbrodt & Gerstenberg, 2012) as well as the PRF dominance and PRF social recognition scales (Jackson, 1984). Results regarding the PRF scales are reported in Chapter 4, Study 3. After being introduced to the DG participants were shown 10 examples of possible splits in order to make sure they understood the rules of the game. Participants were told that they would play four rounds of the DG: two rounds as receiver (the money would, ostensibly, come from the two persons that have filled in the survey just before them) and two rounds as proposer (the money would, ostensibly, go to the two people who would fill in the survey immediately after the participant). Participants were told that they would get paid all rewards as receiver and one randomly selected reward in the role of proposer. The order in which they played these roles was ostensibly randomised, however, the order was fixed as proposer, receiver, receiver, proposer.

When participants played as receiver, they always received 0 GBP. This design was necessary to create two conditions: A neutral condition when playing the proposer for the first time and a dominance-arousal condition when playing the proposer for the second time. After this participants were fully debriefed.

6.4 Results

We report results for both lab-based and online DGs together in this section in order to facilitate comparisons between these two studies. In each study all predictors were standardised before the analysis. We first wanted to investigate whether the DoPL motives were related to behaviour in the DG in general, hence these first analyses focussed on data from the lab-based study and the online study's neutral condition. We created a linear regression model for each of these datasets with the proportion given to the other participant as dependent variable and the DoPL motives as predictors (see Table 6.1). This analysis showed that the dominance motive was significantly negatively related to the proportion given to the other participant in both the lab-based, b = -14.57, t = -2.67, p = .01, as well as the online study, b = -8.98, t = -1.81, p(one-tailed) = .04. The main effects for the prestige and leadership motives were neither significant in the lab-based nor in the online study (ps > .18). In summary, these findings support our hypothesis regarding the unwillingness to give other participants money in a DG as a function of the dominance motive. However, although descriptively positive in both studies, a higher prestige motive was not significantly related to the amount of money given in the DGs.

Table 6.1. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the dominance, prestige, and leadership motives.

	Lab-based study				Online study			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	89.82	4.66	19.28	< .01	105.76	4.27	24.80	< .01
Dominance	-14.57	5.47	-2.67	.01	-8.98	4.98	-1.81	.04[10]
Prestige	6.67	5.04	1.32	.19	4.92	4.90	1.00	.32
Leadership	-7.37	5.37	-1.37	.18	-6.76	5.11	-1.32	.19

To investigate our hypothesis regarding gender effects in the leadership motive, we added gender as an effect coded variable to these models as well as all the interactions between the DoPL motives and gender (see Table 6.1). In the lab-based study, the main effects for dominance and prestige motive remained virtually unchanged and neither of their interactions with gender reached significance (*p*s > .23). Nonetheless, the main effect for leadership was significant after controlling for gender, b = -11.74, t = -2.25, p = .03; however, this main effect was qualified by a significant interaction of the leadership motive with gender, b = 33.20, t = 3.18, p < .01. This interaction showed that whereas the relationship between the leadership motive and the proportion given in the DG was highly negatively for males, b = -28.34, it was slightly positive for females, b = 4.86. Recoding gender as a dummy variable (females = 0) showed this latter effect was only descriptively positive (p > .46) showing that there was no significant relationship between the leadership motive and the proportion given in females. Controlling for gender in the online studies' neutral condition rendered all effects non-significant (*p*s > .14). In summary, in the lab-based study, when controlling for the influence of gender we still found the predicted negative relationship of the dominance motive with the amount of money given in a DG. Moreover, as predicted, we found the leadership motive to be

[10] Note, that as we had a directional hypothesis a one-tailed test was permissible here, the two-tailed *p*-value was p = .07. All other *p*-values reported here represent two-tailed *p*-values.

negatively related to the amount of money given for males but not for females. Although these effects pointed towards the predicted direction in the online study's neutral condition, we could not replicate any of them.

Table 6.2. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the dominance, prestige, and leadership motives, gender (effect coded; -.5 for males), and the interactions between the DoPL motives and gender.

	Lab-based study				Online study*			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	91.65	4.47	20.49	<.01	107.01	4.40	24.32	<.01
Dominance	-15.49	5.17	-3.00	<.01	-7.55	5.10	-1.48	0.14
Prestige	7.11	4.80	1.48	.15	4.35	5.07	0.86	0.39
Leadership	-11.74	5.22	-2.25	.03	-7.21	5.14	-1.40	0.16
Gender	-2.13	8.95	-0.24	.81	12.42	8.80	1.41	0.16
Gender*Dominance	-1.68	10.35	-0.16	.87	4.81	10.20	0.47	0.64
Gender*Prestige	-11.71	9.61	-1.21	.23	-8.81	10.14	-0.87	0.39
Gender*Leadership	33.20	10.44	3.18	<.01	9.25	10.28	0.90	0.37

In order to investigate the effect of the arousal condition but also controlling for gender we analysed data from both conditions of the online study in a single multilevel model* using R's (R Core Team, 2017) *lme4* package (Bates et al., 2016; version 1.1-12). Note, that this package does not provide *p*-values, hence, all decision regarding significance are based on 95% bootstrapped confidence intervals (10000 iterations).

This multilevel-model included the proportion given in the DGs as dependent variable and the DoPL motives, gender, condition and all second order interactions between gender, condition and each of the DoPL motives as predictors (see Table

6.3). The random effect structure consisted of by-participant random intercepts and by-participant random slopes for experimental condition.[11] The only two significant predictors in this model were first, experimental condition, b = -33.78, t = -7.40, 95% CI = [-42.88, -24.77], showing that participants gave on average 34 pennies less after having received nothing in two previous DGs (i.e., in the arousal condition). Second, there was a significant main effect of the dominance motive, showing a negative relationship between the dominance motive and the amount of money given across both conditions of the DG, b = -10.10, t = -2.05, 95% CI = [-19.62, -0.21]. The interaction between the dominance motive and experimental condition was not significant, b = -4.62, t = -0.86, 95% CI = [-15.16, 5.80], indicating no significant difference in the regression slopes for the dominance motive between the neutral and the arousal condition. In summary, the dominance motive was negatively related to the proportion given across both experimental conditions when controlling for gender and experimental condition. Although descriptively this dominance effect was stronger in the experimental condition this effect was not significant. Independent of the DoPL motives participants gave significantly less money to the other participants in the arousal condition, which means, after having received no money in two previous DGs.

Note that we conducted ten further exploratory analyses (see Tables A6.1 to A6.6 in Appendix 3) based on the same five models as described above (Table 6.1 to 6.3). Retaining all other variables, the only change to the previous analysis of these models was that we only ever included either the dominance (plus interactions) or leadership motive (plus interactions). In all of these models both the effects for the dominance as well as the leadership motive were significantly negative (ps < .04) except for the leadership motive in the multilevel model (cf. Table 6.3). This suggests that these two motives share some of the predictive variance regarding the proportion given in DGs, however, it also shows that the dominance motive predicted the proportion given beyond this shared variance with the leadership motive. Thus the dominance motive was the stronger predictor.

[11] As the initial model did not converge we restricted all random effect correlations to 0 (Barr et al., 2013).

Table 6.3. Multilevel model* with by-participant random intercepts and by-participant random slopes for experimental condition predicting the amount of money (in pennies) out of 3 GBP given to another participant in an online DG. The independent variables included the DoPL motives, gender (effect coded: males = -.5), experimental condition (effect coded: neutral = -.5; arousal = .5), and all second order interactions between gender, condition and each of the DoPL motives as predictors. Significant effects in bold.

	b	*SE*	*t*	Bootstrapped 95% CI
Intercept	90.70	4.25	21.35	[82.22, 99.06]
Dominance	**-10.10**	**4.92**	**-2.05**	**[-19.62, -0.21]**
Prestige	1.95	4.89	0.40	[-7.79, 11.65]
Leadership	-4.77	4.96	-0.96	[-14.49, 4.84]
Gender	7.71	8.50	0.91	[-9.34, 24.06]
Condition	**-33.78**	**4.57**	**-7.40**	**[-42.88, -24.77]**
Gender*Condition	-9.65	9.35	-1.03	[-27.84, 8.64]
Gender*Dominance	12.54	9.84	1.28	[-6.45, 31.54]
Condition*Dominance	-4.62	5.41	-0.86	[-15.16, 5.80]
Gender*Prestige	-4.91	9.78	-0.50	[-24.08, 13.92]
Condition*Prestige	-5.67	5.21	-1.09	[-15.90, 4.89]
Gender*Leadership	-2.05	9.91	-0.21	[-21.13, 17.23]
Condition*Leadership	4.13	5.44	0.76	[-6.77, 14.66]

6.5 Discussion

In a lab-based and an online study we aimed at providing evidence for the discriminant validity of the dominance motive by employing a DG paradigm (e.g., Engel, 2011). We had hypothesised that denying receivers' money to take it for oneself would satisfy a person's desire to coerce others into adhering to one's will (i.e., dominance motive) and in line with this we found that the dominance motive was negatively related to the amount of money given to the other participant in the

DG across both studies. In the online study only, we created a dominance arousal condition by having participants receive nothing in two DGs played as a receiver. We had hypothesised that this would increase the effect of the dominance motive in a subsequent DG played as proposer; however, the descriptively stronger effect of the dominance motive was not significant. Based on the assumption that males with a high leadership motive would have a more self-centred, assertive personality than females (e.g., Eagly & Johnson, 1990; Moskowitz et al., 1994) we predicted a negative relationship between the leadership motive and the amount of money given in the DGs for males but not females. This hypothesis was confirmed in the lab-based but not the online study, hence, this finding awaits further replication. Based on the assumption that prosocial behaviour such as giving other people money would be a way to attain respect and admiration (i.e., prestige motive; Cheng & Tracy, 2014) we predicted a positive relationship between the prestige motive and the proportion given in the DG. Although this was descriptively the case in both DGs, these effects were not significant.

Generally effect sizes seemed to be bigger in the lab-based study as compared to the online study. This makes sense as the DoPL motives are social motives (i.e., desires related to other people; e.g., Heckhausen & Heckhausen, 2008). Thus these motives are more likely to be aroused in the labs' social context, where participants saw each other before the study and conducted the study in close physical proximity from another as compared to the completely anonymous online study. Nonetheless, the labs' social context was rather restricted as participants were placed in individual cubicles in separate rooms and did also not know with which of the other participants they ostensibly played. In a further study it would be interesting to decrease the anonymity in the DG and to investigate whether the prestige motive would be positively related to the proportion of money given by the proposer.

A big caveat of this study, as in Chapter 5, is that all data collected here, except from the dominance arousal condition, are correlational. It is theoretically possible that a third variables explains the relationship between both the dominance motive and DG behaviour. Hence, although we believe dominance desires influencing DG behaviour

to be the most parsimonious and likely explanation, this cannot be confirmed with this data.

In conclusion, these two studies provide further evidence for the discriminant validity of the DoPL scales by particularly showing that the dominance motive was, as predicted, negatively related to the proportion given in both a lab-based as well as an online dictator DG. The dominance motive predicted DG behaviour over and above the effects of the prestige and leadership motives. A potential negative relationship between the leadership motive and the proportion given in DGs in males, but not females, awaits further replication.

7 Chapter 7: DoPL motives and charitable giving

7.1 Introduction

After Microsoft founder Bill Gates gave away a substantial part of his wealth to charitable causes, TIME magazine displayed him on its cover for the person of the year 2005 representing the world's good Samaritans (TIME, 2005). The businessman Warren Buffet followed him a year later giving more than two thirds of his wealth to charitable causes, which has arguably affected these two men to be among the most respected leaders and public personalities in the world (Prasad, 2011; www.nelsonmandela.org, 2011). Besides philanthropic reasons one can only speculate to what extent, in these specific cases, gains in reputation motivated Gates' and Warren's prosocial giving decision. In Chapter 5, we alluded to this link more generally by showing that desires for admiration and respect (i.e., the prestige motive) were positively related to many conceptualisations of morality and argued that prosocial giving behaviour provides a means to display these high levels of morality (e.g., Anderson & Kilduff, 2009; Cheng & Tracy, 2014). Hence, to expand on Chapter 5's findings and provide a further validation to the DoPL scales, in this study we wanted to test directly whether the prestige motive was positively related to prosocial charitable giving behaviour.

Many researchers have investigated a link between reputation and prosocial behaviour. For example, university student alumni have been shown to donate more money to their old university when their donations were overt rather than covert (Harbaugh, 1998; Karlan & McConnell, 2014). In a sample of Italian blood donors, researchers found that giving people an award for their blood donation only increased their motivation to donate if this prize was announced publicly (Lacetera & Macis, 2010). Along the same lines, Ariely, Bracha, and Meier (2009) found that when Princeton students could earn money for a charity depending on how often they would manage to press a pair of buttons, students increased their effort if they had to disclose their performance and winnings to other participants (overt condition) as compared to when they could not do that (covert condition). Interestingly, if some of these earnings went towards the participants themselves instead of the charity,

participants showed increased effort in the covert condition but decreased effort in the overt condition. Ariely and colleagues (2009) argued that this was due to participants expecting detrimental effects on their reputation if they seemed to put in more effort to earn money for themselves. In summary, this evidence suggests that once prosocial behaviour is made overt people are more willing to indulge in it, which is likely due to reputational concerns. Nonetheless, there is the caveat that this behaviour should not reflect badly on them (e.g., if the prosocial behaviour appears to serve the person themselves).

In this study we asked participants whether they wanted to donate a proportion of the money they earned through this study (1.20 GBP) to a charity. To make this donation behaviour overt we showed a fake leader board with the current top 15 donors in this study and explained that, if they wanted and if they were among the top 15 donors, participants could have their name displayed on the board for the course of the study. In a neutral condition we wanted to omit this leader board, however, due to our sampling strategy participants were never tested in this condition (see below). We hypothesised that the prestige motive should be positively related to the proportion donated and that this relationship should be stronger in the condition with the leader board as compared to the neutral condition. Regarding the dominance motive we assumed that gaining money would strengthen a person's ability to coerce others whereas giving it away for free would weaken it. Moreover, keeping money to oneself seems to be in line with the selfish desires to get one's will/desire for autonomy inherent to the dominance motive (see DG studies in Chapter 6). Hence we predicted a negative relationship between the dominance motive and the proportion donated. Regarding the leadership motive we assumed that donating money would be a way to take responsibility for one's group, although this latter term is rather broadly interpreted here (i.e., one's group of British citizens). Thus we predicted a positive relationship between the leadership motive and the proportion donated. We preregistered all of these hypotheses, the confirmatory statistical models to test them as well as the sample size and rationale (https://osf.io/7c8sn/).

7.2 Method

7.2.1 Analytical method: Bayesian statistics

In this study we employed Bayesian statistics to make decisions regarding the significance of predictors and to determine the number of participants to be collected. Bayesian statistics are based on a "reallocation of credibility across possibilities" (Kruschke, 2015, p. 15). The credibility of each parameter in a model (e.g., the size of a coefficient or error variance) is determined by the product of two density distributions, a) a distribution of prior beliefs/probabilities of different possible sizes of a parameter and b) a distribution of likelihoods (from a likelihood function) of each parameter based on the collected data. For standardising purposes this product is often divided by the average likelihood across all parameters in the model weighted by their prior probability. The resulting weighted and standardised distributions for each parameter are termed posterior distributions. Note that, it is not always possible to find an analytical solution to the above described multiplication (i.e., if likelihood and prior distribution are not conjugate/do not have the same shape); however, a solution can be obtained through Markov Chain Monte Carlo (MCMC) random sampling of representative combinations of parameters (Kruschke, 2015).

There are three features to Bayesian statistics which are important for our analyses. First, contrary to classical frequentist statistics based on null hypothesis significance testing (NHST), the sample size in a Bayesian analysis does not have to be determined *a priori*. As Edwards, Lindman, and Savage (1963) have famously pointed out in regards to Bayesian statistics "(...) the rules governing when data collection stops are irrelevant to data interpretation. It is entirely appropriate to collect data until a point has been proven or disproven, or until the data collector runs out of time, money, or patience." (p. 193). Second, posterior distributions of parameters allow testing for the significance of predictors by using 95% equal-tailed intervals (ETI). These intervals include 95% of the posterior distribution by cutting off the 2.5% most extreme values on both sides of the distribution. Given a normally distributed posterior, a 95% ETI includes the 95% most credible values for the true size of a coefficient; thus, if 0 is not included in this interval the coefficient can be

considered significantly different from 0 (Kruschke, 2015)[12]. Third, so-called Bayes Factors (BF) can be created to compare the relative evidence for one model/hypothesis over another model/hypothesis. This is done by dividing the integral across the likelihood of all parameters of model 1 (e.g., H0) weighted by their respective priors by the integral across the likelihood of all parameters of model 2 (e.g., H1) weighted by their respective priors. Interestingly, this integration procedure automatically penalises models with more predictors (Broderson, 2012). The evidence for the model representing the H1 over the model representing the H0 (i.e., BF_{10}) can be interpreted as follows: $1 < BF_{10} < 3$ represents anecdotal evidence, $3 < BF_{10} < 10$ represents moderate evidence for H1. Respectively, $1 < BF_{10} < 0.3$ represents anecdotal evidence, and $0.3 < BF_{10} < 0.1$ represents moderate evidence for H0 (Jeffreys, 1961). Note, that simulation studies have shown that a $BF_{10} = 6$ marks a point where most models converge towards the alternative hypothesis if additional data is collected (Schönbrodt, Wagenmakers, Zehetleitner, & Perugini, 2017).

In this study we will calculated BFs and posterior distributions for our linear regression models using the *BayesFactor* package (version 0.9.12-2; Morey & Rouder, 2015) in R (version 3.3.3; R Core Team, 2017) with the default priors (non-informative priors) on all parameters. Parameters of linear regression models include the coefficients for the predictors, the error variance (σ^2), and a normality parameter (g)[13].

Participants and sample size rationale

We employed sequential BFs (Schönbrodt et al., 2017) to determine the number of participants in this study focussing on the hypothesised effect of the prestige motive. Thus we intended to sample participants in the experimental condition until the $BF_{10} > 6$ for the model comparisons (H0: intercept only; H1: intercept + dominance +

[12] Some proponents of Bayesian statistics shy away from using the term "significant" to describe effects of a Bayesian analysis and rather describe these effects in terms of their credibility (e.g., Kruschke, 2015). However, in the interest of easier understanding and to mirror our frequentist analyses, we will use the term significant.

prestige + leadership) and (H0: intercept + dominance + leadership; H1: intercept + dominance + prestige + leadership). Only after this we intended to sample participants for the neutral condition, however, as the former requirements were never met we only sampled participants for the experimental condition. In addition to these decision rules, we determined a lower limit of n = 200 to detect a correlation of r = .2 with α = .05 (two tailed) and statistical power of β = .80 for additional data we collected within the same sample (see Chapter 5). Moreover, we determined an upper limit of n = 550 due to monetary constraints (see Appendix 4 for a detailed description of this preregistered sampling procedure).

The sample was collected through the online webpage www.prolific.ac and participants were reimbursed with 1.20 GBP for their participation. The study was limited to participants living in Great Britain (as we only used British charities) and participants in a full-time employment position (for data we collected in regard to the leadership motive and employment rank; see Chapter 5). Following our sampling plan we collected 605 participants of which we excluded 55 participants for answering incorrectly to either one or both of our attention checking questions (e.g., Please answer this question with Strongly agree). The final sample consisted of n = 550 participants (300 females; M_{age} = 36.69, SD_{age} = 10.00), employed in various kinds of professions.

