Validating the Implicit Autonomy Motive: Studies on the Measurement and Functions of a Fourth Basic Motive

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"When I discover who I am, I'll be free."

Ralph Ellison, 1952

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1 Introduction

Autonomy is an essential part of the human experience. A simple google news search of autonomy results in over six million hits. This just illustrates how ubiquitous autonomy is in our lives. Autonomy has been examined throughout history from a wide range of approaches. For example, the ancient Greeks regarded autonomy as essential for a happy and tranquil life (Chirkov, Ryan & Sheldon, 2011). While it is widely accepted that autonomy is one of the basic human needs, the fulfillment of which is a prerequisite for well-being (Deci & Ryan, 2000), recent research has focused on autonomy as an implicit motive. Evidence points to autonomy as having a place next to affiliation, achievement, and power as one of the basic implicit motives; however, there is still some research that needs to be conducted to support this notion.

The research in this dissertation aimed to address this issue. Although it would be beyond the scope of one dissertation to conduct all the research necessary to validate autonomy as an implicit motive, I have focused on two issues that help solidify the foundation of work that has already been conducted on the implicit autonomy motive, and will also be a foundation for future studies. The first issue is measurement. Implicit motives should be measured using causally valid instruments (McClelland, 1980). The second issue addresses the function of motives. Implicit motives orient, select, and energize behavior (McClelland, 1980). If autonomy is an implicit motive, then we need a valid instrument to measure it and we also need to show that it orients, selects, and energizes behavior.

In the following dissertation, I address these two issues in a series of ten studies. Firstly, I present studies that examine the causal validity of the Operant Motive Test (OMT; Kuhl, 2013) for the implicit affiliation and power motives using established methods. Secondly, I developed and empirically tested pictures to specifically assess the implicit autonomy motive and examined their causal validity. Thereafter, I present two studies that investigated the orienting and energizing effects of the implicit autonomy motive.

Outline of Dissertation

This dissertation consists of seven chapters. The uniting theme of all chapters is that they use the OMT to assess implicit motives. The first two empirical chapters investigated the causal validity of the OMT's power, affiliation, and autonomy measures (Chapters 2-4). The next two chapters then focus on the functions of implicit autonomy motive. I wrote the individual chapters independently and have, where indicated, submitted them for publication or they have already been published. All empirical chapters can be read independently and, consequently, have some theoretical overlap.

Chapter 2 used social interactions in digital contexts to arouse the implicit affiliation motive (*n*Affiliation). Participants completed a social evaluation paradigm in a fictional online social network (Study 1) or the ostracism paradigm Cyberball (Study 2) before completing the OMT. I expected that positive and negative socially evaluative interactions would arouse *n*Affiliation and that the OMT would discern between arousal states.

Chapter 3 consists of two studies that used film/video stimuli to arouse the implicit power motive (*n*Power). I showed participants a film that had been employed in previous research to arouse nAutonomy (Study 3) and political speeches by German politicians (Study 4). Once again, I expected that participants who watched power-related stimuli would have higher *n*Power scores in the OMT than participants who watched power-neutral stimuli.

Chapter 4 presents three empirical studies on the assessment of *n*Autonomy. Firstly, I empirically selected five pictures that specifically assess *n*Autonomy (Study 5). Secondly, as in Chapter 3, I showed participants a film with strong autonomy-related cues to arouse nAutonomy (Study 6). Furthermore, I used the self-completion paradigm (Wicklund & Gollwitzer, 1981) to arouse *n*Autonomy in an online survey (Study 7a) and in a university laboratory (Study 7b). I expected that participants who watched autonomy-related film stimuli and who were interrupted while writing ego-involving essays would have higher nAutonomy scores than participants in control conditions.

Chapter 5 consists of two preliminary studies to examine the orienting effects of *n*Autonomy. Specifically, participants completed a word recognition paradigm (Study 8), an incidental learning task (Study 9), and a word categorization task (Studies 8 and 9) with autonomy-related and autonomy-neutral stimuli. I expected that individuals with high *n*Autonomy would recognize autonomy-related words faster and recognize more autonomy-related words than low *n*Autonomy participants. Furthermore, I expected participants with high *n*Autonomy to categorize more words as being related to autonomy than participants with low *n*Autonomy.

Chapter 6 presents a study conducted on the energizing effects of *n*Autonomy (Study 10). I examined the relationship betIen *n*Autonomy and creativity in adolescents. Specifically, participants completed a creativity task and their teachers rated their innovative behavior. I expected high *n*Autonomy adolescents to have higher creativity scores on both the task and in teacher ratings than participants with low *n*Autonomy.

Chapter 7 discusses the main findings of the dissertation. Furthermore, I discuss the findings' implications for the autonomy motive and the OMT. Finally, I outline potential avenues for future research and provide concluding remarks.

2 Arousing Affiliation in Digital Contexts

Abstract

Classical studies on motive dispositions experimentally aroused implicit motives and examined their effect on behavior in fantasy. Continuing in this line of research, the present studies aimed to arouse the implicit affiliation motive (*n*Affiliation) in digital contexts and examine the effects of this arousal on the Operant Motive Test (OMT). Study 1 ($N = 99$, 17-64 years) induced *n*Affiliation using a social evaluation task in a social network. Participants in the experimental conditions created a profile on a fictional social networking site and received feedback as to whether other fictional participants wanted to form a group with them or not. Study 2, ($N = 78$, 18-31 years) implemented the computerized ostracism game *Cyberball* to arouse *n*Affiliation in participants. We observed higher *n*Affiliation scores on the OMT in participants who were invited to join a group on a fictional social networking site as compared to participants who were excluded from the group and participants in the control condition (Study 1) as well as in ostracized participants in (Study 2). Our data supports the causal validity of the OMT, as the OMT was sensitive to differences in *n*Affiliation arousal in digital contexts.

Today, social networks and digital encounters dominate our interpersonal interactions. However, we know little about the effects of online interactions on our implicit motives. More specifically, we need to examine whether and how online interactions impact our need for relationships and contact. One way to investigate this issue is to examine the effects of such interactions on affiliative motivational states.

The research on the arousal of affiliative emotional states stems from classical studies by McClelland and Atkinson. McClelland (1980) argued that instruments claiming to measure implicit motives must detect differences in arousal states of the motives. Motive arousal is central to McClelland and Atkinson's examination of the nature of motives and the subsequent development of measures used to assess these motives. The results of these studies provided the basis for the definitions of the achievement and affiliation and the scoring guides for their assessment (cf. Smith, 1992). Furthermore, based on this line of research, McClelland maintained that instruments claiming to assess implicit motives should be sensitive to experimental arousal of motivational states just like "a thermometer is sensitive if it responds in a linear fashion as a lighted match is moved closer to it" (1980, p.34).