Procedure

We introduced this study as being interested in personality, employment positions and opinions regarding charities. In the experimental condition we also informed participants that at the end of the study we would give them the opportunity to donate a proportion of their earnings to a charity, that they would see a list of the current top donors and that they could chose to have their name displayed there for the duration of our data collection. After this any personal information would be destroyed. After giving consent and providing demographic information (i.e., gender, age, profession)

[13] For linear regressions containing only continuous variables intercepts are integrated out analytically in the posterior distribution of the *BayesFactor* package and thus will not be reported here (Morey, 2017).

participants filled in the following questionnaires in this fixed order: the 6-item DoPL scales (see Chapter 4, Table 4.3.3) intermingled with 6-item version of the UMS affiliation and intimacy scales (Schönbrodt & Gerstenberg, 2012), the 30-item moral foundation questionnaires (MFQ; Graham et al., 2011), 11 items to measure employment rank (see Chapter 5, Table 5.2). Participants then read a brief description of three actual charities (www.childrenwithcancer.org.uk; www.redcross.org.uk; www.safelives.org.uk). We then asked, if they were to donate any money to a charity, which one of these charities they would chose. Following this we asked them three decoy questions regarding the chosen charity (e.g., "Have you ever donated money to this charity"). In the experimental condition participants then saw a list of the ostensible current top 15 donors with 15 fake names (e.g., "James Maes"), locations (e.g., "Sussex") and the charity these people ostensibly had donated to. These people were ranked by the proportions of their earnings they had donated but we did not display this ostensible amount. This list was displayed for 30 seconds, participants were allowed to move on after 5 seconds. After 4, 15 and 25 seconds this list was ostensibly updated to create the illusion that top positions were still contestable. Following this participants could chose to donate any proportion (in 10% increments) of their 1.20 GBP earnings to their chosen charity. In the experimental condition participants additionally could provide their name and location to ostensibly be displayed in the list of top 15 donors. Although we did not save this personal information, we did save whether participants used the text boxes to give information about their name and location. Finally, participants were fully debriefed and we explained that at no point we had stored any personally identifying data, that the top 15 donors were not real, and that they will be paid in full as we had deceived them. Nonetheless, we provided web links to the charities in case they wanted to donate some money to the charities after all.

7.3 Results

As stated before, following our sampling strategy we collected the maximum of n = 550 participants in the experimental condition only, as the relevant BFs were never greater than 6. In the full sample about 25% of participants were willing to donate a

proportion of their earnings (1.20 GBP) to a charity, with the mean donation being 48% of these earnings. About 77% of the people who were willing to donate money also filled in the textbox ostensibly storing participants' names in order to display them in the list of top 15 donors.

Confirmatory analysis

We created several models to predict the proportion of earnings donated to charities. For the first pair of models (H0: intercept only; H1: intercept + dominance + prestige + leadership) the final BF_{10} was 0.30, indicating moderate evidence for the H0 (see decision rules above). For the second pair of models (H0: intercept + dominance + leadership; H1: intercept + dominance + prestige + leadership) the final BF_{10} was 0.26 also indicating moderate evidence for the H0. This indicates that including the prestige motive as a predictor to a model with the dominance and leadership motive did not improve the model fit.

Table 7.1. Posterior distributions for a linear regression model predicting the proportion of earnings donated by the standardised dominance, prestige, and leadership motives. The mean of these distributions can be interpreted as the mean size of the predictors' slopes.

	M	*SD*	95% ETI
Dominance	-3.33	1.27	[-5.85, -0.83]
Prestige	1.10	1.26	[-1.39, 3.54]
Leadership	2.52	1.24	[0.10, 4.98]
σ^2	736.16	44.24	[654.33, 826.69]
G	0.07	0.12	[0.01, 0.30]

Based on MCMC sampling (10000 iterations) we created posterior distributions for a linear regression model predicting the proportion of earnings donated to charities by the standardised dominance, prestige, and leadership motives (see Table 7.1 &

Figure 7.1). As hypothesised, whereas the dominance motive was significantly negatively related to the proportion donated, *M* = -3.33, *SD* = 1.27, 95% ETI [-5.85, -0.83] the leadership motive was significantly positively related to the proportion donated, *M* = 2.52, *SD* = 1.24, 95% ETI [0.10, 4.98]. Nonetheless, our main hypothesis could not be confirmed as the prestige motive was not related to the proportion donated, *M* = 1.10, *SD* = 1.26, 95% ETI [-1.39, 3.54].

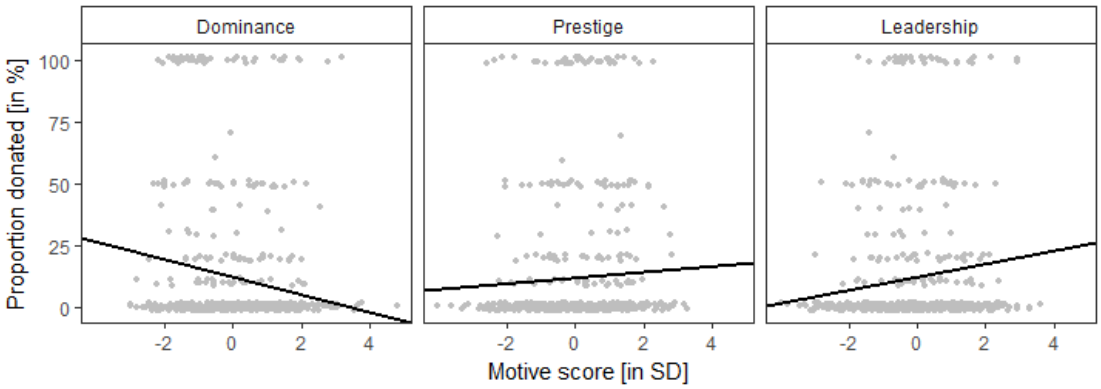

Figure 7.1. Proportion of earnings donated as predicted by the standardised dominance, prestige and leadership motives. Data points jittered for better visualisation.

Exploratory analysis

To investigate possible alternative explanations for the non-significant effect of the prestige motive, we created two further models in an exploratory analysis. Note that we employed standard frequentist statistics as the results in these models were independent from our sampling procedure and using *p*-values is therefore permissible. However, any significant result would have to be interpreted with caution accounting for the exploratory nature of these analyses.

The two models were designed to split the donation behaviour into two parts: a) whether participants gave anything at all and b) given participants were willing to donate, how much did they give. Thus, we first conducted a logistic linear regression model with a binary donation decision as DV (0 = no donation, 1 = donation) and the

standardised DoPL motives as predictors. This model revealed that the prestige motive was indeed positively related to the probability of donating, b = 0.24, SE = 0.11, z = 2.15, p = .03. Whereas the dominance motive was negatively related, b= -0.25, SE = 0.11, z = -2.21, p = .03, the leadership motive was unrelated to the probability of donating, b= 0.16, SE = 0.11, z = 1.47, p = .14. For the second analysis we restricted our sample to participants who had been willing to donate a proportion of their earnings (n = 138). Thus, we created a linear regression model with proportion donated as DV and the standardised DoPL motives as predictors. Although no predictors were significant in this analysis, the dominance motive was marginal significantly negatively related to the proportion donated, b = -5.50, SE = 3.11, t = -1.77, p = .08, with the prestige motive being descriptively negatively related as well, b = -4.53, SE = 3.08, t = -1.47, p = .14. The leadership motive was descriptively positively related, b = 4.38, SE = 3.12, t = 1.40, p = .16. As the effects for the DoPL motives in the main confirmatory analysis are a combination of the effects in these individual exploratory models it is not surprising that we found significant effects for the dominance and leadership motive as these effects were both close to being significant and pointed in the same direction. Interestingly, the willingness to donate money as a function of the prestige motive is in the opposite direction as compared to the prestige motive's negative, albeit non-significant, relationship to the actual proportion that was donated. Thus, these two prestige effects may have cancelled each other out, which could explain the null-result in the main confirmatory analysis.

7.4 Discussion

In an effort to further validate the DoPL scales we wanted to test whether the prestige motive (i.e., the desire for respect and admiration) is positively related to prosocial giving behaviour. This hypothesis was based on the assertion that prosocial giving behaviour is a way to display higher levels of morality, which in turn, should provide the displayer with the respect and admiration from others (e.g., Cheng & Tracy, 2014; see also Chapter 5). To test the hypothesis we asked participants if they wanted to donate any proportions of their earnings in this study (1.20 GBP) to one of three

charities. Due to our sample size rationale we only tested one experimental condition in which participants could see a list of the ostensible current top 15 donors with the prospect of becoming part of this list if they donated enough money. Contrary to our hypothesis we found no significant relationship between the prestige motive and the proportion of money donated to a charity. Nonetheless, the effects of the dominance motive (i.e., the desire to coerce others into adhering to one's will) and the leadership motive (i.e., the desire to direct others' activities and take responsibility for one's group) showed the predicted negative and positive relationship, respectively, with the proportion donated. We argued that the dominance motive should be negatively related as gaining money would provide a participant with more influence over others as well as being the more selfish option favoured by highly dominant people. Regarding the leadership motive we suggested that donating money to a national charity is a kind of responsibility taking which appeals to highly leadership motivated people. Note that, although we regard these as the most parsimonious explanations for these results, based on the data given they can neither be confirmed nor rejected as the data was only correlational and we did not investigate specific mechanism/varied specific parameters (e.g., the amount of responsibility that could be taken).

A potential explanation for the null result regarding the prestige motive might be based on the experimental design itself. Anderson and Kilduff (2009) hold that individuals try to improve their status by promoting their value to the group. Status here refers to "an individual's prominence, respect, and influence in the eyes of others" (Anderson & Kilduff, 2009, p. 295), thus a similar but slightly broader concept than prestige (e.g., Henrich & Gil-White, 2001). The authors argue that one of the ways to promote one's value is through "competitive altruism" (Hardy & Van Vugt, 2006), by which they mean individuals competing over who is the most generous. This idea maps onto our study design in which participants could compete for higher ranks on the leader board of current top 15 donors, nonetheless, a higher desire for prestige was not related to higher donations. As a matter of fact, in an exploratory analysis we found that among the people who were willing to donate anything at all the prestige motive was descriptively negatively related to the proportion donated. On the other hand, the prestige motive was significantly

positively related to the probability of donating something vs donating nothing. A speculative explanation for this could be that highly prestige motivated individuals actually refrain from overt "competitive altruism" as they would fear that others might interpret their prosocial behaviour as selfish (i.e., boasting about how great a person they are/trying to force others' admiration). This would be in line with Ariely and colleagues' (2009) argument that prosocial behaviour which seemingly serves oneself, to a degree, might be perceived as detrimental to one's reputation. A future study could remove this competitive aspect, for example, by providing a list of all donors without ranks and regardless of the amount donated. Nonetheless, it is important to point out that this is only a post-hoc explanation of our findings, which would have to be confirmed in a new study. Moreover, based on these data, we have to conclude that so far there is only very little evidence (i.e., only the exploratory analysis of the binary donating decision) that the prestige motive is related to prosocial giving behaviour.

8 Chapter 8: DoPL motives and cognitive dissonance in the 2016 US election

8.1 Introduction

> "Of course there is large scale voter fraud happening on and before election day. Why do Republican leaders deny what is going on? So naive!" (Trump, 2016a)

In the wake of the 2016 US election the then presidential candidate Donald Trump tweeted several such statements suggesting large scale voter fraud, rigged pre-election polls, or complaining about unfair media coverage (e.g., Trump, 2016b, 2016c, 2016d), however, there has been no credible evidence for any of these accusations (e.g., Bump, 2016; Patterson, 2016). Nonetheless, these conspiracy theories seemed to resonate with Trump voters as a majority of them adopted similar beliefs (Tamman, 2016). In light of many pre-election polls predicting a victory of Trump's opponent, Hillary Clinton, this behaviour of Trump and his supporters can readily be explained by cognitive dissonance theory (Festinger, 1957), which would describe these excuses for losing as an outlet to deal with an impeding defeat. In 2016/17 the terms "fake news", "alternative facts" or "post-truth" relating to exactly this kind of rhetoric have become prominent, moreover, given that Donald Trump actually won the election this rhetoric was arguably quite influential. Thus, we believe it is important to detect factors and moderators predicting people's belief in such conspiracies. In this study we want to investigate exactly this, by combining research on cognitive dissonance with research on different kinds of power motives (i.e., the DoPL motives) and investigating whether the dominance motive is related to cognitive dissonance in voters of the 2016 US election regarding a predicted or actual defeat of their presidential candidate.

Leon Festinger's (1957) theory of cognitive dissonance is one of the most widely validated theories in social psychology (e.g., Greenwald & Ronis, 1978; Harmon-Jones & Harmon-Jones, 2007). It states that a person experiences psychological discomfort if they hold two dissonant cognitions at the same time and that this person

will thus strive to reduce this dissonance to a bearable/negligible amount. Dissonant cognitions refer to clusters of beliefs, desires, or broadly "knowledges" (Festinger, 1957, p. 9) that stand in contradiction to each other. For example, the desire for one's presidential candidate to win the election vs the prospect of a potential or an actual defeat of one's presidential candidate. The theory further holds that if one cognition is stronger than the other, a person will try to reduce the dissonance in favour of the stronger cognition. For example, if a person's acknowledgement of defeat is stronger than their desire of their candidate to win, one might reduce the cognitive dissonance by contemplating that one has not cared about the election in the first place. Moreover, with enough temporal distance to the election, the desire for one's candidate to win becomes irrelevant as they are not a presidential candidate anymore and the dissonance is resolved as well. Nonetheless, if the desire to win is stronger than the acknowledgement of a potential or actual defeat of one's candidate, one possible way of reducing this dissonance is by reducing the acknowledgement of this defeat. For example, by claiming one's candidate is the "moral winner" or has actually won but was cheated out of their victory, which is reflected in many tweets of Donald Trump (e.g., Trump 2016a, Trump, 2016b; Trump, 2016c; Trump, 2016d). In summary, if a person holds two contrary cognitions at the same time such as wanting to win an election vs the prospect of losing an election, this person will experience the psychological discomfort of the dissonance state. One way of reducing this dissonance is by questioning the legitimacy of the defeat.

In this study we measured cognitive dissonance as endorsement of potential excuses for losing the 2016 US election which diverted the responsibility away from the candidate's personality/policy towards factors outside of their control (e.g., voter fraud; see Table 8.2). Importantly, the strength or resistance of a cognition is theorised to be a function of importance or value a person attributes to said cognition (Festinger, 1957). Winning a presidency always comes with the victory of beating one's opponent(s) and the president's power to make others do what one wants them to do (e.g., by executive orders), which represent dominance desires regardless of who assumes the presidency. Moreover, particularly in this election there was an unusually strong "us-against-them" mentality between Democrats and Republicans (MacWilliams, 2016) fuelled by the fear of being dominated by the other group.

Hence, if higher dominance desires represent higher desires to win then dominance desires should be positively related to cognitive dissonance in voters facing (i.e., Donald Trump voters; hypothesis 1) or experiencing defeat (i.e., Hillary Clinton voters; hypothesis 3). Nonetheless, once the presidency is won cognitive dissonance should be resolved in the winning candidate's voters. One could even propose a negative relationship between the dominance motive and the endorsement of excuses due to a reversed cognitive dissonance. For example, if the winner's voters before the election questioned the election's legitimacy, they might now be keen to confirm the legitimacy depending how much they wanted to be the winner (i.e., the extent of their dominance motive). Hence, we predicted a negative relationship between the dominance motive and the endorsement of potential excuses in the winning candidate's voters (i.e., Donald Trump voters; hypothesis 2). In addition to these hypothesis we also wanted to explore mean differences in the dominance, prestige, and leadership (DoPL) motives between Trump and Clinton voters. The three main hypotheses alongside their confirmatory models and sample size were preregistered (www.osf.io/s6u6m).

8.2 Method

Participants

The sample size of the pre-election part of the study was based on a statistical power analysis showing that we would need about n = 250 participants to detect a small to medium mean difference of d = .3 in dominance, prestige, or leadership motives. The sample size of the post-election part of the study was determined by the maximum number of people we could test given our budget. We resampled any data for participants who failed to correctly answer our attention checking question "Please answer this attention checking question with 'Strongly agree'.", which led to the exclusion of n = 5 and n = 18 participants in the pre-election and post-election sample, respectively. The final sample sizes were thus n = 250 (102 females, M_{age} = 32.51, SD_{age} = 11.46) in the pre-election part and n = 500 (230 females, M_{age} = 32.77, SD_{age} = 12.18) in the post-election part (see Table 8.1). Both samples were collected

through the online webpage www.prolific.ac restricted to US American participants. Note that some participants who took part in the first part of the study also took part in the second part; these participants (n = 160) were identified by unique identifier codes. All participants indicated that they were registered voters for the 2016 US election and that they had the intention to vote or have voted for either Donald Trump or Hillary Clinton. Participants were reimbursed with 0.40 US dollar for their participation in any one study.

Table 8.1. Depicting the distribution of males and females either intending to vote or have voted through early voting for either Hillary Clinton or Donald Trump (pre-election) and the distribution of males and females who have voted for Hillary Clinton or Donald Trump (post-election).

		Pre-election		Post-election	
		Clinton	Trump	Clinton	Trump
Gender	Male	93	55	177	93
	Female	82	20	186	44
Total		175	75	363	137

Material

The DoPL motives were measured with the 4-item short scales version of the DoPL scales (see Chapter 4). Sum scores of the DoPL scales were mean-centred and standardised for the analysis. Cognitive dissonance was measured as an endorsement rating on 6-point Likert scale from “Strongly disagree” to “Strongly agree” for six potential-excuse items at each pre and post-election time points. The first three items were based on accusations made by Donald Trump (e.g., Trump, 2016a, 2016b, 2016c, 2016d) before the election regarding rigged pre-election polls (1), voter fraud (2), and unfair media coverage (3). The latter three items referred to other tentative causes of losing this election such as preference to vote for women (4), unequal campaign funds (5) and positive impact of the candidates' children (6). The wording for these items was slightly different in the pre and post-election part and depending on whether participants had indicated to vote/or to have voted for Donald Trump or

Hillary Clinton (see Table 8.2). The rationale behind items #1, #2, #3, & #6 was that higher agreement with these statements indicate a higher belief in excuses for why one's presidential candidate would lose (before election) or had lost (after election) the election. Items #4 and #5 were tailored to the specific event of Donald Trump losing the election. A higher belief a woman (Item 4) or the candidate with more campaign funds (Item 5) has an unfair advantage does not represent an excuse for a defeat for Hillary Clinton voters as their candidate was female and she also was the candidate with more campaign funds (Narayanswamy, Cameron, & Gold, 2016).

Procedure

The pre-election sample was collected one and two days before the US election on the 8th of November 2016, whereas the post-election sample was collected one and two days after the election. Both parts of the study were introduced as a study on personality, voting preferences and opinions regarding the 2016 US election. The requirements of the study clearly stated that participants had to be registered voters for the 2016 US election. Moreover, they either needed to have the intention to vote (pre-election only) or have already voted (pre- and post-election) for either Donald Trump or Hillary Clinton. Participants who did not meet these requirements could not continue further with this study. After checking these requirements, we asked for voter intention/early voting choice between Donald Trump and Hillary Clinton (pre-election) or who participants had voted for (post-election). Following this, participants filled in the 12 items of the 4-item DoPL short scales and the six items regarding cognitive dissonance (see Table 8.2) followed by standard demographic questions (i.e., age, gender, occupation). At the end of the pre-election part, participants were made aware that there will be a post-election survey and we provided them with a unique identifier code to be used to match their data in both studies (n = 160 participated in both parts). Note that participants were not fully debriefed after the pre-election but only after the post-election part. Nonetheless, we provided participants with an email address to which they could direct any questions in both parts of the study.