The following two experiments follow the tradition of research on implicit motives and examine whether the OMT is sensitive to changes in *n*Affiliation due to interactions in digital contexts. In the following, we will first discuss the development of instruments to assess implicit motives. Then, we define *n*Affiliation and discuss previous research on the arousal of *n*Affiliation before presenting two studies that adapted a classical study to a digital context (Study 1) and used a well-researched paradigm on ostracism (Study 2) to arouse nAffiliaiton. Finally, we will discuss the results and their implications for implicit motive measurement.

Motivational Arousal and the Thematic Apperception Test

The Thematic Apperception Test (TAT; Morgan & Murray, 1935) was the first test to measure implicit motives. In the TAT, indivdiuals view a set of comprehensive pictures and interpret the action in the pictures. Then, they create stories regarding the preceding events and outcome. Pictures are selected based on their "stimulating power" (Murray, 1943, p.2), or, their ability to provide a framework for a great number of fantasies. Morgan and Murray (1935) assumed that in completing the task, "the subject would necessarily be forced to project some of his own fantasies into the material and so reveal some of his more pressing underlying needs" (p. 290).

McClelland and Atkinson (1948) recognized the potential of the TAT to diagnose the strength of drives or motives. They believed, however, that it was necessary to first arouse the

motivational or need state and examine the effects of this arousal on perception and projection. With this approach they hoped to demonstrate the effects different strengths of motivational states on projection thus providing experimental support for the underlying assumption of the TAT (p. 206). They followed their first experiments on different intensities of hunger (Atkinson & McClelland, 1948) with experimental manipulations of the need for achievement. The answers of participants in aroused conditions were compared to the neutral condition and characteristics were included into the scoring guide if they appeared more often in stories produced by participants in the arousal conditions than the neutral condition (McClelland & Koestner, 1992).

In related research that followed the same methodological principle, affiliation (Atkinson, Heyns, & Veroff, 1954; Shipley & Veroff, 1952) and power (Veroff, 1957; Uleman, 1972; Winter, 1973) were also experimentally aroused. The content of the resulting stories helped to determine which kind of stories are typical for their respective motive. The content analysis systems established by these classical studies still provide the basis for scoring *n*Achievement, *n*Affiliation, and *n*Power in the Picture Story Exercise (PSE; Winter, 1994).

Arousal of *n*Affiliation

In the first studies on *n*Affiliation, Atkinson et al. (1954) and Shipley and Veroff (1952) aroused this motive by having participants socially evaluate their peers while being socially evaluated by their peers using an adjective checklist. Then, subjects selected three persons they deemed most desirable as a friend. Shipley and Veroff also examined motive arousal in a natural setting by comparing stories written by students rejected by a fraternity to those written by students who were accepted by the fraternity (Experiment 2). They found that both arousal through experimental manipulation (social evaluation) and rejection by a fraternity (natural setting) resulted in higher *n*Affiliation scores as compared to the control and accepted group, respectively. Using a different control condition and different pictures, Atkinson et al. (1954) were able to arouse a broader spectrum of affiliative stories which resulted in the definition of affiliative imagery to include a concern with establishing, maintaining, or restoring positive affective relations.

Taking the motive arousal approach one step further, Wirth and Schultheiss (2006) separated the approach and avoidance components of experimentally induced affiliation. Using two different film clips, they specifically aroused the desire to be close to others in one condition and the fear of rejection and/or separation in a second condition. The results showed an increase of affiliative content in the hope for closeness condition and an unexpected decrease in

affiliation-related stories in the fear of rejection condition. The authors argue that the coding system developed by Heyns, Veroff, and Atkinson (1958), which is based on the results of Atkinson et al. (1954), may not effectively capture the avoidance aspect of affiliation.

A related motive, the intimacy motive (McAdams, 1980), is defined as the "experiencing of a warm, close, and communicative exchange with another (other) person(s) – as an interpersonal encounter, which is non-instrumental and experienced as "good" in and of itself" (p.430). Thus, the intimacy motive moves away from an approach/avoidance conceptualization of affiliation and more towards a focus on the quality of interpersonal encounters (cf. McAdams, 1980). McAdams (1980) also created the scoring guide for intimacy motivation by arousing the motive in experimental and natural interpersonal settings that were characterized by openness and contact, reciprocal dialogue, joy and conviviality, and caring as well as concern.

Thus, a variety of paradigms have successfully aroused *n*Affiliation or its related motive, the intimacy motive. However, research has not yet examined the effects of online interpersonal interactions on the strength of *n*Affiliation. We hypothesize that adapting the paradigms from classical studies to digital contexts will have similar effects on *n*Affiliation.

The Operant Motive Test (OMT)

The Operant Motive Test (OMT; Kuhl, 2013; Kuhl & Scheffer, 1999) is a projective test based on the TAT. Participants are presented 15 ambiguous illustrations and are asked to first identify a main character and then imagine a story revolving around this individual. Then, participants answer three questions as spontaneously as possible: 1) What is important to the person in this situation and what is the person doing? 2) How does the person feel? 3) Why does the person feel this way? The answers provided by the participants are then scored according to a 4 x 5 coding scheme. First, participants' answers are coded for presence of either affiliation, achievement, power, or autonomy content. In a second step, answers are then assigned to one of five levels (enactment modii) within a motive.

This differentiation between enactment modii is based on the Personality Interaction Systems (PSI) theory (Kuhl, 2000, 2001). The classical approach component of each motive is divided into four subcomponents: approach behavior is either driven by positive or negative affect. The former can be either generated by the self or motivated by external incentives (Kuhl, 2013; Kuhl & Scheffer, 1999). Similarly, negative affect is either downregulated by the self or through an external incentive. The fifth level consists of avoidance behavior. Thus, answers on the OMT provide information beyond motive content and approach or avoidance behavior; it also provides information about affective sources of motivation and the types of motivated

behavior. It follows that the OMT not only assesses why behavior is initiated (motive) but also how (implementation).

In its' affiliation scoring guide, the OMT combines both the classical conceptualization of affiliation and intimacy in its scoring system. Approach behavior motivated by positive affect is expressed by stories dealing with intimacy (self-generated) and enjoying the company of other people (incentive-generated). Approach behavior motivated by negative affect is expressed by stories dealing with re-establishing relationships (self-generated) and establishing relationships to avoid frustration (incentive generated). To date, only one study has examined the OMT's sensitivity to motive arousal. Using a similar paradigm as Atkinson et al. (1954), Scheffer, Eichstaedt, Chasiotis and Kuhl (2007, Study 1) placed participants in a socially evaluative or neutral context (control condition) before completing the OMT. Results showed a main effect of motive arousal on OMT stories. That is, participants in the arousal condition had higher *n*Affiliation scores than participants in the neutral condition.

The OMT has sufficient reliability (Runge et al., 2016) and has proven to be a valid instrument in a wide range of studies and across cultures (e.g., Baumann, Kaschel, & Kuhl, 2005; Schüler, Job, Fröhlich, & Brandstätter, 2008; Hofer & Busch, 2013). For example, *n*Affiliation, assessed with the OMT, predicts pleasant non-verbal behavior in sport competitions (Wenger, Boknacker, Mempel, Teubel, & Schüler, 2014), peer ratings of customer service orientation (Scheffer et al., 2007), and intuitive processing (Quirin, Düsing, & Kuhl, 2013).