Table 8.2. Depicting the 6 cognitive dissonance items used for the pre-election part in case participants had indicated to vote for Donald Trump. Curly brackets {} indicate changes in wording for the post-election part. Squared brackets [] indicate changes in wording if participants stated they will or have voted for Hillary Clinton.

#	Category	Cognitive dissonance items
1	Rigged pre-election polls	The pre-election polls are {were} rigged against Donald Trump [Hillary Clinton] in a way that they are {were} showing more voters in favour of Hillary Clinton [Donald Trump] than there actually are {were}.
2	Voter fraud	At this year's election, more than 2% of votes in favour of Hillary Clinton [Donald Trump] will actually be {have actually been} invalid due to voter fraud but will be {have been} counted towards the valid votes for Hillary Clinton [Donald Trump].
3	Unfair media coverage	The portrayal of Donald Trump [Hillary Clinton] in the media has been very unfair as compared to Hillary Clinton's [Donald Trump's] portrayal.
4	Preference to vote for women	As a woman Hillary Clinton has {had} an advantage as most US voters would vote {would have voted} for any female presidential candidate.
5	Unequal campaign funding	It doesn't matter what kind of personalities presidential candidates have, the candidate with more campaign funds always wins.
6	Positive impact of candidates' children	Hillary Clinton's child [Donald Trump's children] had a lot more positive impact on voters than Donald Trump's children [Hillary Clinton's child].

8.3 Results

Differences in DoPL motives between Trump and Clinton voters

To assess whether there were baseline differences in the DoPL motives between Trump and Clinton voters when controlling for gender, we conducted three preregistered 2(gender: male vs female)*2(voting preference: Trump vs Clinton) ANOVAs with the DoPL motives as DVs. We report results from the combined sample here; however, note that results remained virtually unchanged when analysing each part of the study on its own or when excluding participants in the second part who had already participated in the first part. For the dominance motive, both main effects of gender, $F(1,746) = 24.76$, $p < .01$, $\eta^2_G = .03$, and voting preference, $F(1,746) = 22.90$, $p < .01$, $\eta^2_G = .03$, were significant, indicating a higher dominance motive for males and Trump voters. The interaction was not significant ($p = .72$). For the prestige motive, neither main effects nor the interaction were significant, indicating no differences in prestige motives among Trump or Clinton voters, or between males and females (ps > .62). For the leadership motive, both main effects of gender, $F(1,746) = 14.13$, $p < .01$ $\eta^2_G = .02$, and voting preference, $F(1,746) = 6.08$, $p = .01$, $\eta^2_G = .01$, were significant, indicating a higher leadership motive for males and Trump voters. The interaction was not significant ($p = .10$).[14]

In an exploratory analysis we wanted to investigate whether any of the DoPL motives in combination with gender would predict the voting preference when the respective influence of the other DoPL motives were controlled. Hence, we conducted a logistic regression on the full sample with voting preference as DV (Trump = 0) and the DoPL motives, gender (male = 0), and interactions between the DoPL motives and gender as predictors (Figure 8.1). The significant intercept of this model indicated that, given average DoPL motive scores, among males there was a preference to vote for Clinton over Trump, $b = 0.80$, $z = 6.94$, $p < .01$. This effect was even more pronounced in females, $b = 0.56$, $z = 3.07$, $p < .01$, however note that

[14] As the homogeneity of variances assumption was violated in case of the ANOVAs for dominance and leadership motive, we additionally conducted robust ANOVAs using the t2way function in R's *WRS2* package (Mair & Wilcox, 2017; version 0.9-2). There was no change regarding the statistical significance in any of the main effects or interactions.

these effects are likely to be artefacts by us oversampling Clinton voters as well as undersampling female Trump voters (see Table 8.1). Independent from this sampling bias we found that higher dominance scores were related to a higher chance of voting for Trump, b = -0.46, z = -3.93, p < .01, but higher prestige motive scores were related to a higher chance of voting for Clinton, b = 0.40, z = 3.07, p < .01. These two effects did not vary between gender, ps > .23 (interaction terms). Higher leadership scores in males were related to a higher probability of voting for Trump, b = -0.44, z = 3.36, p < .01, however, this effect disappeared for females, b = 0.40, z = 1.99, p < .05 (interaction term). Note, when excluding participants in the second part who had already participated in the first part the difference between males and females in regard to the leadership motive became only marginally significant (p = .06). All other effects remained virtually unchanged except of an additional marginal significant interaction between the prestige motive and gender (p = .07).

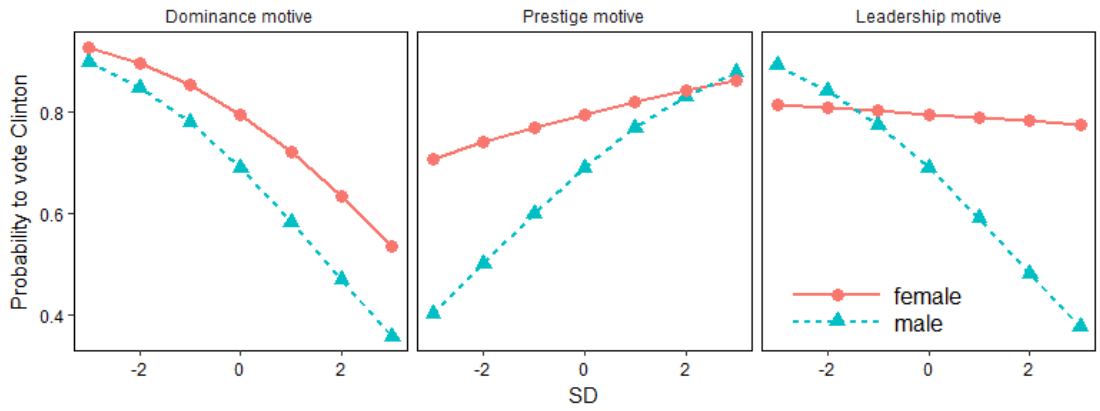

Figure 8.1. Depicting the probability of voting for Clinton over Trump predicted by the DoPL motives [in *SD*] for males (dotted lines) and females (straight line). Note, that the interaction between gender and motive was only significant for the leadership motive.

Cognitive dissonance

In line with our preregistered analysis plan we first assessed whether we could combine the first three cognitive dissonance items and the latter three dissonance items. The first three items pertaining to specific accusations of Donald Trump showed sufficient consistency to be combined into a sum score (Cronbach's α = .70).

The latter three items representing additional excuses for a potential/actual loss of the election did not show sufficient consistency (Cronbach's $\alpha = .31$). However, note that items #4 and #5 (see Table 8.2) did not represent cognitive dissonance in the event of a Trump victory (see Material & Discussion) and we therefore excluded them from our analysis. Note that Item 6 (see Table 8.3) did not correlate with the sum score of items #1-3. The DoPL scales correlated moderately with each other (see Table 8.3).

Table 8.3. Pearson's product-moment correlations of DoPL motives and cognitive dissonance (CD) items with *p*-values adjusted for multiple testing (Bonferroni-Holm correction). Cronbach's alpha on diagonal in square brackets.

	Dominance	Prestige	Leadership	CD sum score #1-3
Dominance	[.84]			
Prestige	0.30**	[.78]		
Leadership	0.29**	0.40**	[.87]	
CD sum score #1-3	0.23**	0.10*	0.07	[.70]
CD Item 6	0.06	0.12*	-0.06	-0.09

Note: ** $p < .01$; * $p < .05$

Our main hypothesis was that cognitive dissonance was positively related to the dominance motive for voters of the anticipated loser of the election (i.e., Donald Trump voters; hypothesis 1) before the election. Moreover, we hypothesised that after the election cognitive dissonance was positively related to the dominance motive for voters of the actual loser of the election (in this case Hillary Clinton; hypothesis 2) and negatively related to the actual winner of the election (in this case Donald Trump; hypothesis 3). To test hypothesis 1 & 3 we conducted a preregistered linear regression model with the DoPL motives as predictors, voting preference (Trump = 0), study part (pre-election = 0), and all possible interactions between the dominance motive, voting preference and study part (see Table 8.4 & Figure 8.2). Results revealed that cognitive dissonance was indeed positively related to the

dominance motive for Trump voters before the election, b = 0.87, t = 2.93, p < .01 (hypothesis 1). Moreover, although cognitive dissonance was not negatively related to the dominance motive after the election for Trump voters, the relationship between cognitive dissonance and the dominance motive was significantly weakened after Donald Trump had won, b = -0.76, t = -2.04, p = .04 (hypothesis 3). Other significant effects showed that independent of study part and voting preference the prestige motive was positively, b = 0.38, t = 3.18, p < .01, and the leadership motive negatively related to cognitive dissonance, b = -0.28, t = -2.32, p = .02. Unsurprisingly, as the cognitive dissonance items were based on Trumps accusations, Trump voters had generally higher cognitive dissonance scores than Clinton voters before the election, b = -5.02, t = -11.90, p < .01. This difference significantly decreased after the election, b = 1.15, t = 2.22, p = .03, however Trump supporters' cognitive dissonance scores still remained higher.

Table 8.4. Cognitive dissonance predicted by dominance motive, voting preference (Trump = 0), study part (pre-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	13.07	0.36	36.67	<.01
Dominance	0.87	0.30	2.93	<.01
Voting preference	-5.02	0.42	-11.90	<.01
Study part	-0.73	0.44	-1.66	.10
Voting preference*study part	1.15	0.52	2.22	.03
Dominance*voting preference	-0.64	0.37	-1.71	.09
Dominance*study part	-0.76	0.37	-2.04	.04
Dominance*voting preference*study part	0.91	0.47	1.92	.05
Prestige	0.38	0.12	3.18	<.01
Leadership	-0.28	0.12	-2.32	.02

To test hypothesis 2, we re-coded voting preference (Clinton = 0) and study part (post-election = 0) and conducted another linear regression model with the same predictors (see Table 8.5). This analysis revealed that the dominance motive was indeed positively related to cognitive dissonance in Clinton voters after the election, $b = 0.38$, $t = 2.15$, $p = .03$. However, even though the relationship between cognitive dissonance and the dominance motive was descriptively smaller before than after the election there was no significant difference in the regression slopes before and after the election, $b = -0.15$, $t = -0.51$, $p = .61$. Note, that the effects reported in Table 8.4 and Table 8.5 remained virtually unchanged when excluding participants' post-election data if they had already participated in the pre-election part, with the exception that the three-way interaction became significant ($p < .05$) as opposed to be marginally significant ($p = .05$). In summary, as predicted the dominance motive was positively related to cognitive dissonance (i.e., believing in an unfair election) in Donald Trump voters before the election when it seemed as if Donald Trump was losing (hypothesis 1). After the election, which Donald Trump won, the relationship between the dominance motive and cognitive dissonance did not become negative, however, it was significantly decreased (hypothesis 3). The dominance motive was positively related to cognitive dissonance in Clinton voters after the election (hypothesis 2), however, although this relationship was descriptively stronger after the election it was not significantly different from before the election.

Table 8.5. Cognitive dissonance predicted by dominance motive, voting preference (Clinton = 0), study part (post-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	8.47	0.16	54.43	<.01
Dominance	0.38	0.18	2.15	.03
Voting preference	3.87	0.31	12.65	<.01
Study part	-0.42	0.27	-1.54	.13
Voting preference*study part	1.15	0.52	2.22	.03
Dominance*voting preference	-0.27	0.29	-0.94	.35
Dominance*study part	-0.15	0.29	-0.51	.61
Dominance*voting preference*study part	0.91	0.47	1.92	.05
Prestige	0.38	0.12	3.18	<.01
Leadership	-0.28	0.12	-2.32	.02

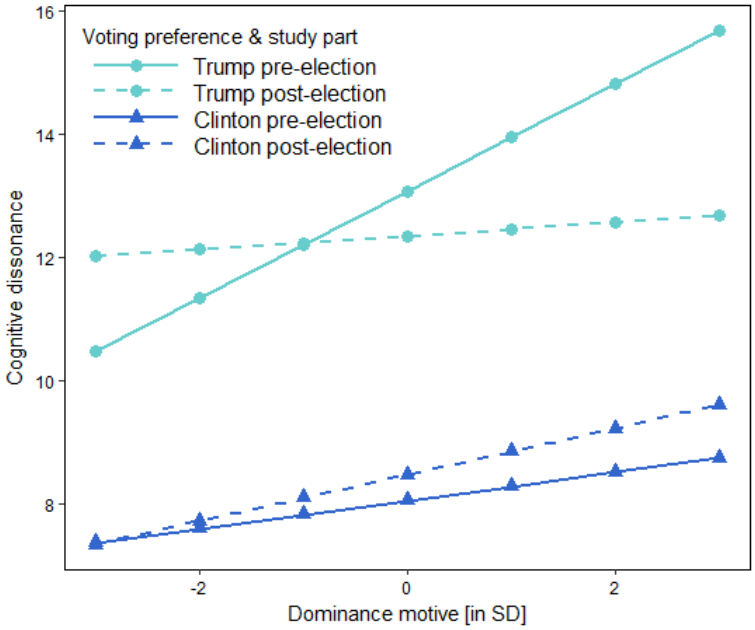

Figure 8.2 Cognitive dissonance [theoretical range 3 – 18] predicted by dominance motive, voting preference and study part (see Table 8.4). Note that both the slope for "Trump pre-election" and "Clinton post-election" are significantly positively related to the dominance motive (hypothesis 1 & 3, respectively). Moreover, the slope for "Trump pre-election" is significantly steeper than for "Trump post-election" (hypothesis 2).

Additional cognitive dissonance items

We are not reporting results for items #4 and #5 (see Table 8.2) here as they were only applicable in the case of a Clinton victory, however, Trump won the election (see Discussion). Nonetheless, the interested reader can find a summary of these results in Tables A5.1 to A5.4 and Figure A5.1 in Appendix 5. Results for item #6 (see Table 8.6) did not follow the pattern of the other cognitive dissonance items (see Figure 8.3). Cognitive dissonance did not differ between Trump and Clinton voters before the election, p = .81, however, was significantly higher for Clinton than for Trump voters after the election, b = 0.54, t = 2.33, p = .02. The dominance motive, opposed to our prediction, was marginal significantly negatively related to cognitive dissonance in Trump voters before the election, b = -0.24, t = -1.80, p = .07 (hypothesis 1). This relationship was marginal significantly more positive after the

election, b = 0.29, t = 1.75, p = .08 (see Table 8.6). In line with our predictions (hypothesis 2), the dominance motive was significantly positively related to cognitive dissonance in Clinton voters after the election, b = 0.19, t = 2.44, p = .01 (see Table 8.7). This relationship did not differ between before and after the election, p = .92.

Table 8.6. Cognitive dissonance as measured by Item #6 (positive impact of candidates' children, see Table 8.2) predicted by dominance motive, voting preference (Trump = 0), study part (pre-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	2.55	0.16	16.01	< .01
Dominance	-0.24	0.13	-1.80	.07
Voting preference	-0.04	0.19	-0.23	.81
Study part	-0.21	0.20	-1.05	.29
Voting preference*study part	0.54	0.23	2.33	.02
Dominance*voting preference	0.42	0.17	2.49	.01
Dominance*Study part	0.29	0.17	1.75	.08
Dominance*voting preference*study part	-0.28	0.21	-1.32	.19
Prestige	0.20	0.05	3.78	< .01
Leadership	-0.16	0.05	-3.03	< .01

Table 8.7. Cognitive dissonance as measured by Item #6 (positive impact of candidates' children, see Table 8.2) predicted by dominance motive, voting preference (Clinton = 0), study part (post-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	2.84	0.07	40.86	< .01
Dominance	0.19	0.08	2.44	.01
Voting preference	-0.50	0.14	-3.63	< .01
Study part	-0.33	0.12	-2.74	.01
Voting preference*study part	0.54	0.23	2.33	.02
Dominance*voting preference	-0.14	0.13	-1.10	.27
Dominance*Study part	-0.01	0.13	-0.10	.92
Dominance*voting preference*study part	-0.28	0.21	-1.32	.19
Prestige	0.20	0.05	3.78	< .01
Leadership	-0.16	0.05	-3.03	< .01

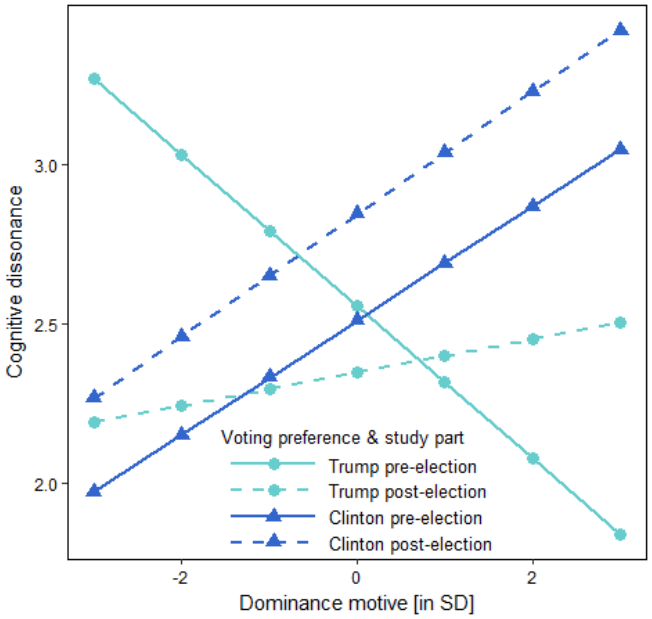

Figure 8.3 Cognitive dissonance as represented by Item #6 (positive impact of candidates' children, see Table 8.2) predicted by dominance motive, voting preference and study part (see Table 8.6).

Analysing subset of participants who took part in both studies

As we had collected unique identifier codes for participants, we could analyse whether participants' opinions had changed between before and after the election for a subset of our sample (n = 160). Hence, we conducted a multi-level model using the lmer function in R's (version 3.3.3; R Core Development Team, 2017) *lme4* package (version 1.1-12; Bates et al., 2016). The random effect structure consisted of by-subject random intercepts, the fixed effects structure was identical to the two models described above (see Table 8.4 & Table 8.5). Note that, although *b* and *t* values were somewhat smaller due to the decreased statistical power, results essentially mirrored the results reported in Table 8.4 & Table 8.5. The only effect that had completely disappeared was the relationship between cognitive dissonance and leadership. See Table A5.5 and Table A5.6 in Appendix 5 for a full description of the multi-level model results. Due to the similarity of the results for this subset as compared to the full sample we will not further discuss these findings.

8.4 Discussion

In a study of voters in the 2016 US election we investigated three hypothesis regarding whether the dominance motive predicted the endorsement of potential excuses for why one's presidential candidate appeared to lose (just before the election) and actually had lost (just after the election). These hypotheses were based on cognitive dissonance theory (Festinger, 1957) explaining the endorsement of excuses as a dissonance reduction arising from two contrary cognitions: the desire for one's candidate to win vs the apparent or actual defeat of one's candidate. As we assumed that one's desire for victory and thus one's cognitive dissonance was a function of the dominance motive we predicted a positive relationship between the dominance motive and the endorsement of excuses just before the election in voters of the anticipated loser (hypothesis 1). As most polls predicted a Clinton victory, this hypothesis was centred on Trump voters and indeed we found a significantly positive relationship between the dominance motive and the endorsement of excuses (e.g., voter fraud/rigged pre-election polls) in Trump voters before the election.

Further we hypothesised that cognitive dissonance should be resolved in the winner's voters (i.e., Trump voters) after the election and potentially even reverse previous effects, thus predicted a negative relationship between the dominance motive and the endorsement of excuses after the election (hypothesis 3). Although this relationship significantly decreased to a point where it essentially disappeared, the relationship was not, as predicted, negative. A potential explanation for this might be that either the cognitive dissonance resolved after the election in Trump voters as Trump had won and there simply was no reverse cognitive dissonance effect. Or, since Trump did not win the popular vote, this reverse effect was diminished as there was still some dissonance left. Indeed, Donald Trump himself did not give up on his conspiracy theories even after the election, claiming he would have won the popular vote if it had not been for voter fraud (Trump, 2016e).

Finally, we also hypothesised a positive relationship between the dominance motive and endorsements of excuses for a defeat in the losing candidate's voters, in this case Hillary Clinton voters (hypothesis 2). We did find this predicted positive relationship, however it is interesting that this effect was only descriptively larger than the relationship between the dominance motive and endorsement ratings before the election. As most pre-election polls predicted a close victory it is possible that Clinton voters could not completely ignore that Clinton might lose the election, which introduced some cognitive dissonance after all. In summary, these results are in line with our general assertion that the dominance motive is related to endorsing even very unlikely excuses (e.g., large scale voter fraud) in voters for the anticipated (i.e., Donald Trump) and the actual loser (i.e., Hillary Clinton) of the 2016 US election. Moreover, the relationship between the dominance motive and the endorsement of these excuses disappeared in voters of the actual winner, but did not become negative as predicted.

The results discussed above pertained to a sum score of cognitive dissonance based on three correlated potential excuses offered by Donald Trump (item #1 to #3 in Table 8.2). Nonetheless, we also measured the endorsement of three additional excuses not offered by Donald Trump. We did not report results for item #4 and item #5 (see Table 8.2) as these were created in case of a Clinton victory and thus were

only suitable to describe cognitive dissonance in Trump voters. For example, if Trump had lost, the excuse that the candidate with more campaign funds always win (item #5) would have seemed reasonable for Trump voters to reduce cognitive dissonance by claiming unfair standings and regarding Trump as the moral winner; as Clinton had more campaign funds. However, since Trump won, neither a high nor a low endorsement of the statement that the candidate with more funds always wins represents an excuse for Clinton voters as to why Clinton might have lost. Endorsements of the excuse in item #6 (see Table 8.2) did not correlate with the cognitive dissonance sum score (r = -.09). Moreover, these endorsement related somewhat differently to dominance in Trump voters than did endorsements for items #1 to #3 (see Table 8.2). This difference might have been due to Trump not promoting this excuse himself, however, we will not further interpret these results as single-item measures for broader concepts such as cognitive dissonance are likely little reliable (Postmes, Haslam, & Jans, 2013). In summary, we excluded items #4 and #5 (see Table 8.2) from our analysis as they were one-directional and would have only predicted cognitive dissonance in case of a Clinton victory. Results regarding Trump voters in item #6 were somewhat different from the other results, which might have been due to the excuse in this item having not been endorsed by Trump himself. Nonetheless, given the caveat of little reliable results of single-item measures we will refrain from a further interpretation of these latter results.

In a further analysis we also investigated whether the probability of voting for Clinton over Trump was predicted by the three DoPL motives (when controlling for each other) and gender. First, we found that the dominance motive was negatively related to the probability to vote Clinton for both males and females. This relationship might have been due to many of Trump's ideas being centred on a strong/independent state ("Make America Great Again"), brokering unequal deals in favour of the US ("America First"), and a superiority of some groups over others (e.g., "Caucasian" & "Males" over "Mexicans"; Degani, 2016; Filipovic, 2016). These ideas are consistent with the dominance motive and dominance being based on forced deference (see Chapter 2 & 4, Cheng, 2010; Henrich & Gil-White, 2001; see also Choma & Hanoch, 2017).

Second, contrary to the dominance effect, higher prestige motive scores were positively related to the probability to vote for Clinton regardless of gender. An analysis of website and Twitter content of both Trump and Clinton showed that while Clinton listed 24 issues on her website, Trump listed 4. In line with this Clinton's tweets focused more than twice as many times on actual issues than Trump's, nonetheless, Trump was four times more likely to tweet an attack on critics as compared to Clinton (Lee & Lim, 2016). Moreover, an analysis of speeches by Trump and Clinton showed that whereas Clinton's strategy seemed more to argue for her points/issues in order to convince old and new followers to vote for her, Trump's strategy seemed more to forcefully repeat points his followers already agreed on (Quam & Ryshina-Pankova, 2016). Thus, Clinton's behaviour/strategy seemed to be more about convincing others with her knowledge and by argument (a prestige strategy; e.g., Cheng & Tracy, 2014) than Trump's, which arguably would make Clinton's strategy more appealing to voters with a higher prestige motive due to this similarity (e.g., Ben-Ner, McCall, Stephane, & Wang, 2006).

Third, we found that the leadership motive was negatively related to the probability to vote for Clinton in males but unrelated in females. This result could be explained by male leaders understanding leadership more in an autocratic, assertive, and agentic way than female leaders (see Chapter 6; Eagly & Johnson, 1990) and thus agreeing more with Trump's leadership style than Clinton's. Since being in a leadership position and the leadership motive are strongly linked (see Chapter 5) this effect might transcend to males with high leadership motives. In another analysis in which we did not control for the respective other DoPL motives we found that the dominance and leadership motive were higher for males than females and higher in Trump voters than Clinton voters with no gender-interaction effects. Prestige motive scores did not differ between Trump and Clinton voters or males and females. This shows that more nuanced effects can be obtained when controlling for the respective other DoPL motives in the same analysis. In summary, whereas the dominance motive was negatively, the prestige motive was positively related to voting for Clinton over Trump, regardless of gender. The leadership motive was negatively related to voting for Clinton over Trump for male but not female voters.

Limitations and future research

In our view, there were two main limitations to this research. First, the hypotheses in this study hinged on a chain of assumptions, which seemed very plausible to us but have not been confirmed yet. Further research should investigate whether there is a direct link between the dominance motive and the desire to beat one's (political) opponent(s) and whether the prospect or an actual defeat causes immediate psychological discomfort as a function of the dominance motive. Second, although our hypotheses seem to imply a causal link between, for example, the dominance motive influencing voting for Trump or the dominance influencing cognitive dissonance, these results are correlational. As the DoPL motives are assumed to be stable personality traits it would be difficult to manipulate these motives to establish a causal relationship in a future experiment, however, in the future researchers could manipulate the importance of a potential victory or the humiliation of a defeat and measure whether a person's psychological discomfort can be predicted by the dominance motive after the actual defeat.

Conclusion

In times of "fake news" and "post truth" it is important to determine which factors relate to endorsing populist opinions not based on objective facts. In this study we used statements offered by the presidential candidate Donald Trump as proxy for such populist opinions (e.g., the accusation of large scale voter fraud) and found that the dominance motive predicted their endorsement in Trump voters in lieu of a potential defeat in the 2016 US election. We argued that the endorsement of such opinions is a way of reducing cognitive dissonance. Understanding the interplay between cognitive dissonance in situations of impeding defeat and the dominance motive is important to ensure people can make decisions based on actual facts and not "alternative facts".

9 Chapter 9: DoPL motives and effort mobilisation

9.1 Introduction

The function of motives is to energise, direct, and maintain behaviour (Heckhausen & Heckhausen, 2008). The previously reported studies in this dissertation mainly focussed on the directing part of motives, however, to provide further evidence for the DoPL motives' validity we wanted to show their relationship to effort mobilisation (i.e., the energising part) in motive-relevant tasks.

A theoretical account of how much energy people invest in order to complete a task has been provided by Brehm and Self's (1989) motivational intensity theory. This account is an extension of classic expectancy*value models of motivation, which hold that motivation is the product of the incentive value a task itself and/or its outcome provide multiplied with one's subjective assessment of whether one will be successful in this task (i.e. expectancy; Beckmann & Heckhausen, 2008). Furthermore, the incentive value is determined by one's need state and motivational disposition. For example, in terms of hunger motivation, the incentive value prescribed to making a sandwich depends on how long one has gone without food (need state) and how much one likes food in general (motivational disposition). Brehm and Self (1989) coined the result of this expectancy*value calculation "potential motivation" (p. 110).

Importantly, Brehm and Self (1989) argued that another determinant, task difficulty, has to be taken into account in order to arrive at the actual effort a person mobilises in a task. Their argument is based on the assumption that humans want to conserve energy, and that, given that they believe a task can be completed, they only invest as much energy as necessary. For example, if it is easy for a person to make a sandwich, having a low potential motivation will make a person work as hard as having a very big potential motivation. Nonetheless, the potential motivation determines the upper limit of effort a person will mobilise. For example, if a task is very difficult a person with low potential motivation will disengage from the task, whereas a person with high potential motivation will mobilise a lot more energy to solve the task up to the point where the needed effort goes beyond the potential motivation or a person is not

physically able to do the task. Importantly, in cases where a person cannot assess the task difficulty or is instructed to perform as well as they can, the effort is solely determined by this person's potential motivation (see Figure 9.1, Gendolla & Richter, 2006, p. 1190). In summary, according to motivational intensity theory the energy a person invests into solving a task depends on the value this person prescribes to this task/outcome of the task, the expectancy to succeed in this task as well as the difficulty of the task. As people are assumed to try to conserve energy they are argued to invest only as much energy into a task as necessary up to the point where the outcome does not justify the invested energy anymore. If a task's difficulty cannot be assessed a person is theorised to invest as much energy as is maximally justified by the outcome (e.g., Gendolla & Richter, 2006, 2010).

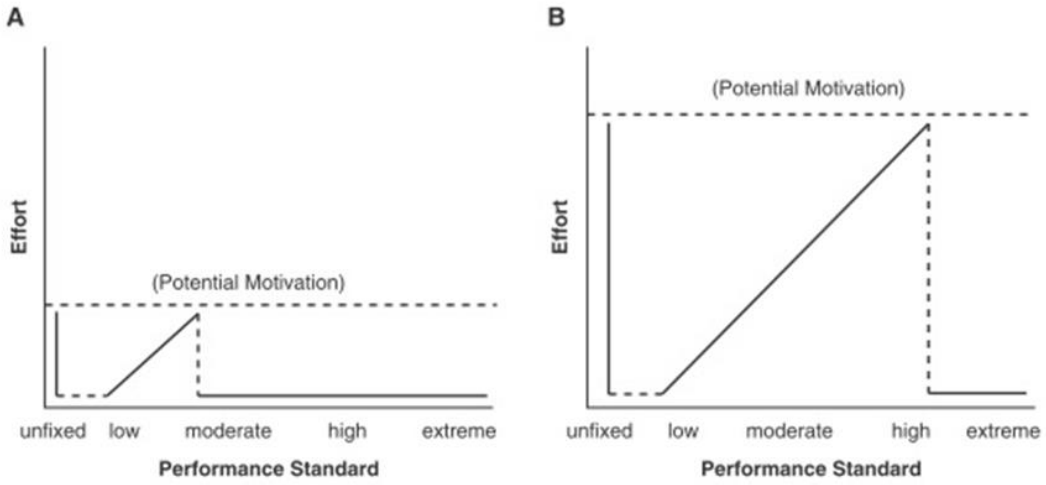

Figure 9.1 Depicting the relationship between effort and task difficulty (here called performance standard) according to Brehm and Self's (1989) motivational intensity theory in cases of low potential motivation (A) and high potential motivation (B).

Note. Reprinted from "Ego-Involvement and the Difficulty Law of Motivation: Effects on Performance-Related Cardiovascular Response", by Gendolla & Richter, 2006, Personality and Social Psychology Bulletin, 32, p. 1190. Copyright 2006 by the Society for Personality and Social Psychology, Inc.

In order to apply motivational intensity theory, it is important to determine how effort mobilisation can be measured. Researchers have argued that neither self-report measures (due to self-presentational concerns) nor direct performance measures (due to differences in abilities) provide satisfactory means to measure effort (e.g., Gendolla, Wright, & Richter, 2012). Instead, researchers (e.g., Capa, Audiffren, & Ragot, 2008; Gendolla & Richter, 2006) have utilised measures of cardiovascular reactivity as indicators of sympathetic nervous system activation, which in turn plays a dominant role in actively coping with stressors and activation in general (Obrist, 1976; Wright, Tunstall, Williams, Goodwin, & Harmon-Jones, 1995). Two measures of cardiovascular reactivity seem to be particularly suitable to capture increased effort mobilisation: a) increased systolic blood pressure and b) decreased heart rate variability in the low frequency band.

Systolic blood pressure

Systolic blood pressure (SBP) is the blood pressure measured as the heart contracts; that means the maximum blood pressure. The strength of a heart contraction is determined by "beta-adrenergic sympathetic discharge to the heart" (p. 1190; Gendolla & Richter, 2006) and has been shown to relate to effort mobilisation in several studies (see Gendolla & Richter, 2010, for a review). For example, Gendolla & Richter (2006) asked students to memorise different amounts of random letter strings (e.g., "Q P T Z") within 5 minutes in four difficulty conditions (easy: 3 letter strings; moderate: 6 letter strings; difficult: 15 letter strings; unfixed: instead of being asked to remember all of the letter strings displayed, participants were asked to remember as many as they can out of 15 displayed letter strings). These four difficulty conditions were crossed in a 2*4 between subjects design with two conditions of ego-involvement. In the high-ego-involvement condition, the task was framed as a concentration task that was especially indicative for academic success, which should be in the interest of the study's student sample. In the low-ego-involvement condition, the task was not framed as having a relationship to any measure of academic success. SBP was measured several times before the task was introduced (as a baseline) and several times during the memorisation task. In line

with Brehm and Self's (1989) theory, participants' SBP did not differ between low and high ego-involvement in the low and moderately difficult condition (as participants arguably mustered enough potential motivation for these conditions). However, in the difficult and unfixed conditions participants showed significantly higher SBP in the high as compared to the low ego-involvement condition. This finding is also in line with motivational intensity theory as potential motivation represents the upper limit of effort participants invest in a task and the potential motivation should be higher in the high than the low-ego involvement condition. Importantly, to control for individual differences in baseline SBP and random fluctuation in SBP measurements all SBP measurements were averaged and baseline-corrected.

Heart rate variability (HRV) in the low frequency band

The human heart is innervated by both the sympathetic and the parasympathetic nervous system. Whereas the sympathetic innervation speeds up the heart rate, the parasympathetic, guided by information from baroreceptors, slows the heart rate down (Berntson et al., 1997). Researchers have proposed that changes in heart rate can be utilised to disentangle the sympathetic and parasympathetic influence on the heart. This is done by splitting the frequency of heartbeat intervals (called RR intervals or interbeat intervals) into low, .07 – .14 Hz, (sometimes also referred to as midfrequencies; Mulder, Van Roon, Veldman, Elgersma, & Mulder, 1995) and high, .14 - .4 Hz, frequencies via spectral analysis (e.g., Capa et al., 2008a; Capa, Audiffren, & Ragot, 2008b; Mulder et al., 1995). Both the variability of heart rates (HRV) in the low and high frequency bands have been shown to decrease with increased mental effort (e.g., Mulder et al., 1995). However, the variability in the high frequency band seems to be distorted through the vagal (i.e., parasympathetic) innervation of the heart, which becomes more pronounced as respiratory patterns change. Variability in low frequency band seems not to be influenced by this, thus this frequency band was proposed to mainly represent sympathetic activation (Mulder et al., 1995). Note though, that this claim has recently been refuted by showing that the low frequency HRV is indeed still a mix of sympathetic and

parasympathetic influence (e.g., Billman, 2013; TaskForce, 1996). Nonetheless, in the past low frequency HRV has been shown to relate to effort mobilisation across several studies (e.g., Capa et al., 2008a, 2008b; Mulder et al., 1995). For example, Capa and Audiffren (2009) found significantly lower heart rate variability in the low frequency range for people with a high achievement motive (in this case people with simultaneously a very high approach achievement score and very low avoidance achievement score) as compared to people with a low achievement motive (in this case people with simultaneously a very low approach achievement score and very high avoidance achievement score) in a reaction time task when asked to consistently beat their previous performance.

In this study we wanted to investigate whether cardiovascular indices of effort mobilisation vary as a function of DoPL motives in tasks related to DoPL incentives. To do so, we employed the random letter memorisation task as described above (Gendolla & Richter, 2006) with an unfixed difficulty level. However, instead of framing the task in terms of academic success, we made an ostensible connection between memory skills and better abilities to dominate, gain prestige, or leading others. To control for simple desires to perform well in this task, we also controlled for individuals' achievement motive (defined as "a recurrent concern with a standard of excellence and the disposition to derive satisfaction from the mastery of challenging task", Schönbrodt & Gerstenberg, 2012, p. 726). We used four indices of effort mobilisation (i.e., DVs): systolic blood pressure during memorisation (SBP memorisation), systolic blood pressure during recall (SBP recall), heart rate variability in the low frequency band of .07 – .14 Hz during memorisation (HRV memorisation) and the number of correctly recalled items. We hypothesised that SBP memorisation, SBP recall and the number of correctly recalled items would be positively and HRV memorisation would be negatively, related to the respective DoPL motive in a task providing incentives for the respective DoPL motive.

9.2 Method

Participants

We collected data from 140 students studying various degrees of which 11 participants were excluded for responding incorrectly to our attention checking question (see procedure). This left a total of 129 participants (M_{age} = 22.34, SD_{age} = 3.52; 94 females)[15]. Participants received 4 GBP for their participation.

Questionnaire

Dominance, prestige and leadership motivation was measured by the 10-item version of the DoPL scales intermingled with the 10-item versions of the Unified Motive Scales (Schönbrodt & Gerstenberg, 2012) for achievement, affiliation, and intimacy. The latter two scales were only included to provide distractor items and were not further analysed.

Apparatus

Systolic blood pressure (SBP) was measured in millimetres of mercury (mmHG) with two Omron M10-IT blood pressure monitors. One monitor was used for baseline and memorisation measurements, the other for recall measurements. The blood pressure cuff was placed over the brachial artery about 1-2 cm above participants' elbow and always on their left arm. Three blood pressure measurements were taken automatically in intervals of 2 minutes for baseline and memorisation measurements and in intervals of 15 seconds for recall measurements. Heart rate variability (HRV) was measured in ms^2 with a movisens ekgMove sensor placed over participants' hearts and kept in place by a chest belt. Here we were only interested the low frequency band (0.04 – 0.15 Hz; TaskForce, 1996) as this is hypothesised to mainly reflect sympathetic nervous system activity (Malliani,

[15] Note that due to equipment failure the number of participants varied for the four dependent variables. SBP memorisation & correctly recalled items: n = 129; SBP recall: n = 124; HRV memorisation: n = 112 (see Table 9.1).

Pagani, Lombardi, & Cerutti, 1991; Mulder et al., 1995). Note that we did not assess HRV during recall as recall durations were too short to attain a reliable estimate for this time frame. The DataAnalyzer in the movisens software package was used to read out the HRV from the sensor. All measurements were baseline-corrected.