Present Research

The purpose of the present research is twofold. First, with only one experiment having examined the sensitivity of the OMT to motive arousal, further studies need to confirm this characteristic. As the OMT is based on the same principles of apperception as the TAT, we expect to confirm its sensitivity to experimental manipulations of motive arousal. Second, until now, studies have examined motive arousal in face to face interactions. As online interactions are more prevalent in our day to day lives, we adapted motive arousal paradigms to digital contexts. In Study 1, we aroused *n*Affiliation using a socially evaluative manipulation in an online social network. In Study 2, we used a well-known ostracism paradigm, cyberball, to examine whether outright social inclusion or exclusion in an online context arouses *n*Affiliation.

Study 1

Study 1 induced *n*Affiliation using a similar method to that used by Atkinson et al. (1954), Shipley and Veroff (1952), and Scheffer et al. (2007). In this study, participants created a profile for a social networking site under the impression that other participants would judge whether they wanted to form a group with this person or not. Thus, we created a socially evaluative atmosphere in which we manipulated inclusion or exclusion from a social group. As the OMT is designed to capture both approach and avoidance behavior in fantasy, we expected that both the inclusion and exclusion conditions would increase the number of affiliation-motivated answers on the OMT in comparison to a control condition.

Participants and Procedure

Ninety-nine individuals with a mean age of $M = 26.29$ years ($SD = 9.11$, range 17 to 64) were recruited via social networks to participate in an online study.[1] Most (71%) of the participants were university students, 19% were working professionals, and the remaining participants did not provide information regarding employment. The experimental procedure was conducted on the online portal "Unipark". Participants first completed a self-regulation questionnaire that is not relevant for the following analyses. Then, subjects were randomly assigned to one of three conditions: motive satisfaction ($N = 42$), Avoidance/Fear ($N = 41$), or a control condition ($N = 16$). The group sizes were uneven as more potential participants quit the experiment in the control condition as compared to potential participants in the experimental conditions.

In the arousal conditions, subjects were asked to create a profile on a fictitious social network site. Participants were under the impression that other participants would judge whether they wanted to form a group with them or not. After completing their profiles, subjects were shown two profiles from fictitious individuals whom they believed to be currently online. Participants then indicated whether they wanted form a group with these fictious individuals based on their perceptions of the person's likeability and their judgment of the person's cooperativeness. Then, participants received notification that both (approach/hope condition) or neither (avoidance/fear condition) of the fictitious individuals wanted to form a group with them. Subjects in the control condition were asked to produce a resume in response to a job advertisement. Following the manipulation, subjects completed the OMT and measures assessed within a larger-scale experiment. Finally, participants provided sociodemographic information and answered three questions that served as a manipulation check.

Measures

Implicit affiliation motive. In order to assess *n*Affiliation, the five pictures from the OMT that aim to elicit *n*Affiliation were administered. These pictures include two individuals embracing (Picture 1), three individuals together in a pool (Picture 2), two individuals sitting at a table appearing to whisper with a third individual standing separately from the others (Picture 3), two individuals sitting across from each other at a table (Picture 4), and an isolated individual (Picture 5). Half of the subjects were presented the items in this order, whereas the other half saw the pictures in the reverse order to control for effects of item order. Two coders scored the stories independently and reached a sufficient inter-rater agreement (ICC = .86) for affiliation. Discrepancies were resolved through discussion before the final scores were analyzed. Consistent with common protocols for projective measures (Schüler et al., 2016; Winter, 1994), we summed up all subcategories across all pictures to compute participants' affiliation scores.

Manipulation check. We asked subjects in the both arousal conditions if they had the impression that their profile was rated positively by the other participants who rated them, if they felt rejected by the other participants, and whether they felt excluded by the other participants. Answers were given on a 7-point scale ranging from 0 (*not at all*) to 6 (*yes, very much*).

Results

Manipulation check. T-tests were conducted to examine differences between groups regarding their feelings of being favorably rated, feelings of rejection, and feelings of exclusion. Participants in the Approach/Hope condition (M = 5.69, SD = 1.16) indicated significantly higher feelings of being rated favorably as compared to participants in the Avoidance/Fear (M = 2.93, SD = 1.16; $t(74)$ = 9.16, p < .001). In contrast, participants in the Avoidance/Fear (M = 4.95, SD = 1.94) had significantly higher ratings of feeling rejected as compared to participants in the Approach/Hope group (M = 1.36, SD = .79; $t(81)$ = -11.12, p < .001). In a similar manner, participants in the Avoidance/Fear (M = 4.00, SD = 2.07) had significantly higher feelings of being excluded as compared to participants in the Approach/Hope group (M = 1.64, SD = 1.06; $t(81)$ = -6.55, p < .001).

Implicit motive arousal. To test our hypotheses, we conducted an analysis of variance (ANOVA) with the mean frequency of stories coded with affiliation content as the dependent variable. The ANOVA revealed a main effect of condition ($F(2, 96)$ = 3.37, p = .04). As can be seen in Figure 2.1, participants wrote on average M = 2.36 (SD = 1.16) affiliation-related stories in the Approach/Hope condition, M = 1.80 (SD = 1.27) affiliation-related stories in the Avoidance/Fear condition, and M = 1.56 (SD = 1.20) affiliation-related stories in the