Procedure

Students who responded to our online advertising were informed that the study consisted of two parts: Filling in a questionnaire at home and then coming to the lab for the main task. Participants created unique identifier codes for both parts so we could match their data. The study had been advertised as a study interested in how blood pressure and heart rate were affected in a demanding situation, which was reiterated when participants came to the lab. In the lab the experimenter attached blood pressure cuff and heart rate sensor to participants after which they relaxed for 10 minutes while reading about some historical events. Five minutes into this baseline the experimenter started the blood pressure monitor to take 3 measurements for the baseline measurement. These 5 minutes were also used to take baseline measures for the HRV. After this participants were informed that they would do a memory test in which they needed to memorise and recall 14 random letter strings (e.g., "y m x d") as well as in which location (i.e., in which of the 14 numbered boxes) they appeared in. The instruction was to remember as many letter strings as they could. After a practice trial participants were given a cover story explaining the motivation of the study. More precisely, we gave them fake information about two studies having found a relationship between memory performance and stress-levels (first study) or between memory performance and, counterbalanced across participants, either being able to a) dominate, b) lead or c) acquiring prestige from others (second study). The description of the second study served as the between-subjects experimental manipulation. In each condition this text consisted of an introducing sentence which stated that *"Davis and Franklin (2015) could show that having good memory is key to: a) to being able to influence others and getting them to do what you want, b) to being a good leader and directing the activities of others, c) to acquiring skills and knowledge which are respected and admired by other*

people." This was followed by some additional information. *"The skill to remember details, which is measured in this task, seems to be especially important. Davis and Franklin found that the better a) you remember another person's knowledge, habits, and beliefs the better you could convince them of something even when they have a strong opposing opinion about it. As a matter of fact, in Davis and Franklin's study the ability to influence others was directly related to performance in this memory task. b) someone remembered the particular strengths and weaknesses of other people the better they could assign them to suitable tasks if need be. In fact, in Davis and Franklin's study a person's likelihood of becoming and their success as a leader was directly related to performance in this memory task. c) individuals can remember details about the world and other people the more often will other people ask for their advice. As a matter of fact in Davis and Franklin's study the degree to how much individuals were respected was directly related to performance in this memory task."*

After participants had read this we briefly quizzed them with two questions about both studies to assess whether they had actually read the information. Only participants who identified the key findings of the made-up second study correctly were included in our analysis (e.g., "Memory is key to being a good leader and directing the activities of others." in the leadership condition). Eleven participants were excluded for answering this question incorrectly. After the quiz, the experimenter started the blood pressure measurements (SBP memorisation) and left the room to give participants 5 minutes time to memorise the 14 letter strings displayed on the screen. Immediately after this the experimenter came back in, switched the blood pressure monitors over (SBP recall) and left the participants to recall however many letter strings they remembered by typing them into empty numbered boxes on the screen. Subsequently to this participants were asked what they thought this study was about, received some feedback regarding their performance as compared to participants in Gendolla and Richter's study (2006) and were then fully debriefed.

Table 9.1. Depicting the number of participants in each experimental condition and for each dependent variable.

Dependent variable	Experimental Condition		
	Dominance Condition	Prestige Condition	Leadership Condition
SBP memorisation	41	45	43
SBP recall	39	44	41
HRV memorisation	32	39	41
Correctly recalled items	41	45	43

9.3 Results

Analysis and sampling strategy

As we did not know what effect sizes to expect, we could not conduct an *a priori* power analysis to estimate a sufficient sample size. Thus, we determined the size of our sample by using Sequential Bayes Factors (SBF; Schönbrodt et al., 2017) and judged the significance of predictors on the basis of 95% ETI intervals. See Chapter 7 for a detailed description of this approach and the interpretation of Bayes Factors and 95% ETI intervals. In this study we had three between-subjects experimental conditions and four DVs, yielding 3*4=12 experimental levels (see Table 9.1). We calculated BFs by comparing models with dominance, prestige, leadership, and achievement motives and any combination of these predictors to an intercept-only model for each of these 12 experimental levels. Any model including more than just the intercept represented an H1 whereas the intercept-only model represented the H0. Sampling was stopped after n = 129 participants as each of these BFs indicated anecdotal or moderate evidence for the H0 with one exception where we found anecdotal evidence for the H1, with the predictor (prestige motive) showing a relationship with the DV (HRV) in the opposite direction than we hypothesised (see HRV during memorisation). For each of the four DVs we also estimated a posterior probability distribution of a model including all focal predictors and their interactions with the experimental conditions while controlling for the achievement motive. All

analysis were conducted with the *BayesFactor* package (version 0.9.12-2; Morey & Rouder, 2015) in R (version 3.3.3; R Core Team, 2017) with the default priors (non-informative priors) on all parameters. All predictor variables were standardised.

Table 9.2. Pearson product-moment correlations for all four predictor variables with *p* values adjusted by Holm-Bonferroni correction for multiple tests. Standard deviations and [range] on diagonal.

	Dominance	Prestige	Leadership	Achievement	Cronbach's alpha
Dominance	7.44 [11, 49]				.82
Prestige	0.35**	7.54 [21, 58]			.83
Leadership	0.36**	0.35**	8.63 [18, 59]		.91
Achievement	0.16	0.29**	0.38**	7.48 [18, 60]	.88

** $p < .01$, * $p < .05$.

Preliminary analysis

As participants needed different amounts of time to recall the letter strings, the number of blood pressure measurements differed between participants ($M = 2.33$; $SD = 0.78$), however, the number of measurements did not predict SBP for recall or the number of correctly recalled items ($ps > .34$). As often found for younger adults (e.g., Gendolla & Richter, 2006; Wolf et al., 1997) the baseline measurements of SBP were higher for men ($M = 104.73$) than for women ($M = 95.62$), $t(50.17) = 5.00$, $p < .01$.

The predictor variables dominance, prestige, leadership, and achievement motive were generally moderately correlated with each other with the exception of an only marginally significant correlation of dominance and achievement motive scores (see Table 9.2). The dependent variables correlated less than expected. Only the two SBP measurements correlated moderately and only SBP Recall correlated significantly

with the number of items recalled[16]. Contrary to what would be expected, the HRV measurements did not correlate negatively with the SBP measurements or the number of items correctly recalled (see Table 9.3).

Table 9.3. Pearson product-moment correlations for all four dependent variables with *p* values adjusted by Holm-Bonferroni correction for multiple tests. Standard deviations and [range] on diagonal.

	SBP Memorisation	SBP Recall	HRV Memorisation	Items correct
SBP Memorisation	4.30 [-5, 18]			
SBP Recall	0.44**	8.44 [-10, 51]		
HRV Memorisation	-0.02	0.22	689.59 [-1807, 4208]	
Items correct	0.18	0.25*	-0.01	3.40 [0, 14]

** $p < .01$, * $p < .05$.

SBP during memorisation

None of the models with average SBP during memorisation as DV and dominance, prestige, leadership, and achievement motives - or any combination of those – as predictors provided a more probable representation of the data than the intercept-only model in the dominance (BFs < 0.4), prestige (BFs < 0.32) or leadership (BFs < 0.53) condition. A full model including all experimental conditions, DoPL motives, and DoPL motives' interactions with experimental conditions while controlling for achievement yielded non-significant effects as judged from the 95% ETI (see Table 9.4).

[16] Only complete letter strings placed in the appropriate box were scored as correct. However, scoring complete letter strings which were in the wrong boxes as correct did not markedly change correlations.

Table 9.4. Posterior probability of a linear model predicting SBP during memorisation by dominance, prestige, leadership, and achievement motive scores as well as by the interaction of prestige, dominance, and leadership with the three experimental conditions. Coefficients represent deviations from the grand mean. Coefficients for which we had hypothesis are marked in bold.

	b	*SD*	95% ETI Interval
Intercept (grand mean)	3.86	0.39	[3.10, 4.62]
Dominance	-0.01	0.39	[-0.78, 0.76]
Prestige	0.12	0.37	[-0.60, 0.85]
Leadership	-0.06	0.40	[-0.86, 0.73]
Achievement	**-0.20**	**0.36**	**[-0.91, 0.51]**
Dominance condition	0.17	0.50	[-0.80, 1.15]
Prestige condition	-0.21	0.49	[-1.19, 0.76]
Leadership condition	0.04	0.49	[-0.93, 1.02]
Dominance condition: Dominance	**0.29**	**0.51**	**[-0.70, 1.30]**
Dominance condition: Prestige	-0.41	0.63	[-1.65, 0.82]
Dominance condition: Leadership	0.11	0.53	[-0.93, 1.16]
Prestige condition: Dominance	0.09	0.52	[-0.93, 1.11]
Prestige condition: Prestige	**-0.33**	**0.55**	**[-1.42, 0.75]**
Prestige condition: Leadership	0.24	0.48	[-0.70, 1.20]
Leadership condition: Dominance	0.12	0.50	[-0.86, 1.11]
Leadership condition: Prestige	0.38	0.56	[-0.73, 1.50]
Leadership condition: Leadership	**-0.50**	**0.56**	**[-1.62, 0.58]**

SBP during recall

None of the models with average SBP during recall as DV and dominance, prestige, leadership, and achievement motives - or any combination of those – as predictors provided a more probable representation of the data than the intercept-only model in the dominance (BFs < 0.97), prestige (BFs < 0.80), or leadership (BFs < 0.56)

condition. A full model including all experimental conditions, DoPL motives, and DoPL motives' interactions with experimental conditions while controlling for achievement yielded non-significant effects as judged from the 95% ETI (see Table 9.5).

Table 9.5. Posterior probability of a linear model predicting SBP during recall by dominance, prestige, leadership and achievement motive scores as well as by the interaction of prestige, dominance and leadership with the three experimental conditions. Coefficients represent deviations from the grand mean. Coefficients for which we had hypothesis are marked in bold.

	B	*SD*	95% ETI Interval
Intercept (grand mean)	5.02	0.76	[3.53, 6.51]
Dominance	-0.39	0.78	[-1.94, 1.13]
Prestige	0.68	0.74	[-0.76, 2.16]
Leadership	-0.32	0.79	[-1.88, 1.25]
Achievement	**0.27**	**0.73**	**[-1.17, 1.72]**
Dominance condition	0.53	0.99	[-1.40, 2.47]
Prestige condition	-1.01	0.98	[-2.96, 0.87]
Leadership condition	0.48	0.98	[-1.42, 2.42]
Dominance condition: Dominance	**0.79**	**1.01**	**[-1.19, 2.81]**
Dominance condition: Prestige	-0.35	1.24	[-2.81, 2.10]
Dominance condition: Leadership	-0.43	1.06	[-2.53, 1.63]
Prestige condition: Dominance	1.17	1.05	[-0.86, 3.25]
Prestige condition: Prestige	**-1.11**	**1.11**	**[-3.31, 1.05]**
Prestige condition: Leadership	-0.06	0.99	[-1.99, 1.89]
Leadership condition: Dominance	-0.88	1.00	[-2.87, 1.06]
Leadership condition: Prestige	0.55	1.11	[-1.64, 2.75]
Leadership condition: Leadership	**0.33**	**1.09**	**[-1.81, 2.50]**

HRV during memorisation

None of the models with average HRV during memorisation as DV and dominance, prestige, leadership, and achievement motives - or any combination of those – as predictors provided a more probable representation of the data than the intercept-only model in the dominance (BFs < 0.75) or leadership condition (BFs < 0.42). However, in the prestige condition, models including prestige were at least as probable a representation of the data as the intercept-only model (BF = 1) with a model only including prestige and leadership being almost 5 times more probable than the intercept-only model (BF = 4.96). Nonetheless, a further inspection of these models revealed that these prestige effects were in the opposite direction as predicted, indicating a negative relationship between the prestige motive and effort mobilisation (i.e., lower HRV) in the prestige condition. A full model including all experimental conditions, DoPL motives and their interactions with experimental conditions, as well as the achievement motive showed a significant main effect of prestige, b = 164.99, 95% ETI [41.48, 294.37], with no other significant effects as judged from the 95% ETI (see Table 9.6).

Table 9.6. Posterior probability of a linear model predicting HRV during memorisation by dominance, prestige, leadership and achievement motive scores as well as by the interaction of prestige, dominance and leadership with the three experimental conditions. Coefficients represent deviations from the grand mean. Coefficients for which we had hypothesis are marked in bold.

	B	SD	95% ETI Interval
Intercept (grand mean)	223.8	63.67	[97.86, 348.51]
Dominance	-31.01	64.94	[-159.33, 96.92]
Prestige	164.99	64.71	[41.48, 294.37]
Leadership	-106.81	68.44	[-243.79, 25.54]
Achievement	**46.48**	**60.21**	**[-70.95, 166.38]**
Dominance condition	94.76	85.75	[-70.7, 266.17]
Prestige condition	50.48	81.85	[-108.14, 213.64]
Leadership condition	-145.23	83.10	[-311.11, 15.27]
Dominance condition: Dominance	**3.15**	**83.49**	**[-160.87, 167.68]**
Dominance condition: Prestige	31.19	104.97	[-174.72, 237.96]
Dominance condition: Leadership	-34.34	85.84	[-203.28, 133.34]
Prestige condition: Dominance	7.14	84.43	[-158.56, 173.70]
Prestige condition: Prestige	**111.69**	**93.69**	**[-69.85, 297.99]**
Prestige condition: Leadership	-118.83	79.34	[-276.91, 34.63]
Leadership condition: Dominance	-13.25	86.65	[-183.77, 157.75]
Leadership condition: Prestige	-60.47	96.31	[-251.42, 128.31]
Leadership condition: Leadership	**73.72**	**93.20**	**[-107.53, 258.78]**

Correctly recalled letter strings (items)

None of the models with the number of correctly recalled letter strings as DV and dominance, prestige, leadership and achievement motives - or any combination of those – as predictors provided a more probable representation of the data than the intercept-only model in the dominance (BFs < 0.52), prestige (BFs < 0.64) or

leadership (BFs < 0.43) condition. A full model including all experimental conditions, DoPL motives, and DoPL motives' interactions with experimental conditions while controlling for the achievement motive yielded no significant effects as judged from the 95% ETI (see Table 9.7).

Table 9.7. Posterior probability of a linear model predicting number of correctly recalled letter strings by dominance, prestige, leadership, and achievement motive scores as well as by the interaction of prestige, dominance, and leadership with the three experimental conditions. Coefficients represent deviations from the grand mean. Coefficients for which we had hypothesis are marked in bold.

	B	*SD*	95% ETI Interval
Intercept (grand mean)	6.49	0.30	[5.90, 7.08]
Dominance	0.06	0.31	[-0.55, 0.67]
Prestige	-0.14	0.29	[-0.72, 0.43]
Leadership	-0.12	0.32	[-0.75, 0.51]
Achievement	**-0.27**	**0.28**	**[-0.83, 0.28]**
Dominance condition	-0.57	0.40	[-1.37, 0.20]
Prestige condition	0.06	0.39	[-0.70, 0.82]
Leadership condition	0.51	0.39	[-0.26, 1.30]
Dominance condition: Dominance	**0.32**	**0.40**	**[-0.47, 1.12]**
Dominance condition: Prestige	-0.22	0.49	[-1.20, 0.74]
Dominance condition: Leadership	-0.10	0.42	[-0.92, 0.72]
Prestige condition: Dominance	-0.28	0.41	[-1.08, 0.53]
Prestige condition: Prestige	**0.21**	**0.44**	**[-0.64, 1.07]**
Prestige condition: Leadership	0.06	0.38	[-0.68, 0.81]
Leadership condition: Dominance	0.35	0.4	[-0.42, 1.15]
Leadership condition: Prestige	-0.33	0.44	[-1.21, 0.54]
Leadership condition: Leadership	**-0.02**	**0.44**	**[-0.89, 0.83]**

9.4 Discussion

In this study we wanted to investigate whether people invest more effort into a random letter memorisation task (cf. Gendolla & Richter, 2006) as a function of their individual dominance, prestige, and leadership motive if the task was framed as being relevant to dominating others, gaining prestige or leading others. None of our four measures of effort mobilisation (SBP during memorisation & recall, HRV during memorisation, and the number of correctly recalled items) showed any effect in line with this hypothesis. Using a Bayesian Analysis method, we found that for almost all DVs, the observed data were more probable under an intercept-only model than any model including the predictors dominance, prestige, leadership motives, or any combination of these. The only exception to this were models including the prestige motive as a predictor and HRV during memorisation as DV. We found that these models were an anecdotally to moderately more probable representation of the data than an intercept-only model. Nonetheless, in these models the prestige motive predicted effort in the opposite direction to what we had hypothesised. In other words, a higher prestige motive was related to an increase in HRV in the low frequency band 0.04 Hz – 0.14 Hz, which indicates less effort mobilisation. Note though that measuring effort mobilisation by means of HRV in the low frequency band has been criticised as this HRV is both influenced by sympathetic and parasympathetic activation with only the former being related to effort mobilisation (Billman, 2013). In fact, the cleaner measure of sympathetic activation, SBP during memorisation, did not show any relationship with the prestige motive, which makes us doubt whether we actually measured effort mobilisation in this case. As such we will not further interpret this result.

To take individuals' general desire to perform well in challenging tasks into account, we controlled for the achievement motive (e.g., Schönbrodt & Gerstenberg, 2012) in all our analysis. Although this motive has shown to predict task performance in other studies (e.g., the number of cells completed in a Sudoku; Schönbrodt & Gerstenberg, 2012) in our study it was neither related to any physiological measure of effort mobilisation nor to the actual task performance (i.e., number of correctly recalled items). This null-result was surprising to us, however, the achievement motive has

often been related to performance in tasks that allowed participants to constantly monitor their performance as to see whether they have improved (e.g., Brunstein & Heckhausen, 2008). In our study, participants performed the same task only once. An effect of the achievement motive might have occurred if participants had done the same task twice so they could see whether they could beat their own performance the second time round.

There are several tentative explanations as to why we found null-results in this study. First, as this was a further validation study of the DoPL scales we need to address the possibility that the DoPL scales do not measure motives after all. However, this seems unlikely given the plethora of successful validation studies previously reported in this thesis, which show the DoPL scales' predicted relationship with relevant behaviour and personality characteristics. Second, it could be that the relationship between motives and effort mobilisation is not as strong as theorised. Although researchers (Capa & Audiffren, 2009; Capa et al., 2008a, 2008b) have shown a relationship of the achievement motive with objective cardiovascular indices of effort mobilisation in achievement related tasks we are not aware of any other research investigating this relationship with any other motives. As such this possibility awaits further empirical investigation. Third, it is entirely possible that the experimental manipulation in this study was too weak to produce any effects. Our contention was that if participants read, for example, that a better memory ability makes them better at leading others and if they also possess a higher leadership motive, they then want to prove to themselves that they have excellent memory skills and see this as an indicator for good leadership performance. We accept that this is not a straight forward experimental manipulation, which hinges on several assumptions. a) Participants would have to believe that this link between, for example, memory and leadership skills actually exists. b) It seems reasonable to assume that a person wants to improve their leadership qualities if they are highly leadership motivated, however, in our study they could actually not improve their leadership qualities but only prove to themselves that they have the abilities (in this case memory) to be a good leader. Although it also seems plausible that highly motivated people want to prove to themselves that they have the skills to achieve their motive goal we cannot back up this assumption. c) Even if assumptions a) and

b) were met it is still possible that memory abilities are too far removed from the actual motive goal (i.e., dominating others, gaining prestige, or leading others) such that they would not stimulate participants enough to increase their effort in the task. If a single assumption or any combination of these assumptions were not met, this could thus explain the null-results in our study. In summary, there are at least three explanations for the null-results in this study. However, whereas we believe it is unlikely that the results were due to the DoPL motives not actually measuring motives, or motives in general not being related to effort mobilisation, we believe the strongest explanation is that the experimental manipulation was too weak to arouse the respective DoPL motive.

In conclusion, we did not find any relationship between the DoPL motives and effort mobilisation in a random letter memorisation task which was construed to be relevant for these motives. A likely explanation for these null-results is that we did not succeed in making the task performance relevant enough for the respective DoPL motive. However, we believe that investigating the link between motives and cardiovascular indices of effort mobilisation is an important area for future research. This is because the energising role of motives is a key theoretical assumption (e.g., Heckhausen & Heckhausen, 2008), which has received little scientific attention in terms of objectively measured effort mobilisation (i.e., not being based on performance or self-reports; e.g., Gendolla & Richter, 2006). We chose a letter memorisation task as it was well-established paradigm to examine effort mobilisation and offered the possibility to investigate all three DoPL motives at once. Future studies would benefit from using different tasks that are immediately relevant to the respective motives, even if each motive has to be investigated within a unique study. For example, in case of the prestige motive, researchers could measure participants' systolic blood pressure (i.e., effort mobilisation) while they are actively trying to impress other participants (e.g., when creating a profile on an internet platform).

10 Chapter 10: General discussion

In this thesis we wanted to investigate whether the general power motive (e.g., Schönbrodt & Gerstenberg, 2012; Winter, 1973) can be decomposed into distinct motives related to desires to rise in social hierarchies (e.g., Henrich & Gil-White, 2001; Magee & Galinsky, 2008). In Chapter 3 & 4 we showed that three motives can be distinguished within questionnaire items related to the general power motive: a dominance motive (i.e., a desire to coerce other's into adhering to one's will), a prestige motive (i.e., a desire to attain respect and admiration for one's skills and knowledge), and a leadership motive (i.e., a desire to direct others and take responsibility in and for one's group). The dominance and prestige motive fit very well into the dominance vs prestige approach of social hierarchies (Cheng & Tracy, 2014; Henrich & Gil-White, 2001). The leadership motive could be conceptualised as either a distinct social hierarchy based on legitimate power (e.g., French & Raven, 1959) or as an orthogonal hierarchy to dominance and prestige depending on the degree individuals use their dominance or prestige influence to lead others to a common group goal (e.g., Van Vugt, 2006). In Chapters 4, 5, 6, and 7 we showed that these dominance, prestige, and leadership (DoPL) motives could not only be distinguished on statistical grounds but also predicted personality (e.g., agreeableness, extraversion), behaviour (e.g., giving behaviour towards charities or in dictator games), and other characteristics (e.g., leadership positions, endorsing of morality). Chapters 8 and 9 expanded on these findings and investigated the DoPL motives' role in cognitive dissonance in the 2016 US election as well as regarding objectively measured effort mobilisation in motive relevant tasks. In sum, we believe that this set of empirical studies provides sufficient evidence to conclude that the general power motive can and should be decomposed into distinct DoPL motives which underlie desires to rise in social hierarchies.

In the following discussion we will first highlight four ways in which this research contributes to investigations into social hierarchies and the power motive. Second, we will consider other possible distinctions within the power motive and social hierarchy literature. Third, we will examine how research into the DoPL motives relates to research into individual differences (i.e., BIG 5 model), in which way these

approaches overlap, differ, and which way they can complement each other. Finally, we will discuss the limitations of our approach and give an outlook regarding directions of future research.

10.1 Contributions of this research

This research makes four major contributions to investigations into social hierarchies and the power motive. First, it extends existing theories regarding social hierarchies by showing how two such theoretical frameworks can be combined. Second, it informs power motive theory by providing a theoretical framework to distinguish between distinct components within the power motive. Third, it provides scholars with a tool to simultaneously measure distinct DoPL motives. Fourth, it demonstrates empirically that these different DoPL motives relate to distinct behaviour, personality traits and other characteristics.

There are two major theories regarding the bases of social hierarchies, the dominance vs prestige (e.g., Henrich & Gil-White, 2001) and the power vs status approach (e.g., Magee & Galinsky, 2008). Conceptions of prestige and status are almost synonymous, however, whereas dominance describes influence through threat and fear power describes influence through reward and punishment based on asymmetrical access to resources. As Cheng and colleagues (2013) have correctly pointed out, this conception of power confounds the basis of hierarchy with the rank in a hierarchy (which is also defined by asymmetrical access to resources). Nonetheless, we argued that if power is conceptualised as a right to asymmetrical access to resources, the two theories can meaningfully complement each other. Thus we proposed that groups which want to achieve a common group goal accept, legitimise, and increase a person's (i.e., a leader) influence (thus increasing their hierarchy rank) so this person can successfully direct the group towards achieving their goal (cf. Raven & French, 1958; Van Vugt, 2006). Hence, our research expands on the dominance and prestige approach by implementing elements of a modified power vs status approach. More precisely, this research helps explain leader emergence beyond the assumption that people with a high dominance or high prestige rank automatically become group leaders.

Based on the observation that individuals have a desire to influence other people, researchers proposed a distinct power motive (distinct from affiliation or achievement motive) representing a desire to influence others (Murray, 1938; Uleman, 1972; Veroff, 1957; Winter, 1973). However, conceptualisations of this motive vary among scholars. To take these different conceptions into account and therefore acknowledging that there are many ways to attain influence, Winter (1988) defined the power motive deliberately broadly as "a concern for having impact on others, arousing strong emotions in others, or maintaining reputation and prestige" (p. 510). We argued that this power motive reflects a desire to rise in a social hierarchy, however, as we proposed three kinds of hierarchies, based on dominance, prestige, and leadership, we argued that the power motive should be conceptualised by three interrelated but distinct motives. This assumption was substantiated by evolutionary accounts of dominance, prestige, and leadership (Henrich & Gil-White, 2001; Van Vugt, 2006) and the assumption that functionally autonomous motives (Allport, 1937; Bischof, 2008) evolved in relation to each of these hierarchies. Hence, this research provides a theoretical framework for distinguishing between different components within the heterogeneously defined power motive on the basis of different social hierarchies.

Several methods have previously been used to measure desires relating to social hierarchies, however, they suffered from two shortcomings: confounding dominance with leadership desires and confounding desires for prestige with attainment of a high prestige rank. Maner and Mead (2010) employed scales to tap into dominance and prestige desires, however, their dominance scale confounded dominance with leadership desires (e.g., dominance item: "I would make a good leader."; cf. Cassidy & Lynn, 1989). Critically, we showed in several studies dominance and leadership desires relate to distinctly different kinds of behaviour. Cheng and colleagues (2010) developed scales to measure dominance and prestige strategies, however, whereas the dominance scale seemed suitable to either measure a dominance desire or one's actual dominance position (e.g., "I enjoy having control over others."; "Some people are afraid of me."), the prestige motive only related to one's prestige position (e.g., "Members of my group respect and admire me."). Crucially, we hold that having a high prestige rank is not synonymous to a high desire for prestige. For example, a

person who has prestige due to a valued skill (e.g., hunting) could have achieved this skill through a desire for respect and admiration (i.e., prestige motive) but also through a desire to achieve excellence in challenging tasks (i.e., achievement motive; Brunstein & Heckhausen, 2008). On the other hand, although motives are strong predictors for attaining goals (e.g., Heckhausen & Heckhausen, 2008), a higher explicit motive does not guarantee successful goal attainment. For example, in a longitudinal study Sheldon and Schüler (2011) showed that participants were more likely to achieve affiliation or achievement goals when they had a high affiliation or achievement motive paired with feeling that they were more autonomous (internally driven) than controlled (externally driven) in their goal pursuit. Moreover, some research indicates that a congruence between explicit and implicit motive increases the chance to achieve respective motive goals (e.g., Schüler, Job, Fröhlich, & Brandstätter, 2008; Winter, John, Stewart, Klohnen, & Duncan, 1998). In sum, our research provides scholars with a unique tool which distinguishes between dominance, prestige, and leadership aspects as well as measuring distinct motives rather than confounding having and wanting dominance or prestige.

This research also highlights the practical use for distinguishing between the DoPL motives. Across several studies we showed that the DoPL motives predict relevant variables to different degrees, beyond the shared influence of the other DoPL motives and in some cases even in opposite directions. For example, whereas the dominance motive was significantly negatively related to agreeableness, both the prestige and leadership motive had a positive relationship with agreeableness. Whereas the dominance motive was unrelated to neuroticism, the prestige motive was positively and the leadership motive negatively related (see Table 4.3.6 in Chapter 4). Whereas the prestige motive was only positively, the dominance motive was only negatively related to various moral concerns; the leadership motive showed both negative and positive relationships (Chapter 7). This shows that when not controlling for these different influences of the DoPL motives, using a general power motive might mask important effects.

10.2 Other distinctions within the power motive and social hierarchies

Besides our distinction between dominance, prestige, and leadership, scholars have distinguished other concepts within either the power motive or social hierarchies. In the following we will briefly introduce these three distinctions of autonomy, morality, and socialised vs personalised power, and discuss how they fit into the DoPL framework.

First, Lammers, Stoker, Rink, and Galinsky (2016) highlighted the importance of autonomy rather than influence when predicting desires for greater power. Across nine studies they showed that feeling to be or actually being in a position of power both positively predicted perceived autonomy and perceived influence on others. However, whereas perceived autonomy decreased a desire for greater power, perceived influence did not. Thus, Lammers and colleagues (2016) concluded that a desire to attain more power reflects a desire to increase one's autonomy and not a desire to increase one's influence on others. As the definition of the power motive does not include autonomy desires (cf. Winter, 1988; Schönbrodt & Gerstenberg, 2012) we had largely ignored this concept, with the exception of the dominance motive including elements of not wanting to be controlled against one's will. Even though the desire to attain autonomy is not regarded as a component of the power motive, it could plausibly relate to a general desire to rise in all of the three DoPL hierarchies. This is because any higher rank position provides more access to all kinds of resources, thus means to fulfil one's own goals.

Nonetheless, out of the three hierarchies, a high position in a dominance hierarchy should be most appealing to a person with high autonomy desires as a person. Such an agent, given that they possess relevant characteristics such as physical strength, could enforce a higher ranking themselves (e.g., Cheng & Tracy, 2014). A high position in a prestige hierarchy should be least appealing to a person with high autonomy desires as even if a person has superior skills, a higher ranking still arises from others' voluntary deference (e.g., Henrich & Gil-White, 2001). The prediction for the leadership hierarchy is not completely clear and would depend on whether one proposes a distinct or orthogonal leadership hierarchy. However, if a leader's

influence arises from legitimised power granted by others to achieve a common group goal, then autonomy desires would probably moderately predict attaining a higher rank in a leadership hierarchy. This is because, on the one side, legitimised power is not easily challenged, thus providing autonomy. On the other side, it comes with responsibility over others which should hinder autonomy. An interesting path for future research would be to assess how much of the variance a general autonomy desire shares with specific DoPL motives when predicting the desire to rise in, versus actual rank attainment, in a specific DoPL hierarchy. In summary, Lammers and colleagues (2016) found that perceived autonomy decreased desires for greater power whereas perceived influence over others did not. This indicates that desires for autonomy could play an important role for attaining a higher rank in DoPL hierarchies, which is an interesting avenue for future research.

Second, in a recent paper Bai (2017) argued that morality represents another pathway to attaining a higher ranking in a hierarchy; effectively proposing a distinct morality hierarchy. This morality theory is based on virtues (i.e., morally praiseworthy characteristics), which are culturally dependent (e.g., Western cultures valuing issues of fairness as more moral than Eastern cultures, cf. Graham et al., 2016) and which necessarily involve some sort of self-sacrifice (i.e., giving more of a resource than receiving). Although Bai argued that these virtues are not necessarily helpful, sometimes even detrimental, for solving immediate group-tasks (e.g., Bendersky & Shah, 2012), ultimately a group would experience this self-sacrificing behaviour as beneficial. Thus, in order to encourage a virtuous person in continuing their moral behaviour a group would voluntarily defer to this person and provide this person with a higher rank in a hierarchy akin to dominance or prestige. Bai identified admiration as the functional emotion which connects perceiving a person as virtuous with voluntarily deferring to her. Importantly, Bai distinguished this kind of admiration from admiration in the prestige hierarchy. Whereas admiration for virtues is associated with feelings of warmth (i.e., a more internally positive feeling; cf. Fiske, Cuddy, Glick, & Xu, 2002), admiration for skills is more associated with a desire to emulate the skilful person (she also calls this affective respect). She thus argued for disentangling moral virtues and competence within the prestige hierarchy in which virtues are only regarded as modifiers that increase the perceived value of a person's

skills. Hence, in the prestige approach copying moral behaviour would be beneficial for other individuals as this aids the display of their skills. However, Bai (2017) held that virtues increase people's hierarchy ranking even if they are not immediately beneficial and even if they go beyond prosocial behaviour and specifically generosity (as discussed in the dominance vs prestige approach; see Henrich & Gil-White, 2001; Cheng & Tracy, 2014) but could involve, for example, religious purity.

Morality, similar to autonomy, is not a component of the power motive, and we did not include any desires for being a moral person in our analysis. Nonetheless, if morality is indeed a path towards increasing one's ranking in a hierarchy, it begs the question whether a distinct morality motive can be postulated and whether this would be functionally autonomous. To assume a functionally autonomous motive would require further exploration into the evolutionary underpinnings of morality. Indeed, direct empirical support for a morality hierarchy would be necessary as the existence of such a hierarchy has yet to be established. Notwithstanding this, if a distinct morality motive could be assumed, then the current conception of the prestige motive would have to be refined, as although it is mostly concerned with admiration and respect for skills and knowledge, it also contains a general desire for "being respected and admired" (see Chapter 4, Table 4.3.3), which potentially confounds desires for respect (for competence) and admiration (for virtuousness). The dominance hierarchy seems to have no overlap with the morality hierarchy (Bai, 2017). The leadership hierarchy might share a mutual desire to take responsibility for one's group. Nonetheless, whereas in the leadership hierarchy this is clearly linked to directing a group towards a common group goal, virtues in the morality hierarchy do not include any leadership components and might even be detrimental to directing a group towards a common goal. Moreover, authority/legitimised power is both a part of leadership as well as a part of morality (see the moral domain of authority/respect; Graham et al., 2011). However, whereas authority in the leadership motive is something people desire for themselves in order to obtain influence, authority in regard to morality describes a cognition that people in general should/ought to listen to authority figures and adhere to the traditions of society. In summary, Bai (2017) proposed another pathway to rise in a social hierarchy based on morality and proposed to distinguish prosocial from competence aspects within the prestige

hierarchy. Whereas a potential morality motive underlying this hierarchy would seem to be mostly distinct from the dominance or leadership motives, the prestige motive would have to be further refined to differentiate between admiration for skills and admiration for being virtuous. Nonetheless, further research is necessary to confirm this morality hierarchy on theoretical as well as empirical grounds.

Third, researchers have proposed that the power motive can be divided into personalised and socialised aspects (Magee & Langner, 2008; McClelland, 1970; Winter & Stewart, 1978). In this conceptualisation, individuals high in a personalised power motive (p power) desire power for self-serving purposes in a zero-sum manner (McClelland, 1970). By contrast, those high in a socialised power motive (s power) aim to use power to benefit others, thus demonstrating more prosocial behaviour, but also have ambivalent feelings towards having power. As such p and s power seem to have substantial overlap with the dominance and leadership motives and indeed all aspects of the dominance and leadership motive can be found among different conceptualisations of p and s power, respectively. Nonetheless, as different scholars appeared to have slightly different understandings of these concepts, many aspects included under the p and s power terms do not match with dominance and leadership desires. For example, besides desires to dominate others measures of p power included desires to impress others, desires for reputation, unsolicited helping behaviour (Magee & Langner, 2008), desires for autonomy unrelated to coercing others (Wang & Sun, 2016), or general beliefs that there should be social hierarchies (Torelli & Shavitt, 2010). Similarly, besides desires to take responsibility and lead others, measures of s power included doubts about one's ability to influence others, antipathy towards power as it is perceived to be flawed or deceptive (Magee & Langner, 2008), making the world a better place at large but not strictly by leading others (Wang & Sun, 2016), or positive feelings from showing general prosocial behaviour (Torelli & Shavitt, 2010). The prestige motive shows some overlap with p power under some conceptualisations (e.g., Magee & Langner, 2008), however, it remains mostly unrepresented by either p or s power. In summary, conceptualisations of distinct p and s power have included all aspects of the dominance and leadership motives, however, as p and s power were not clearly defined they also included many aspects that did not match these motives. In the interest of maintaining these

concepts of p and s power, scholars could use the more narrowly defined dominance and leadership scales.

10.3 Explicit DoPL motives in relation to five factor models of personality

Apart from other distinctions within social hierarchies and the power motive, the DoPL motives also show overlap with some facets of five factor models of personality (e.g., Big-Five; Goldberg, 1990)[17]. In this section we will briefly describe the different theoretical underpinnings of five factor models and motive research in general and highlight the commonalities and differences between the DoPL motives and five factor model facets. We will then discuss how motive research could benefit from findings of five factor models.

Both five factor models of personality as well as research into motives serve the classification of individual differences in people. The five factor model of personality was originally based on factor analytical and lexical approaches to find commonalities among words referring to personality attributes (e.g., Asendorpf & Neyer, 2012; John, Angleitner, & Ostendorf, 1988). Researchers consistently found five factors/domains (termed traits; e.g., extraversion or agreeableness) underlying questionnaire responses based on these attributes which described individual differences in "stylistic and habitual patterns of cognition [C], affect [A], and behaviour [B]" (Emmons, 1989, p. 32). Although researchers agreed that desire/motivational (D) aspects should also be included in the representation of personality traits (e.g., Borkenau, 1990; Costa & McCrae, 1988; Read, Jones, & Miller, 1990; Wilt & Revelle, 2015), Wilt and Revelle (2015) found that questionnaire items measuring these are scarce among the most popular personality trait scales (i.e., NEO-PI-R, Costa & McCrae, 1992; IPIP version of NEO-PI-R & IPIP version of AB5C, Goldberg et al., 2006).

[17] We will use the terms five-factor model and Big-Five interchangeably as for the purpose of this section they are the same. However, we are aware that there are subtle differences between these models (Wilt & Revelle, 2015) such as the labelling of certain facets.

Investigations into motives started out with an effort to classify human needs through observation and experimentation (see Chapter 2.3.1; Murray, 1938; Jackson 1967). Among these, researchers were mostly interested in the psychogenic (rather than physiogenic) needs and tested whether these could be aroused experimentally (i.e., by increasing the need state; e.g., McClelland et al., 1949), whether this would show in projective tests like the TAT and whether these TAT test scores would predict motive-relevant behaviour (e.g., Winter, 1973; McClelland, 1987). Three basic needs were considered to cover most fundamental human motives: power, affiliation, and achievement (e.g., Langan-Fox & Grant, 2006; McClelland, 1987; Veroff, Depner, Kulka, & Douvan, 1980). Unlike traits these motives were not only measured with questionnaire scales (i.e., explicit motives) but also through projective methods such as the TAT (i.e., implicit motives; e.g., Heckhausen & Heckhausen, 2008). As motives represent preferred goal states, at least for explicit motives, questionnaire items measuring these motives have mostly referred to D aspects. However, recently researchers have included questionnaire items which acknowledge that desiring these goals states can also show in distinct ABC ways (e.g., Schönbrodt & Gerstenberg, 2012; see Chapter 4.2.1). In summary, both trait as well as motivational psychologists created frameworks to classify individual differences in people. Whereas trait psychologists employed a lexical approach to create an all-encompassing framework of personality, motivational psychologists employed experimental arousal studies to investigate a few basic human motives. Although both fields of research have included ABCD aspects in their personality models, traits researchers have focussed more strongly on ABC aspects, whereas motivational psychologists focussed more strongly on D aspects.