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Control condition. Post-hoc t-tests revealed that participants in the Approach/Hope group wrote significantly more affiliation stories than participants in the Avoidance/Fear ($t(81) = 2.07$, $p = .04$) and Control groups ($t(56) = 2.30$, $p = .02$). There was no significant difference between the Avoidance/Fear and Control groups regarding number of affiliation-related stories ($t(55) = .66$, $p > .05$). The experimental manipulation explained 6.6% of the variance ($_{part}Eta^2 = .066$). The main effect of motive arousal remained significant when controlling for order of pictures ($F(2, 96) = 3.35$, $p = .04$).
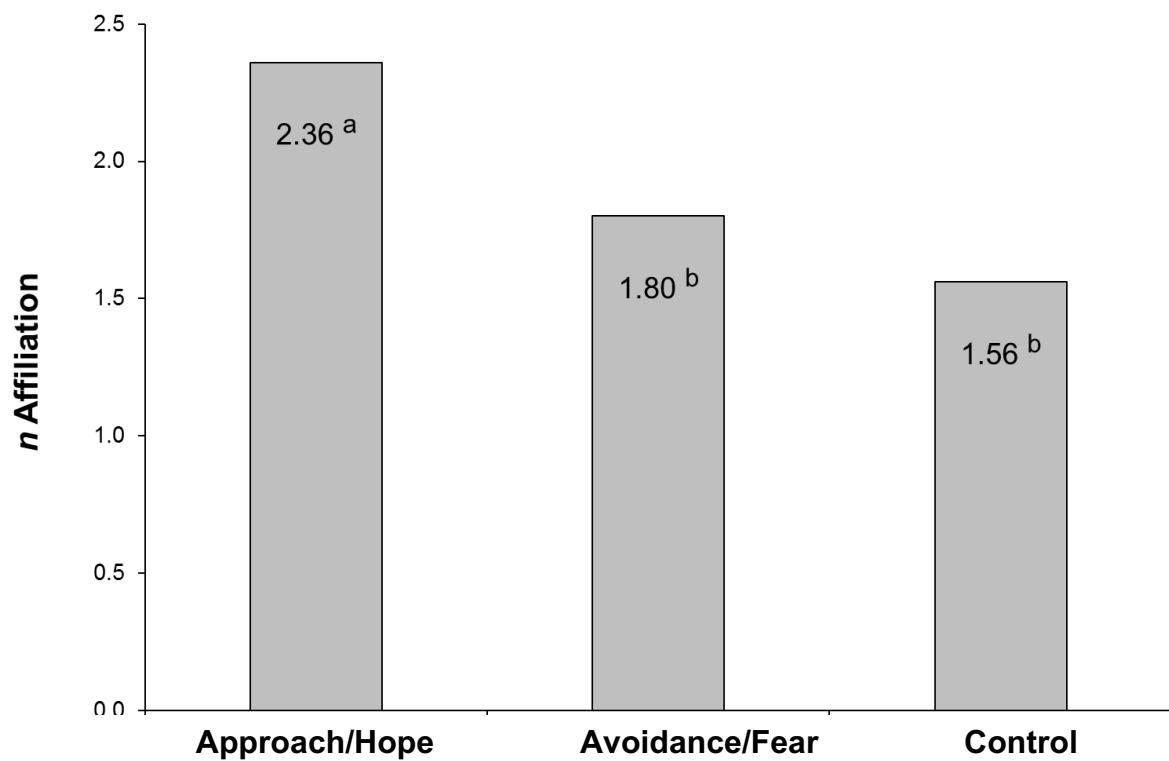

Figure 2.1. Mean *n* Affiliation scores in the Operant Motive Test (OMT) after social networking (approach/hope vs. avoidance/fear) and control tasks (different superscripts indicate significant differences in post-hoc tests).

Discussion

To summarize the results of Experiment 1, we found a main effect of our experimental conditions on OMT affiliation scores. Participants in both arousal conditions had descriptively higher affiliation scores in comparison to the control group. A closer examination of the data revealed that the experimental manipulation resulted in significantly more affiliation-related stories in the Approach/Hope condition as compared to the Avoidance/Fear and control groups. That is, participants who were made to believe that they were selected by other participants based on a profile they had created produced more stories that had affiliative content as compared to participants who were made to believe that they were not selected by participants. Thus, the results mirror previous research; motive arousal resulted in higher affiliation scores. When separating the motive Approach/Hope and motive Avoidance/Fear conditions, our results are in line with the findings of Wirth and Schultheiss (2006) who also found an increase in affiliation scores on the PSE after participants watched a film segment that contained approach-oriented affiliation themes.

The question then turns to why only the approach-related manipulation resulted in significantly higher affiliation scores than the avoidance and control conditions. It may be that our exclusion condition was not strong or self-relevant enough to arouse *n*Affiliation. Shipley and Veroff (1952) found higher affiliation scores in participants who had just been rejected by a fraternity in comparison to participants accepted by a fraternity. It is perhaps this outright experience of exclusion from a social group that one might want to or expect to be a part of that might make *n*Affiliation more salient in negative conditions. To test this assumption, we employed a well-known ostracism paradigm in Study 2.

Study 2

Williams (2007) defined ostracism as the ignoring and excluding of groups or individuals by groups or individuals. Gerber and Wheeler (2009) considered ostracism as the most powerful form of rejection due to the automatic and indiscriminate reaction it evokes (p. 472). A virtual ball-tossing game called *Cyberball* (Williams, Cheung, & Choi, 2000) is a well-documented ostracism paradigm. In this game, at least three individuals engage in tossing a virtual ball. Two of the individuals are fictional and controlled by the computer and the third individual is the participant. In the ostracism condition, the participant is included for two ball tosses and then excluded for the remainder of the game. In the inclusion conditions, the participant receives the ball an equal amount as the other supposed participants. This paradigm has been employed in

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over 200 publications (cf. Hartgerink, van Beest, Wicherts, & Williams, 2015). A meta-analysis conducted by Hartgerink et al. (2015) revealed that the paradigm is associated with large effect sizes (d > |1.4|) and negative impacts on fundamental needs including belonging, mood, physiological measures, as well as interpersonal behaviors. Effects of ostracism in cyberball are robust, as they are observed even when participants know that they are playing with a computer and not actual people (Zadro, Williams, & Richardson, 2004).

It is cyberball's effect on the fundamental need of belonging that connects it to *n*Affiliation. Baumeister and Leary's (1995) define belonging as the need to form and maintain strong, stable interpersonal relationships (p. 497). A meta-analysis on rejection (Gerber & Wheeler, 2009) revealed that rejection and ostracism paradigms such as cyberball activate the need for belonging. A meta-analysis conducted by Hartgerink et al. (2015) also confirms this finding. Thus, we concluded that cyberball would be an appropriate paradigm to arouse *n*Affiliation through rejection. We expected that participating in cyberball would arouse *n*Affiliation the rejected condition as compared to a control condition. In addition, in this study we controlled for baseline *n*Affiliation to rule out any effects of individual differences between participants in their trait *n*Affiliation.

Participants and Procedure

Data for this study were collected in combination with a study examining the effects of a novel ostracism paradigm (Operator Challenge; e.g., Birk et al., 2016) that was conducted with a total of 125 participants (57 female, 46%) aged 18-32 years (*M* = 23.4 years, *SD* = 2.64).[2] Of these 125 participants, 27 were randomly allotted to a cyberball included condition, 26 to a cyberball excluded condition, and 25 to a control condition. Because we were interested in the effects of the classical ostracism paradigm, only this subset of 78 participants (36 female, 46%) aged 18-31 years (*M* = 23.6 years, *SD* = 2.64) was included in our study. About half (45%) of participants were psychology majors. Participants received money (10 € = approx. $11) or course credit for their participation.

Participants completed the experiment in separate cubicles in a laboratory at the university. Using Unipark software (created by Questback), participants were introduced to the experiment before completing the OMT, questionnaires on explicit motives and self-regulation (not relevant for the present analyses), and a mood scale. Then, participants were led to the game servers (located in Saskatoon, Canada) according to their experimental condition. Participants in the cyberball conditions were told they would be playing a team game and would shortly be connected to two other players. They were informed that they could toss the ball to

any other player whenever they caught it. After receiving the ball twice at the beginning of the game, participants in the cyberball excluded condition did not receive the ball for the remainder of the game, whereas participants in the inclusion condition received the ball 33% of the time. Participants in the control condition completed a "Bejeweled" game in which they switched around pieces on a virtual game board to create sets of matching pieces in a row. For purposes not pertaining to this study, participants gave saliva samples before, during, and after experimentation. After completion of cyberball or Bejeweled, participants completed the mood scale a second time and answered control questions. Then, participants completed the five affiliation-oriented pictures from the OMT a second time as well as two questionnaires on video game behavior.

Measures

Implicit affiliation motive. As in Study 1, *n*Affiliation was assessed using the OMT. Participants first completed all 15 items of the OMT (T1), and, after the experimental manipulation, participants were presented the five affiliation-related pictures (T2). As the order of pictures did not have any effect on motive arousal in Study 1, we did not vary the order of the five affiliation pictures (Pictures 1-5). The OMTs were coded by experienced raters who had achieved agreements of 85% or better in responses to training material prescored by experts. They resolved coding difficulties by discussion in regular expert meetings. Furthermore, the OMTs from T2 were independently coded by two raters who reached an acceptable interrater agreement for affiliation (ICC= .78). Finally, an independent third rater made a final decision regarding the coding and achieved sufficient interrater agreements with the other two independent coders (ICC = .86 and ICC = .92).

Mood. Positive and negative affect were assessed using the German version (Krohne, Egloff, Kohlmann, & Tausch, 1996) of the PANAS (Watson, Clark, & Tellegen, 1988) before and after the experimental manipulation. Each scale consists of 10 adjectives that participants rate on a 5-point scale ranging from -2 (*very slightly or not at all*) to 2 (*extremely*). The positive affect scale included items like 'interested' and 'strong' (Cronbach's α = .86 and .92 at T1 and T2) while the negative affect scale consisted of items such as 'ashamed' and 'upset' (Cronbach's α = .89 and .85 at T1 and T2).

Manipulation check. Participants completed a questionnaire with items similar to those used by Jamieson, Harkins, and Williams (2010) which were translated into German. Items assessed the extent to which participants felt excluded or ignored during cyberball on a five-point scale. An additional inverted item, "I felt included" was presented to participants.

Furthermore, participants were asked to estimate the percentage of throws they received. In the control condition, participants rated how much fun they had, how difficult the game was, and to what extent they thought they should have tried harder on a five-point scale. The scales ranged from 1 (*not at all*) to 5 (*extremely*).

Results

Manipulation check. The comparison of the two experimental groups revealed that the participants in the cyberball Excluded group rated their feelings of being ignored as $M = 4.15$ ($SD = .81$) which was significantly higher than the average rating of $M = 1.54$ ($SD = .81$) in the Included condition ($t = -11.46, p < .001$). In a similar manner, participants in the Excluded group had significantly higher feelings of exclusion ($M = 4.27, SD = .83$) than participants in the Included condition ($M = 1.58, SD = .86; t = -11.53, p < .001$). In contrast, participants in the Included condition had higher ratings of feeling included ($M = 4.12, SD = .91$) than participants in the Excluded condition ($M = 1.54, SD = .51; t = 12.62, p < .001$). Regarding estimation of the percentage of throws they received, participants in the Included condition estimated that they received the ball approximately 34% of the time, whereas participants in the Excluded condition estimated they received the ball about 8% of the time.

Mood. We examined the effects of cyberball on mood using four ANOVAs with the positive affect and negative affect at T1 and T2 as dependent variables, respectively. We observed no main effects for condition positive or negative affect at T1 ($p > .05$). However, we found main effects for positive affect at T2 ($F(74, 2) = 12.03, p < .001$) and negative affect at T2 ($F(74, 2) = 3.46, p = .04$). Participants reported an average positive affect of $M = 2.60$ ($SD = .86$) in the Included condition, $M = 1.83$ ($SD = .61$) in the Excluded condition, and $M = 2.82$ ($SD = .79$) in the Neutral condition. Negative affect was descriptively highest in the Excluded condition ($M = 1.42, SD = .43$), followed by the Neutral condition ($M = 1.39, SD = .51$), and the Included condition ($M = 1.15, SD = .22$). Post-hoc Tukey-HSD tests revealed significant differences between the Excluded and Neutral conditions ($p < .001$) and Included and Excluded conditions ($p < .001$) for positive affect at T2. Regarding negative affect, the difference between the Included and Excluded conditions was significant at T2 ($p = .02$).

Implicit Affiliation Motive. In a first step, an ANOVA was performed with baseline (T1) *n*Affiliation scores to check for potential differences in *n*Affiliation in experimental groups. The resulting main effect was not significant, $F(2, 75) = 1.02, p > .05$, indicating that experimental groups did not differ with respect to *n*Affiliation at T1. In a second step, an ANOVA with *n*Affiliation scores at T2 revealed a significant main effect for condition, $F(2, 75)$

= 3.28, $p < .04$. As can be seen in Figure 2.2, participants wrote descriptively more *n*Affiliation-related stories in the Excluded condition ($M = 2.11$, $SD = .99$) as compared to the Included ($M = 1.63$, $SD = .92$), and Neutral conditions ($M = 1.52$, $SD = .71$) after the experimental manipulation. Post-hoc Tukey-HSD tests revealed a significant difference between the Excluded and Control conditions ($p = .05$), all other comparisons were not significant ($p > .05$). The main effect of condition explained 8% of the variance ($_{part}Eta^2 = .08$).[3]
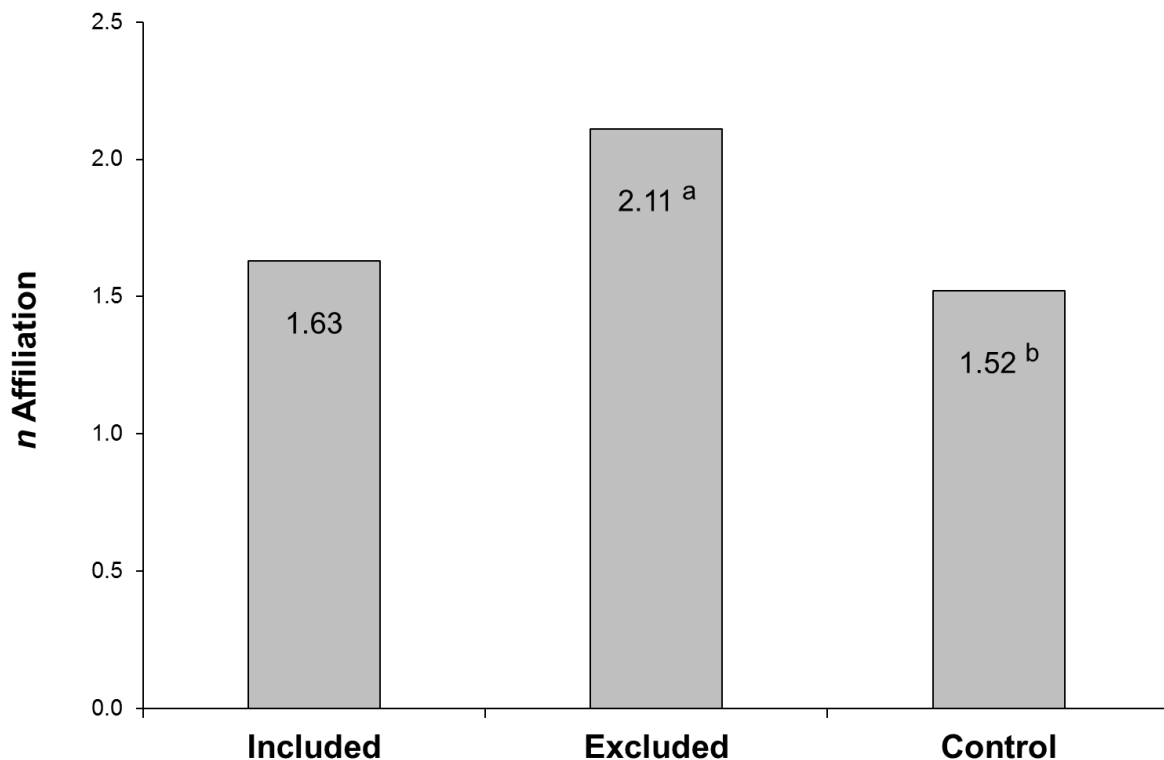
Figure 2.2. Mean *n* Affiliation in the Operant Motive Test (OMT) after Cyberball (included vs. excluded) and control conditions (different superscripts indicate significant differences in post-hoc tests).