Although based on different methodological approaches, trait model domains as well as their narrower facets have shown substantial correlations with explicit motives (e.g., Costa & McCrae, 1988; Engeser & Langens, 2010; Paunonen, Jackson, Trzebinski, & Forsterling, 1992; Stumpf, 1993). Whereas the affiliation and achievement motives seemed to reliably map onto certain Big-Five domains/facets, the power motive correlated differently with Big-Five facets depending on which kind of power motive scale was used (Engeser & Langens, 2010). This might be explained by the heterogeneity of the power motive and different power motive

scales focussing more strongly on different aspects. The DoPL motives were designed to reduce this heterogeneity and provide meaningful subcomponents of the power motive, thus might place the power motive more reliably within the five factor model. By inspecting items of facets of the most common Big-Five questionnaires, DoPL dominance seemed most closely related to affiliation's straightwordness facet in the NEO-PI-R or morality in the IPIP version of the NEO-PI-R and AB5C (e.g., "Use others for my own ends"). Nonetheless, these scales seemed to only represent the manipulative part of the dominance motive but not the more overt forceful part. Furthermore many items seem to be involved with just sticking to the rules (e.g., "Would never cheat on my taxes"). DoPL prestige seemed to be best reflected by affiliation's modesty facet in the NEO-PI-R and IPIP version of NEO-PI-R (e.g., "Making myself the centre of attention"). However, all of these items seemed to be concerned with boasting about oneself or having a high opinion of oneself, which at best reflects a mix of dominance and prestige aspects (see Chapter 3.4). DoPL leadership seemed to be most closely related to extraversion's assertiveness facet in the NEO-PI-R and IPIP version of NEO-PI-R as well as the leadership facet in the IPIP version of the AB5C (e.g., "Try to lead others."). Although the overlap here is very big this facet also contained items relating to dominance content (e.g., "I am dominant..").

In summary, Big-Five domains/facets and explicit motives have shown substantial correlations in the past. At face-value the DoPL leadership motive seemed to be closely resembled by the assertiveness/leadership facet, the dominance and prestige motives seemed to be only partly represented by respective Big-Five facets. As there is an enormously rich pool of questionnaire items measuring traits we have no doubt that one could handpick items from different questionnaires and facets which would closely resemble the DoPL scales. This is reassuring as the DoPL scales intend to measure individual differences in people and these should have surfaced at some point in a thorough investigation of personality. Nonetheless, this does not render research into the DoPL motives redundant for three reasons. First, whereas the basis of five factor models is exploratory, the DoPL motives are based on theoretical accounts of different social hierarchies. Thus without this theory it would be purely coincidental to create scales from the pool of trait items that resemble different

desires to rise in DoPL hierarchies. Second, as most trait items only focus on ABC aspects of personality, we believe the DoPL scales with a more balanced ABCD distribution cover the DoPL aspects of personality more broadly than trait items could (c.f., Wilt & Revelle, 2015). Third, by using some of the exact same items used in previous power motive scales we managed to link the DoPL scales more closely to the power motive as this would have been possible by selecting existing trait scale items.

Finally, given this overlap of traits and motives we believe motivational psychology could benefit from trait psychological findings in at least two ways. First, in multiple twin studies trait researchers investigated the genetic, shared environmental, and non-shared environmental correlates of personality traits at a domain (e.g., Riemann, Angleitner, & Strelau, 1997), facet (e.g., Jang, Livesley, Angleitner, Riemann, & Vernon, 2002), and even item-level (e.g., Mõttus, Kandler, Bleidorn, Riemann, & McCrae, 2016) in five factor model questionnaires. Results showed a strong genetic component and very little (albeit non-zero) shared environmental influences. As stated in Chapter 2.3.1, motives are theorised to form during childhood as a function of positive or negative learning experiences (e.g., Heckhausen & Heckhausen, 2008). Given the theoretical and operational overlap of explicit motive items and trait items and assuming that most childhood experiences are shared among twins (e.g., Borkenau, Riemann, Angleitner, & Spinath, 2002), this casts doubt on this developmental claim at least for explicit motives. Hence, explicit motive research would benefit from incorporating genetic influences in the genesis of explicit motives akin to trait theory. Second, both motives and traits are assumed to be relatively stable over time, however, whereas this has been shown for implicit motives (e.g., Schultheiss & Pang, 2007) as well as traits (e.g., Ardelt, 2000) the longest test-retest interval for explicit motives we found was two weeks (Jackson, 1984). Again, given the theoretical and operational overlap of explicit motive items and trait items it seems reasonable to assume that explicit motives are also relatively stable over time. Assuming this stability would substantiate the claim regarding explicit motives' lasting effects on behaviour. Moreover, in respect of the DoPL motives it could solve some problems regarding the purely correlational interpretations of findings. Assuming temporal stability in the DoPL motives' would

render some reversed causal relationships unlikely (e.g., a leadership position causing a higher leadership motive). In summary, as there seems to be substantial overlap between traits and explicit motives it seems reasonable to assume that, akin to traits, differences in explicit motives are strongly influenced by genes and that they are relatively stable over time.

10.4 Limitations of this research

There are three important limitations to our research. First, when constructing the DoPL scales we did not conduct an exhaustive review of all power motive items; thus our items are not randomly drawn from the population of all possible power motive items (e.g., Dhami, Hertwig, & Hoffrage, 2004). Rather than investigating all power motive scales we chose the most widely used power motive scale (Jackson, 1984) as well as scales that have shown to distinguish between different aspects potentially related to different social hierarchies (Schönbrodt & Gerstenberg, 2012). Moreover, rather than selecting all possible items we pre-selected items based on matching definitions of different social hierarchies. Thus, it is entirely possible to find different components of the power motive or more fine grained distinctions based on a different item pool. However, our aim was not to find all possible distinctions within the power motive and, as Bischof (2008) pointed out, this would be an almost impossible endeavour as any concept can be distinguished into finer and finer graded distinctions. The method we employed only served the purpose of distinguishing distinct (i.e., not strongly correlated) power motive components which relate to theoretical considerations of social hierarchies.

Second, all relationships between the DoPL motives and the various dependent variables (DVs) in this thesis are correlational. Thus, although our hypotheses often implied a causal relationship (e.g., a higher leadership motive leads to a higher leadership position) we were careful to point out that, given our data, the significant relationships we found could also reflect a reversed causal link (e.g., someone who is in a higher leadership position developing desires for leadership) or that both variables could be driven by a third variable (e.g., having a higher leadership position and desiring leadership are both driven by a common desire for money). Admittedly, as we regard the DoPL motives as relatively stable personality dispositions (e.g.,

Heckhausen & Heckhausen, 2008) experimentally manipulating these motives to establish a causal relationship would prove to be difficult. Nonetheless, in a longitudinal study consistently positively promoting prestige aspects (in case of the explicit motive) or consistently establishing prestige stimuli-reward contingencies (in case of the implicit motive) might be a method to manipulate individuals' motives (Schultheiss, 2001). An informative and less intrusive alternative way would be arousing participants' motives, similarly to our manipulation in the online dictator game study (Chapter 6). However, this would only get us part of the way towards causality. This because a significant interaction between experimental factor and DoPL motive in predicting a DV could show that the experimental factor causes a relationship between DoPL motive and DV to become bigger or smaller, however, the relationship itself would still be correlational. In sum, given our data, we can conclude that the DoPL motives relate distinctly different to a range of relevant variables, however, we cannot conclude that the DoPL motives cause differences in these relevant variables. As motives are theorised to direct, energise, and maintain behaviour (Heckhausen & Heckhausen, 2008), thus implying a causal relationship, future research is necessary to bridge this gap from correlational to causal evidence.

Third, assuming a distinct leadership motive based on a desire to take responsibility and direct others is a novel approach and our findings provided initial evidence for this leadership motive theory. For example, a variable related to initiative-taking/responsibility-taking, extraversion, was strongly positively related to the leadership motive (e.g., Van Vugt, 2006). Moreover, the leadership motive was positively related to variables related to competence such as the achievement motive or conscientiousness, which would also be beneficial to attract followers (Van Vugt, 2006). Finally, the leadership motive was a strong predictor for employment rank/leadership position across a wide range of professions, thus illustrating the universality of the leadership motive (see Chapter 5). Nonetheless, there are still many open questions regarding the underlying theoretical evolutionary framework (e.g., Allport, 1937; Van Vugt, 2006; see Chapter 4). For example, is it sensible to assume a distinct leadership hierarchy akin to dominance and prestige based on legitimate power (e.g., French & Raven, 1959)? Can initiative taking and/or directing others provide a person with legitimate power (e.g., Raven & French, 1958) and thus

influence over other people? Or is leadership a hierarchy orthogonal to dominance and prestige hierarchies, based on whether people put their dominance or prestige influence into practice to achieve a common group goal? In sum, although our findings provide preliminary support of our leadership motive theory this theory needs to be further refined theoretically and awaits further empirical support.

10.5 Future directions

The theoretical framework proposed in this thesis and in particular the DoPL scales as a measurement tool provide many interesting avenues for future research. As we stated before, we hold that wanting dominance, prestige or leadership is not synonymous to having them. Nonetheless, for a comprehensive theory of social hierarchies it would be important to investigate under which circumstances higher DoPL motives lead to higher DoPL hierarchy rankings. Previous research in motivational psychology indicated that increasing internally driven motivation (Sheldon & Schüler, 2011) or a congruency between implicit and explicit motive (e.g., Schüler et al., 2008; Winter et al., 1998) predict an enhanced relationship between motive and goal attainment. Moreover, situational variables could provide further moderating influences. For example, a higher socio-economic status could provide individuals with more access to learning superior skills (in case of prestige). Being in an environment in which dominance behaviour is prevalent could strengthen the relationship between the dominance motive and dominance ranks (e.g., in imprisoned gang members; Wood & Dennard, 2017).

Another interesting line of research involves the relationship between testosterone and the DoPL motives. For a long time scholars linked testosterone solely to aggression and dominant behaviour. However, such effects have been largely intermittent in the literature (Archer, Birring, & Wu, 1998; Dabbs, Carr, Frady, & Riad, 1995; Dabbs & Hargrove, 1997). Recently, Eisenegger, Haushofer, and Fehr (2011) suggested that testosterone might be linked to a desire to increase one's rank in a hierarchy. Assuming different kinds of social hierarches, this could sometimes show in aggression (e.g., dominance hierarchy) but could also show in prosocial behaviour (e.g., prestige hierarchy). Preliminary support for this hypothesis comes from two economic exchange game studies in which participants showed increased

selfish/dominant behaviour as well as increased generous behaviour after being administered testosterone (Dreher et al., 2016; Eisenegger, Naef, Snozzi, Heinrichs, & Fehr, 2010). Only one study so far has tested the interplay between individuals' dominance and prestige and testosterone. In this study, Johnson, Burk, and Kirkpatrick (2007) measured men's self-perceived dominance and prestige and found that baseline testosterone levels were unrelated to self-perceived dominance and negatively related to self-perceived prestige. These findings were somewhat surprising, however, might be due to confounding having dominance and prestige with desiring dominance and prestige. Moreover, testosterone might represent a dynamic marker of motivation (Schultheiss & Wirth, 2008), thus might only show once a motive is aroused. The DoPL motives provide a novel framework to test these relationships between testosterone and the distinct desires to rise in social hierarchies.

10.6 Concluding remarks

Social hierarchies have been prevalent throughout human history and determine the way we are influenced by our football captains, our teachers, our managers, our politicians. In times in which socially regressive forces are again gaining ground it appears especially pressing to understand what drives people to advance in these omnipresent social structures. Where does power come from? Which structural components provide those people with influence who support our values? What determines who will emerge as our leaders? An investigation into motives to rise in social hierarchies constitutes an essential step towards answering these questions and we hope that the theory and findings in this doctoral thesis both inspire and support further inquiries into this important field of research.

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12 Appendix 1: For Chapter 3

Table A1.1. Factor loadings of the refined three-factor solution including 19 out of 28 focal items with loadings < .25 omitted. Reverse scored items are marked with #.

	Prestige	Dominance	Leadership
I feel sad if nobody recognises my unique talents and abilities.	0.53		-0.31
I like it when others look up to me.	0.57		
Be respected and admired by other people.	0.93		
To be well-known to a lot of people.	0.65		
A position with prestige.	0.60		
Be held in high-esteem by those I know.	0.90		
It is not important to me that others value my opinion.#	0.37		
I am happy to do people favours as long as they respect me.	0.28		
High social status.	0.49	0.28	
I try to control others rather than permit them to control me.		0.58	
I am willing to use aggressive tactics to get my way.		0.61	
Others know it is better to let me have my way.		0.82	
I often try to get my own way regardless of what others may want.		0.97	
I like to have the final say.		0.45	
I would like to be an executive with power over others.			0.61
I have little interest in leading others.#			0.92
I feel confident when directing the activities of others.			0.76
I do not enjoy having authority over other people.#			0.85

The opportunity to exercise control over an organization or group.	0.27	0.45

13 Appendix 2: For Chapter 4

13.1 Study 1

Table A2.1.1. Factor loadings of the five-factor solution including all 57 focal items with loadings < .25 omitted. Reverse scored items are marked with #. The loadings on factor F4 seem to underlie no distinct pattern. The factor F5 seems to represent a method factor with high loadings of the goal items.

	Dominance	Leadership	Prestige	F4	F5
I enjoy manipulating others.	0.66			-0.26	
I enjoy bending others to my will.	0.79				
I try to control others rather than permit them to control me.	0.56				
I am willing to use aggressive tactics to get my way.	0.66				
If people don't think highly of me, I don't help them.	0.53				
When people challenge me I want to put them down hard.	0.85				
I want to twist others around my little finger.	0.79				
Others know it is better to let me have my way.	0.79				
Putting people in their place is often necessary.	0.72				
It's probably a good thing that certain groups are at the top and other groups are at the bottom.	0.52				
I often try to get my own way regardless of what others may want.	0.84				

Dominating others.	0.70				0.32
Getting others to do what I want.	0.58				
I relish opportunities in which I can lead others.		0.69			
I like to be in charge of others.		0.70			
I have little interest in leading others.#		0.82			
I want to be in a position in which others look to me for direction.		0.53			
I feel confident when directing the activities of others.		0.79			
I do not enjoy having authority over other people.#		0.68	0.25	-0.28	
I am often the leader.		0.85			
I avoid positions with responsibility over others.#		0.84			
When things need to be changed in the group, I step up and do it.		0.62			
I make a good leader.		0.90			
I would like to be an executive with power over others.	0.32	0.52			
Strong leadership.		0.71			
I like it when others look up to me.			0.65		
I want to be held in high-esteem by others.			0.62		
I like it when others compliment me on my curriculum vitae.			0.65		
I am willing to work harder if this earns me more recognition from others.			0.55		
I feel sad if nobody recognises my		-0.27	0.61		

unique talents and abilities.					
I am happy when I can present my achievements to others.			0.55		
It doesn't matter if I don't get the credit for my work.#			0.67	-0.34	
It is not important to me that others value my opinion.#			0.56		
Recognition from others.			0.69		0.32
Be respected and admired by other people.			0.57		0.31
Being respected by others is often payment enough.				0.63	
It's not good to dominate others.#	0.47			-0.28	
I am happy to do people favours as long as they respect me.			0.43	0.32	
I get a lot of enjoyment out of winning an argument.	0.33		0.50		
The world needs good leaders.	-0.30		0.28	0.26	
I don't like if somebody challenges my authority.	0.42				
The best thing in life is to be a good leader.		0.27		0.40	
Good leaders are more important than good workers.	0.40			0.36	
I often share with others when I achieved something great.			0.38		
I celebrate my own successes with others more often than theirs.	0.50				
Success means being respected.			0.30	0.45	
The best people in life are those who have the respect of others.				0.45	
Being unnoticed by others is a			0.47		0.25

terrible thing.				
Some people have to be in control over others.	0.39			
If I am with other people, it is mostly me who makes the decisions.	0.42	0.37	0.26	
I want to be well-known to a lot of people.			0.32	0.38
I can easily detect when people want to challenge me.	0.33	0.31		-0.26
I like it when I have the final say.	0.46		0.26	
High social status.	0.27		0.27	0.47
To be in a leadership position in which others work for me.		0.49		0.35
The opportunity to exercise control over an organization or group.	0.34	0.38		0.34
A position with prestige.			0.35	0.38

Table A2.1.2. Factor loadings of the refined three-factor solution including 43 out of 57 focal items with loadings < .25 omitted. Reverse scored items are marked with #.

	Domi-nance	Pres-tige	Leader-ship
It's not good to dominate others.#	0.53		
I enjoy manipulating others.	0.70		
I enjoy bending others to my will.	0.80		
I try to control others rather than permit them to control me.	0.54		
I am willing to use aggressive tactics to get my way.	0.65		
When people challenge me I want to put them down hard.	0.75		
I want to twist others around my little finger.	0.82		
Others know it is better to let me have my way.	0.73		
Putting people in their place is often necessary.	0.65		
I often try to get my own way regardless of what others may want.	0.81		
Dominating others.	0.78		
Getting others to do what I want.	0.63		
Some people have to be in control over others.	0.40		
It's probably a good thing that certain groups are at the top and other groups are at the bottom.	0.50		
I like it when I have the final say.	0.40		
I like it when others look up to me.		0.66	
I am happy to do people favours as long as they respect me.		0.62	
I want to be held in high-esteem by others.		0.73	
I like it when others compliment me on my curriculum vitae.		0.66	
I am willing to work harder if this earns me more recognition from others.		0.57	
I often share with others when I achieved something great.		0.52	
I feel sad if nobody recognises my unique talents and abilities.		0.57	
Success means being respected.		0.62	

The best people in life are those who have the respect of others.	0.53	
Being unnoticed by others is a terrible thing.	0.61	
I am happy when I can present my achievements to others.	0.68	
Recognition from others.	0.73	
Be respected and admired by other people.	0.70	
Being respected by others is often payment enough.	0.46	
It doesn't matter if I don't get the credit for my work.#	0.39	
I want to be well-known to a lot of people.	0.48	
It is not important to me that others value my opinion.#	0.41	
A position with prestige.	0.48	
I relish opportunities in which I can lead others.		0.66
I like to be in charge of others.		0.68
I have little interest in leading others.#		0.79
I feel confident when directing the activities of others.		0.76
I do not enjoy having authority over other people.#		0.65
I am often the leader.		0.81
I avoid positions with responsibility over others.#		0.83
When things need to be changed in the group, I step up and do it.		0.58
I make a good leader.		0.87
Strong leadership.		0.67

Table A2.1.3. Factor loadings of the two-factor solution including all 57 focal items with loadings < .25 omitted. Reverse scored items are marked with #. Factor F1 shows a mix of prestige and leadership items, factor F2 is mostly related to dominance items.