Gender. Regarding gender differences, a *t*-test revealed a significant difference between *n*Affiliation scores in men and women at T1 ($t = -2.60$, $p = .01$), but not at T2. At T1, men had an average of $M = 1.47$ ($SD = .87$) *n*Affiliation scores, whereas women's *n*Affiliation scores were $M = 1.95$ ($SD = 1.17$). At T2, men's average *n*Affiliation scores were $M = 1.65$ ($SD = 1.02$) and women scored an average of $M = 1.93$ ($SD = .88$) for *n*Affiliation. To test whether the motive arousal effect was independent of gender, we conducted an ACNOVA with *n*Affiliation scores at T2 and controlled for *n*Affiliation scores at T1 and gender. The analysis revealed a significant main effect for condition ($F(2, 71) = 2.23$, $p = .04$). This model explained

24% of the variance ($_{part}Eta^2 = .24$).

Discussion

In Study 2, the results confirmed our hypothesis. We observed significantly higher *n*Affiliation scores in participants in the Excluded condition in comparison to a control condition. We also observed descriptively that *n*Affiliation scores were higher in participants in the Excluded as compared to the Included condition. This effect remained significant when controlling for baseline *n*Affiliation and gender. Thus, our results are descriptively similar to Shipley and Veroff's (1952) results in which they found higher arousal of *n*Affiliation in participants rejected from a fraternity as compared to accepted participants. Our results lend support to the notion that outright rejection, in this case in the form of ostracism via a computer game, arouses affiliation. Most importantly, the results confirm that the OMT is sensitive to the arousal of *n*Affiliation through motive Avoidance/Fear.

Our results also replicated previous results from cyberball and implicit motive research. Specifically, we replicated typical effects of rejection paradigms on mood. Gerber and Wheeler (2009) found that rejection has a larger negative effect on positive mood than negative mood. In our data, the adverse effect of rejection was evident for positive affect, but not negative affect. Furthermore, we showed that the typical gender differences observed for *n*Affiliation (Drescher & Schultheiss, 2016) are also present in the OMT.

General Discussion

Classical studies on psychogenic motives implemented motive arousal methods to not only detect and define motives, but also to validate the instruments used to measure these motives. In two experimental studies, we aroused *n*Affiliation using manipulations from these classical studies and adapted them into digital contexts. Thus, we were able to examine the OMT's sensitivity to the arousal of *n*Affiliation. We confirmed our hypotheses in two studies, as we detected differences in motive arousal states through satisfying and frustrating the motive using two different paradigms set in digital contexts.

Arousing *n*Affiliation through approach/hope cues

In Study 1, a socially evaluative paradigm was employed that resembled the task used by Shipley and Veroff (1952) and Atkinson et al. (1954). Our task included an approach/hope and avoidance/fear manipulation. We observed higher *n*Affiliation scores in participants in the

approach/hope condition. We achieved this by having participants who had evaluated the online profiles of other supposed participants believe that those individuals wanted to form a group with them, whereas participants in the avoidance/fear group were notified that they were not invited to form a group with the other participants. The approach/hope condition resulted in more affiliation content in fantasy stories as compared to participants in the avoidance/fear condition.

The arousal of *n*Affiliation in Study 1 through approach/hope manipulations is in line with McAdam's (1980) manipulations of *n*Intimacy. Here, he moved away from Murray's (1938) deficit-based need theory which postulates that a need produces action until tension is relieved and at this point action stops. Instead, McAdams subscribed more to Maslow's (1955) conceptualization of growth motivation. The reciprocity experienced by participants through accepting and being accepted aroused affiliation in participants. It appears that the avoidance/fear condition of Study 1 was not strong enough to arouse affiliation or that participants were able to attribute the rejection to something other than affiliative reasons.

Arousing *n*Affiliation through Avoidance/Fear

In Study 2, participants who were excluded in the cyberball game had significantly higher *n*Affiliation scores in comparison to participants in the control condition. Participants in the included condition had descriptively higher *n*Affiliation scores than participants in the control condition; however, this difference did not reach statistical significance. We assumed that due to the affiliative nature of both the excluded and included conditions, we would see higher *n*Affiliation scores regardless of inclusion or exclusion. It appears though that cyberball's effect lies in the experienced rejection and not the experience of being accepted into a group.

The outright experience of rejection in Study 2 was a sufficient manipulation to activate *n*Affiliation. This is in line with previous research that found the effects of cyberball in the Avoidance/Fear condition rather than in the included condition. Specifically, cyberball frustrates feelings of belonging in the rejection condition (Gerber & Wheeler, 2009). Participants were told they would be playing a team game and were then inexplicably ignored after receiving the ball twice which arouses *n*Affiliation. In contrast, participants in the included condition were expecting the other team members to throw them the ball and the affiliative content of this situation is not strong enough to arouse *n*Affiliation. Consistent with the assumption that the expectation of being included is the default, most cyberball studies compare the exclusion condition only to the inclusion condition and omit a neutral control condition (Hartgerink et al., 2015).

Sensitivity to Motive Arousal in Support of Causal Validity

In addition to arousing *n*Affiliation across two studies using two different paradigms, we were also able to demonstrate the ability of the OMT to detect this arousal in fantasy behavior. While arguing that the arousal of motives must be detected by the instrument claiming to measure the motive in question, McClelland (1980) stated that "a thermometer is sensitive if it responds in a linear fashion as a lighted match is moved closer to it." As OMT scores on *n*Affiliation were higher in motive arousal compared to control conditions, we were able to show that the OMT sensitively reflects variations in the strength of *n*Affiliation. This sensitivity to motive arousal is an indicator of *causal validity* (Borsboom, Mellenbergh, & van Heerden, 2004, p. 1061): "A test is valid for measuring an attribute if (a) the attribute exists and (b) variations in the attribute causally produce variation in the measurement outcomes."

Most validation research for personality dispositions focuses on the relation between the measured attribute and other attributes (i.e., convergent and discriminant validity; Campbell & Fiske, 1959; for a brief overview of more elaborated nomological network ideas see Preckel & Brunner, in press). Validation research for motive dispositions is a notable exception. From the very beginning, motive research has focused on the *processes* that convey the effect of the measured attribute (i.e., implicit motives) on scores in projective tests such as the TAT and PSE (McClelland et al., 1948, Shipley & Veroff, 1952, Atkinson et al., 1954, Winter, 1973). The OMT scoring system is based on the scoring manuals of these causally validated tests. The present findings further support the causal validity of the OMT measure of *n*Affiliation and fulfil a gold standard in the validation of implicit motive measures.

Limitations and Future Directions

A recent meta-analysis conducted by Drecher and Schultheiss (2016) found a robust gender difference in *n*Affiliation and *n*Intimacy. However, after our experimental manipulation, we detected no gender differences. It is a limitation of our first study that we did not examine gender differences and did not examine baseline *n*Affiliation. However, we observed differences between genders regarding *n*Affiliation at T1 but not at T2 in Study 2. It would be of interest to examine further data samples that have used the OMT to assess *n*Affiliation to see if the observed gender differences is inherent in the OMT.

Future research should also focus on real-life behavior in two aspects. First, in our two studies we detected motive arousal through behavior in fantasy. Future research should examine if we can evoke behaviors that we observe in individuals with high *n*Affiliation through motive arousal techniques: frequent smiles during positive social interactions (McAdams, Jackson, &

Kirshnit, 1984), pleasant nonverbal behavior towards opponents in competitive matches (Wegner, Bohnacker, Mempel, Teubel, & Schüler, 2014), better memory for communal episodes (Woike, 2008), better intuitive judgments (Quirin et al., 2013), and lower cortisol reactions to acute psychosocial stress (Wegner, Schüler, & Budde, 2014). Second, new research should focus on naturalistic settings to examine which current real-life scenarios evoke *n*Affiliation. An example would be looking at the effects of communication on social networks such as a thumbs-up sign in reaction to a post or a picture on *n*Affiliation.

Finally, the findings of this study provide support for the causal validity of the OMT measure of *n*Affiliation. Future research needs to be conducted to examine if the OMT can detect the arousal of other motives such as *n* Power or *n* Achievement. Fulfillment of this criteria would then further solidify the OMT's status as a measure of implicit motives. Furthermore, we were able to adapt a classical paradigm into a digital context in Study 1 and use a well-established method to experimentally manipulate rejection in Study 2. However, further research using the OMT should replicate findings using paradigms that have been employed to arouse motives in previous research using a wide range of media, such as film, and situations, such as real behavior manipulations and digital contexts.

Conclusion

In two studies, we aimed to investigate whether interactions in the digital world can arouse *n*Affiliation as has been shown in the past in face-to-face interactions. Our results showed that we were able to arouse *n*Affiliation in two different samples using two different paradigms. Specifically, we observed that *n*Affiliation was higher in participants whose *n*Affiliation was satisfied in a social evaluation task that took place in the context of online social networks. Secondly, *n*Affiliation was higher in participants in the rejection condition of cyberball. The results show support for the causal validity of the OMT as it was sensitive to manipulations of motive arousal through Approach/Hope and Avoidance/Fear of *n*Affiliation.

Footnotes

[3] Operator Challenge (OC) is a math based social exclusion paradigm (Birk et al., 2016). When including the OC included (N = 26) and OC excluded (N = 23) groups into the ANOVA on *n*Affiliation at T1, there was a significant main effect of condition, $F(2, 122) = 3.67, p = .007$. Post-hoc Tukey-HSD tests revealed that *n*Affiliation at T1 was (marginally) significantly lower in the OC Excluded condition (M = 1.09, SD = 1.00) compared to the OC Included (M = 2.08, SD = .98; p = .002), cyberball Excluded (p = .048), and cyberball Included (p = .060) conditions

but not compared to the neutral condition (p > .50). Despite these baseline differences in *n*Affiliation, Operator Challenge had similar motive arousal effects as cyberball. Pairwise *t*-tests revealed that, in the OC Excluded condition, *n*Affiliation at T2 (*M* = 1.57, *SD* = 1.20) was significantly increased compared to T1 (Diff. = .48; $t(22)$ = 2.55, p = .018). In the OC Included condition, in contrast, *n*Affiliation at T2 (*M* = 2.04, *SD* = .82) was not significantly different compared to T1 (Diff. = -.04; $t(25)$ = -.17, *ns*).

3 Power of Politics: Using Political Stimuli to Arouse the Implicit Power Motive

Abstract

Classical research on implicit motives used motive arousal methods to create scoring systems for implicit motive measures. These methods also demonstrate the sensitivity of such measures to states of arousal. To arouse individuals' implicit power motives, researchers have used political speeches or films with strong power-related themes. We conducted two studies to investigate the sensitivity of the Operant Motive Test (OMT) to aroused states of nPower. Using online surveys, participants viewed power-related film sequences (Study 3, $N = 263$) or political speeches (Study 4, $N = 92$) versus power-neutral control videos and then completed the OMT. Results showed that participants engaged in watching *The Godfather, Part II,* a power-related film, had higher nPower scores than participants engaged in the control video (Study 3). Furthermore, participants who watched a political speech with dominance themes had higher nPower scores than participants who watched a control video (Study 4). We conclude that the results demonstrate the causal validity of the OMT.

Politics and power go hand in hand. Politicians are often thought of in two ways: either as power-hungry individuals who want to impress their beliefs on others and get their way through political action; or, individuals who want to help, do good, and inspire others. This dual view of politicians reflects the dual nature of power as both prosocial and antisocial aspects of power exist (McClelland, 1970; Winter 1973). This duality begs the question: what does power behavior do to observers of power? Motivational psychologists have used politics to examine people's implicit power motives and the measurement of this motive. Specifically, it was hypothesized and demonstrated that participation in political processes and observing politicians arouses the inner drive for power in observers (Veroff, 1957; Winter, 1973). This method was used to create and demonstrate the causal validity of the Thematic Apperception Test (TAT; Morgan & Murray, 1935), an instrument that measures individuals' inner drive for achievement, affiliation, and power. In this paper, we used politics and political themes to examine the causal validity of a methodologically and theoretically extended implicit motives measure, the Operant Motive Test (OMT; Kuhl & Scheffer, 1999).

The OMT is a projective instrument that assesses implicit affiliation, achievement, power, and autonomy motives. Until now, however, research on the psychometrics for OMT has not thoroughly examined what Borsboom, Mellenbergh and van Heerden (2004) call "causal validity." They argued that a test has causal validity "for measuring an attribute if (a) the attribute exists and (b) variations in the attribute causally produce variation in the measurement outcomes" (Borsboom et al., 2004, p. 1061). Causal validity has become the gold standard for implicit motive measurement. In order to understand why, it is helpful to explain implicit motives as a construct and their assessment.