	F1	F2
I like it when others look up to me.	0.748	
I relish opportunities in which I can lead others.	0.762	
I am happy to do people favours as long as they respect me.	0.501	
I like to be in charge of others.	0.693	
The world needs good leaders.	0.549	-0.374
I want to be held in high-esteem by others.	0.79	
I like it when others compliment me on my curriculum vitae.	0.582	
I am willing to work harder if this earns me more recognition from others.	0.577	
I have little interest in leading others.#	0.689	
I want to be in a position in which others look to me for direction.	0.769	
Being respected by others is often payment enough.	0.524	
Success means being respected.	0.554	
I feel confident when directing the activities of others.	0.711	
I do not enjoy having authority over other people.#	0.622	
I am happy when I can present my achievements to others.	0.643	
I am often the leader.	0.708	
I avoid positions with responsibility over others.#	0.635	
I want to be well-known to a lot of people.	0.518	
When things need to be changed in the group, I step up and do it.	0.638	
I make a good leader.	0.818	
I would like to be an executive with power over others.	0.548	0.377
Strong leadership.	0.726	
Recognition from others.	0.621	

Be respected and admired by other people.	0.733	
To be in a leadership position in which others work for me.	0.578	0.34
A position with prestige.	0.622	
It's not good to dominate others.#		0.533
I enjoy manipulating others.		0.708
I enjoy bending others to my will.		0.801
I try to control others rather than permit them to control me.		0.525
I am willing to use aggressive tactics to get my way.		0.647
I celebrate my own successes with others more often than theirs.		0.527
When people challenge me I want to put them down hard.		0.757
I want to twist others around my little finger.		0.84
Others know it is better to let me have my way.		0.752
Putting people in their place is often necessary.		0.65
It's probably a good thing that certain groups are at the top and other groups are at the bottom.		0.511
I often try to get my own way regardless of what others may want.		0.82
Dominating others.		0.791
Getting others to do what I want.		0.63
I get a lot of enjoyment out of winning an argument.	0.34	0.286
I don't like if somebody challenges my authority.		0.305
The best thing in life is to be a good leader.	0.469	
Good leaders are more important than good workers.		0.407
I often share with others when I achieved something great.	0.455	
If people don't think highly of me, I don't help them.		0.499
I feel sad if nobody recognises my unique talents and abilities.	0.291	
The best people in life are those who have the respect of others.	0.438	
Being unnoticed by others is a terrible thing.	0.33	
Some people have to be in control over others.		0.394

If I am with other people, it is mostly me who makes the decisions.	0.431	0.386
It doesn't matter if I don't get the credit for my work.#	0.271	
I can easily detect when people want to challenge me.	0.302	
It is not important to me that others value my opinion.#	0.382	
I like it when I have the final say.	0.367	0.4
High social status.	0.391	0.394
The opportunity to exercise control over an organization or group.	0.45	0.45

Table A2.1.4. Factor loadings of the one-factor solution including all 57 focal items. No factor loadings omitted in this output, however, only one item showed a loading below < .25. Reverse scored items are marked with #.

	F1
I like it when others look up to me.	0.56
It's not good to dominate others.#	0.38
I relish opportunities in which I can lead others.	0.73
I am happy to do people favours as long as they respect me.	0.31
I like to be in charge of others.	0.78
I get a lot of enjoyment out of winning an argument.	0.55
I enjoy manipulating others.	0.44
The world needs good leaders.	0.21
I want to be held in high-esteem by others.	0.59
I don't like if somebody challenges my authority.	0.37
I enjoy bending others to my will.	0.57
I try to control others rather than permit them to control me.	0.56
I like it when others compliment me on my curriculum vitae.	0.39
I am willing to work harder if this earns me more recognition from others.	0.65
I am willing to use aggressive tactics to get my way.	0.63
The best thing in life is to be a good leader.	0.59
Good leaders are more important than good workers.	0.49
I often share with others when I achieved something great.	0.33
If people don't think highly of me, I don't help them.	0.32
I have little interest in leading others.#	0.63
I feel sad if nobody recognises my unique talents and abilities.	0.44
I want to be in a position in which others look to me for direction.	0.78
I celebrate my own successes with others more often than theirs.	0.57
Being respected by others is often payment enough.	0.30

Success means being respected.	0.57
When people challenge me I want to put them down hard.	0.47
I want to twist others around my little finger.	0.52
I feel confident when directing the activities of others.	0.64
I do not enjoy having authority over other people.#	0.65
The best people in life are those who have the respect of others.	0.43
Being unnoticed by others is a terrible thing.	0.41
Others know it is better to let me have my way.	0.55
Putting people in their place is often necessary.	0.55
Some people have to be in control over others.	0.40
If I am with other people, it is mostly me who makes the decisions.	0.71
I am happy when I can present my achievements to others.	0.58
It's probably a good thing that certain groups are at the top and other groups are at the bottom.	0.42
I am often the leader.	0.72
I avoid positions with responsibility over others.#	0.46
It doesn't matter if I don't get the credit for my work.#	0.31
I want to be well-known to a lot of people.	0.63
I often try to get my own way regardless of what others may want.	0.57
I can easily detect when people want to challenge me.	0.47
When things need to be changed in the group, I step up and do it.	0.62
I make a good leader.	0.72
It is not important to me that others value my opinion.#	0.25
I like it when I have the final say.	0.66
I would like to be an executive with power over others.	0.81
High social status.	0.68
Dominating others.	0.66
Strong leadership.	0.73

Recognition from others.	0.69
Getting others to do what I want.	0.67
Be respected and admired by other people.	0.65
To be in a leadership position in which others work for me.	0.81
The opportunity to exercise control over an organization or group.	0.78
A position with prestige.	0.75

13.2 Study 2

Strategy to determine final DoPL scales

In Study 1 we determined 10 items to measure each of the DoPL motives. These items constituted the preliminary core items of the DoPL scales and were chosen on the basis of high factor loadings in Study 1, an even spread of affective, behavioural, cognitive, and desire aspects (ABCD; Wilt & Revelle, 2015), as well as a broad coverage of the underlying concept. However, we also tested several factor analyses, exchanging core items with additional "reserve" items (5 dominance, 8 prestige, 0 leadership items) which yielded essentially identical three-factor structures. As we aimed to create 3 10-item scales for each the DoPL motives consisting of items that uniquely load on a single factor in both Study 1 and Study 2 we would replace any core item showing cross-loadings > .25 with a reserve item of the same ABCD category. This resulting set of items would then constitute the final DoPL scales. Note that this item selection was completely independent from the hypothesis tests described in Table 4.3.1.

This description can also be found in our preregistration (https://osf.io/2w647/).

14 Appendix 3: For Chapter 6

Table A6.1. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the dominance and prestige motives.

	Lab-based study				Online study			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	89.82	4.70	19.10	< .01	105.76	4.27	24.76	< .01
Dominance	-17.65	5.03	-3.51	< .01	-11.35	4.65	-2.44	.02
Prestige	5.65	5.03	1.12	.27	2.84	4.65	0.61	.54

Table A6.2. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the prestige and leadership motives.

	Lab-based study				Online study			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	89.82	4.95	18.14	<.01	105.76	4.28	24.69	< .01
Prestige	3.49	5.20	0.67	.51	2.87	4.79	0.60	.55
Leadership	-13.25	5.20	-2.55	.01	-10.08	4.79	-2.10	.04

Table A6.3. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the dominance, prestige, and leadership motives, gender (effect coded; -.5 for males), and the interactions between dominance and prestige motives and gender.

	Lab-based study				Online study			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	89.40	4.95	18.07	< .01	107.13	4.40	24.33	< .01
Dominance	-17.28	5.20	-3.33	< .01	-10.19	4.76	-2.14	.03
Prestige	4.85	5.31	0.91	.37	2.28	4.81	0.47	.64
Gender	1.40	9.89	0.14	.89	11.98	8.81	1.36	.17
Gender*Dominance	7.95	10.39	0.77	.45	8.29	9.52	0.87	.38
Gender*Prestige	-6.82	10.63	-0.64	.52	-6.56	9.62	-0.68	.50

Table A6.4. Linear regression models predicting the proportion of money (in pennies) out of 2 GBP (lab-based study) and 3 GBP (online study: neutral condition) given to another participant by the dominance, prestige, and leadership motives, gender (effect coded; -.5 for males), and the interactions between prestige and leadership motives and gender.

	Lab-based study				Online study			
	b	*SE*	*t*	*p*	*b*	*SE*	*t*	*p*
Intercept	91.54	4.81	19.04	< .01	106.75	4.31	24.78	< .01
Prestige	3.33	4.96	0.67	.51	2.68	4.95	0.54	.59
Leadership	-17.81	5.16	-3.45	< .01	-10.00	4.79	-2.09	.04
Gender	-3.96	9.62	-0.41	.68	15.01	8.62	1.74	.08
Gender*Prestige	-14.53	9.92	-1.47	.15	-7.47	9.91	-0.75	.45
Gender*Leadership	30.81	10.31	2.99	< .01	11.29	9.59	1.18	.24

Table A6.5. Multilevel model with by-participant random intercepts and by-participant random slopes for experimental condition predicting the amount of money (in pennies) out of 3 GBP given to another participant in an online DG. The independent variables included the dominance and prestige motives, gender (effect coded: males = -.5), experimental condition (effect coded: neutral = -.5; arousal = .5), and all second order interactions between gender, condition and dominance and prestige motives as predictors.

	b	*SE*	*t*	Bootstrapped 95% CI
Intercept	90.65	4.24	21.39	[82.41, 99.02]
Dominance	-11.79	4.58	-2.58	[-20.61, -2.63]
Prestige	0.38	4.62	0.08	[-8.67, 9.47]
Gender	7.39	8.47	0.87	[-9.07, 23.87]
Condition	-33.77	4.56	-7.40	[-42.48, -24.86]
Gender*Condition	-9.38	9.34	-1.01	[-27.90, 9.06]
Gender*Dominance	11.92	9.16	1.30	[-5.98, 29.96]
Condition*Dominance	-3.15	5.04	-0.62	[-5.98, 29.96]
Gender*Prestige	-6.01	9.24	-0.65	[-23.87, 12.03]
Condition*Prestige	-4.40	4.94	-0.89	[-14.29, 4.90]

Table A6.6. Multilevel model with by-participant random intercepts and by-participant random slopes for experimental condition predicting the amount of money (in pennies) out of 3 GBP given to another participant in an online DG. The independent variables included the prestige and leadership motives, gender (effect coded: males = -.5), experimental condition (effect coded: neutral = -.5; arousal = .5), and all second order interactions between gender, condition and prestige and leadership motives as predictors.

	b	*SE*	*t*	Bootstrapped 95% CI
Intercept	89.80	4.19	21.45	[81.68, 98.05]
Prestige	-0.35	4.81	-0.07	[-9.75, 9.29]
Leadership	-8.56	4.65	-1.84	[-17.79, 0.53]
Gender	11.05	8.37	1.32	[-5.74, 27.33]
Condition	-33.69	4.56	-7.38	[-42.51, -24.81]
Gender*Condition	-8.00	9.14	-0.87	[-26.19, 10.06]
Gender*Prestige	-1.80	9.62	-0.19	[-20.60, 17.14]
Condition*Prestige	-6.70	5.07	-1.32	[-16.66, 2.95]
Gender*Leadership	2.90	9.31	0.31	[-15.19, 20.86]
Condition*Leadership	2.46	5.07	0.49	[-7.64, 12.52]

15 Appendix 4: For Chapter 7

Preregistered sampling plan

Sample size:

Sample size will be determined by the sequential analysis of Bayes Factors. The maximum sample size for this study is n = 550, however, we take the liberty to increase this sample size in increments of n = 25 if the Bayes Factors are close to our predefined requirements (see below).

Sample size rationale:

We are also collecting data for another analysis in the same survey. In this analysis we want to be able to detect a correlation of *r* = .2 with alpha = .05 (two tailed) and statistical power of beta = .80, yielding n = 191. Thus we will, at minimum, collect n = 200 participants in condition 1 to be able to perform this analysis.

Stopping rule:

The stopping decision will be made on the basis of Bayes Factors as well as the maximum sample size. Bayes Factors will be calculated as probability tests of the following linear regression models:

M1: amount donated predicted by intercept only (only using participants in condition 1)

M2: amount donated predicted by dominance and leadership motive (only using participants in condition 1)

M3: amount donated predicted by dominance, prestige and leadership motive (only using participants in condition 1)

M4: amount donated predicted by dominance, prestige and leadership motive, and dummy coded variable representing the experimental condition (condition 1 = 0)

M5: amount donated predicted by dominance, prestige and leadership motive, and dummy coded variable representing the experimental condition (condition 1 = 0) as well as the interaction between the prestige motive and the experimental condition variable.

We will first collect data of participants in condition 1 and sample so long until both of the following requirements are met.

1. Bayes Factor1: M3/M1 > 6
2. Bayes Factor2: M3/M2 > 6

Once both requirements are met we will collect participants for condition 2 and sample so long until either the maximum sample size (n = 550) is reached or both of the following requirements are met:

3. Bayes Factor3: M5/M1 > 6
4. Bayes Factor4: M5/M4 > 6

Using Sequential Bayes Factor is a procedure introduced by Schönbrodt (Schönbrodt, F. D., Wagenmakers, E. J., Zehetleitner, M., & Perugini, M. (2017). Sequential hypothesis testing with bayes factors: efficiently testing mean differences. Psychological Methods, 22(2), 322-339.). Bayes Factors of > 6 represent satisfactory evidence for the alternative hypothesis/model (see paper).

Bayes Factors will be calculated using the *BayesFactor* package (Morey, Rouder, & Jamil, 2017) in the statistical software R using the regressionBF() function with all default priors.

16 Appendix 5: For Chapter 8

Item 4

Table A5.1. Cognitive dissonance as measured by item 4 (preference voting for women, see Table 8.2) predicted by dominance motive, voting preference (Trump = 0), study part (pre-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	3.39	0.15	23.29	< .01
Dominance	0.26	0.12	2.15	.03
Voting preference	-1.20	0.17	-6.97	<.01
Study part	0.01	0.18	0.05	.96
Voting preference*study part	-0.16	0.21	-0.75	.46
Dominance*voting preference	-0.06	0.15	-0.39	.70
Dominance*Study part	-0.11	0.15	-0.71	.48
Dominance*voting preference*study part	0.32	0.19	1.65	.10
Prestige	0.01	0.05	0.12	.90
Leadership	-0.04	0.05	-0.82	.41

Table A5.2. Cognitive dissonance as measured by item 4 (preference voting for women, see Table 8.2) predicted by dominance motive, voting preference (Clinton = 0), study part (post-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	2.04	0.06	32.09	< .01
Dominance	0.41	0.07	5.71	<.01
Voting preference	1.36	0.13	10.89	< .01
Study part	0.15	0.11	1.34	.18
Voting preference*study part	-0.16	0.21	-0.75	.46
Dominance*voting preference	-0.26	0.12	-2.21	.03
Dominance*Study part	-0.21	0.12	-1.77	.08
Dominance*voting preference*study part	0.32	0.19	1.65	.10
Prestige	0.01	0.05	0.12	.90
Leadership	-0.04	0.05	-0.82	.41

Item 5

Table A5.3. Cognitive dissonance as measured by item 5 (unequal campaign funding, see Table 8.2) predicted by dominance motive, voting preference (Trump = 0), study part (pre-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	3.18	0.14	22.36	< .01
Dominance	0.11	0.12	0.97	.33
Voting preference	-0.67	0.17	-3.95	<.01
Study part	-0.91	0.18	-5.15	<.01
Voting preference*study part	0.90	0.21	4.35	<.01
Dominance*voting preference	0.04	0.15	0.28	.78
Dominance*Study part	0.08	0.15	0.55	.59
Dominance*voting preference*study part	-0.04	0.19	-0.21	.84
Prestige	0.17	0.05	3.47	<.01
Leadership	-0.21	0.05	-4.28	<.01

Table A5.4. Cognitive dissonance as measured by item 5 (unequal campaign funding, see Table 8.2) predicted by dominance motive, voting preference (Clinton = 0), study part (post-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	*p*
Intercept	2.51	0.06	40.42	< .01
Dominance	0.20	0.07	2.83	<.01
Voting preference	-0.24	0.12	-1.92	.05
Study part	0.01	0.11	0.05	.96
Voting preference*study part	0.90	0.21	4.35	<.01
Dominance*voting preference	0.00	0.11	-0.03	.97
Dominance*Study part	-0.04	0.12	-0.37	.72
Dominance*voting preference*study part	-0.04	0.19	-0.21	.84
Prestige	0.17	0.05	3.47	<.01
Leadership	-0.21	0.05	-4.28	<.01

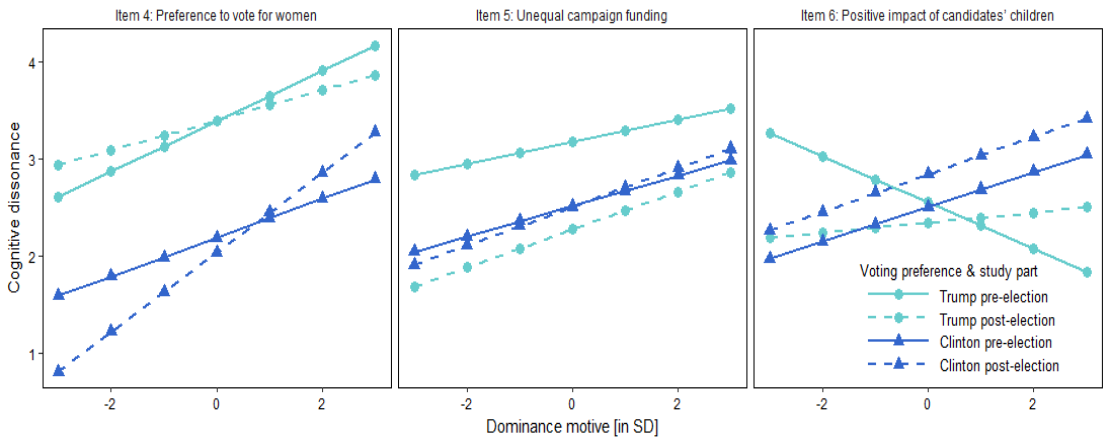

Figure A5.1. Cognitive dissonance as represented by Item #4, #5 and #6 (see Table 8.2) predicted by dominance motive, voting preference, and study part (see Tables A5.1 to A5.4).

Analysing subset of participants who took part in both studies

This analysis only includes the n = 160 participants who took part in both the pre and post-election part of the study. Cognitive dissonance is represented as the sum score of the cognitive dissonance items #1 to #3 (see Table 8.2). Note that although *b* and *t* values were somewhat smaller, due to the decreased statistical power, results essentially mirrored the results reported for the full sample in Table 8.4 & Table 8.5.

Table A5.5 Cognitive dissonance predicted by dominance motive, voting preference (Trump = 0), study part (pre-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	
Intercept	12.52	0.44	28.67	**
Dominance	0.96	0.35	2.73	**
Voting preference	-4.39	0.51	-8.54	**
Study part	-0.12	0.39	-0.32	
Voting preference*study part	0.58	0.46	1.27	
Dominance*voting preference	-0.79	0.43	-1.86	.
Dominance*Study part	-0.63	0.33	-1.90	.
Dominance*voting preference*study part	0.68	0.44	1.56	
Prestige	0.28	0.20	1.37	
Leadership	0.00	0.22	0.01	

Note that the lmer function in R's *lme4* package does not provide *p*-values, however, based on the assumption that a t-distribution with df > 30 is approximately normally distributed $t > |1.96|$ corresponds to $p < .05$ (*); $t > |2.58|$ corresponds to $p < .01$ (**); $t > |1.65|$ corresponds to $p < .10$ (.).

Table A5.6. Cognitive dissonance predicted by dominance motive, voting preference (Clinton = 0), study part (post-election = 0) and any interaction between these variables as well as controlling for prestige and leadership motives.

	b	*SE*	*t*	
Intercept	8.59	0.28	31.03	**
Dominance	0.22	0.31	0.71	
Voting preference	3.81	0.51	7.42	**
Study part	-0.46	0.24	-1.87	.
Voting preference*study part	0.58	0.46	1.27	
Dominance*voting preference	0.12	0.46	0.25	
Dominance*Study part	-0.05	0.28	-0.18	
Dominance*voting preference*study part	0.68	0.44	1.56	
Prestige	0.28	0.20	1.37	
Leadership	0.00	0.22	0.01	

Note that the lmer function in R's *lme4* package does not provide *p*-values, however, based on the assumption that a t-distribution with df > 30 is approximately normally distributed $t > |1.96|$ corresponds to $p < .05$ (*); $t > |2.58|$ corresponds to $p < .01$ (**); $t > |1.65|$ corresponds to $p < .10$ (.).