Implicit Motives and Their Measurement

McClelland, Koestner and Weinberger (1989) distinguished between self-attributed motives and implicit motives. The latter refers to dispositions that orient, select, and energize behavior (McClelland, 1980). McClelland and colleagues (1989) theorized that implicit motives differ from explicit motives in the following ways. First, implicit motives predict spontaneous (operant) behavior over time, whereas explicit motives predict specific responses to specific situations (respondent) or choice behavior (p. 691). Second, implicit motives are activated by the task itself and explicit motives are activated by explicit, often social, incentives (p. 693). Third, unlike explicit motives, which are explicitly learned, implicit motives develop in the pre-verbal phase of childhood based on affective experiences (p. 699). Because implicit motives develop in the preverbal phase, they are mentally represented as pictures or symbols within

networks of affective associative experiences (McClelland et al., 1989). As such, implicit motives are for the most part not available for introspection (Thrash & Elliot, 2002) and projective tests are used to assess them.

Implicit motive measures combine the mechanisms of apperception, the perception of new experiences in relation to past experiences, and projection to investigate the needs underlying fantasy. As individuals can verbally express their fantasies, daydreams, and autobiographical memories (Langens, 2002; Woike, 1994), analyses of these can thus provide insight into needs (Morgan & Murray, 1935). These tests are administered by presenting participants a set of comprehensive and ambiguous pictures. The participant must interpret the action in the pictures and then create stories regarding the preceding events and final outcome. Pictures are selected based on their ability to provide a framework for a great number of fantasies (Murray, 1943).

In order to validate the underlying assumptions of the original TAT, McClelland and Atkinson (1948) argued it was necessary to first arouse the motivational or need state and examine the effects of this arousal on perception and projection. This established a precedence for all motive measurement; an instrument claiming to measure implicit motives must first demonstrate that it can distinguish between aroused and non-aroused/neutral motivational states (McClelland, 1980). This was first accomplished by examining the effects of different intensities of hunger on perception (McClelland & Atkinson, 1948) and apperception (Atkinson & McClelland, 1948). McClelland and colleagues subsequently argued that psychogenic needs functioned similarly to physiological needs (e.g., hunger). In a series of experiments, participants' achievement motives were experimentally induced and the effects of this induction on apperception were examined (McClelland et al., 1948; McClelland, Atkinson, & Clark, 1949). This sensitivity to motive arousal is an indicator of *causal validity* (Borsboom et al., 2004).

Scoring systems for the Picture Story Exercise (PSE), the current version of the TAT, were developed by comparing the answers of participants in aroused versus relaxed/neutral conditions and only included characteristics if they appeared more often in stories produced by participants in the arousal conditions (McClelland & Koestner, 1992). In related research that followed the same methodological principle, affiliation (Atkinson, Heyns, & Veroff, 1954; Shipley & Veroff, 1952) and power (Uleman, 1972; Veroff, 1957; Winter, 1973) were also experimentally aroused. The content of the resulting stories helped to determine which kind of stories are typical for their respective motive and have provided the basis for the scoring systems of PSE.

TAT/PSE vs. OMT

Today, there are two established instruments with an open answer format that are used to assess implicit motives: The PSE and OMT (Schüler, Brandstätter, Wegner & Baumann, 2015). The PSE and the OMT have several similarities. Both instruments assess the implicit motives for achievement, affiliation, power, and, more recently, have been used to assess autonomy as an implicit motive (Baum & Baumann, 2019; Schüler, Sheldon, Prentice, & Halusic, 2016). Both the OMT and PSE use ambiguous pictures to arouse implicit motives, which participants then project into the stories they create about the characters and events depicted in the picture.

The PSE does not have a pre-determined set of pictures for the individual motives. Instead, it is recommended that individuals complete stories to six pictures (Schultheiss & Pang, 2007). The whole OMT consists of 20 pre-determined pictures that are motive-specific, that is, for each motive there are five pictures that aim to arouse that particular motive. While the PSE asks participants to write down the whole story prompted by questions regarding the characters and plot in the story, the OMT asks participants to identify with one of the characters and answer three questions regarding the story that is depicted in the picture (What is important to the person in this situation and what is the person doing? How does the person feel? Why does the person feel this way?).

For both the PSE and OMT the individuals' answers are coded for motive content according to standardized coding systems. The PSE's coding system was developed using the method described above (see Smith et al., 1992 and Winter, 1999). The OMT's scoring manual is based on the PSE but is theoretically extended to include five implementation strategies for motive satisfaction based on Kuhl's Personality Systems Interactions theory (Kuhl, 2001). Thus, individuals' answers are coded according to motive (affiliation, achievement, power, or autonomy) as well as the implementation of the motive. Four approach/hope components are classified according to the affect (positive or negative) and type of motivation (self-regulated or incentive-driven) and the fifth implementation strategy represents the avoidance/fear component. These implementation strategies will become clearer when we discuss the conceptualization of the power motive in the OMT. The answers provided for each picture are coded for one motive and one enactment strategy, whereas in the PSE, one story can be coded as having content from more than one motive.

In summary, while the PSE and OMT are both open-answer projective tests that use ambiguous pictorial stimuli to assess implicit motives, there are several key theoretical and methodological differences that warrant empirical evidence for each test's validity. While the

causal validity of the PSE has been established (see above), empirical evidence for the OMTs sensitivity to motive arousal has until now only been demonstrated in one study (Scheffer, Eichstaedt, Chasiotis, & Kuhl, 2007).

Assessing the Power Motive

As this paper focuses on the sensitivity of the OMT to the arousal of the implicit power motive, we will define the power motive and explain how it is assessed in the PSE and OMT. The implicit power motive (*n*Power) refers to a dispositional need for dominance (Schultheiss, Wirth & Stanton, 2004). Specifically, Winter (1992) defined the *n*Power as, "the desire to have impact on other people, to affect their behavior or emotions" (p. 301). *n*Power has a prosocial or an antisocial component (McClelland, 1970; Winter 1973). Studies on *n*Power confirm this bifurcation, as forms of the implicit power motive have been empirically associated with prosocial decision making (Magee & Langer, 2008), generativity (Hofer, Busch, Chasiotis, Kärtner & Campos, 2008), and volunteer behavior (Aydinli, Bender, Chasiotis, van de Vijver & Cemalcilar, 2015) but also with maximization of one's own profits and disregard for those of others (Quirin, Beckenkamp & Kuhl, 2009) and aggressive behaviors (Mason & Blankenship, 1987; Zurbriggen, 2000).

These aspects of *n*Power are reflected in the scoring systems for both the PSE and the OMT. Winter's *Manual for Scoring Imagery in Running Text* (1994) provides the scoring system for the PSE. As can be seen in Table 3.1, Winter outlines six basic categories for power imagery. The power themes in the OMT scoring manual for the power motive are similar to those in Winter's coding system. However, there are few differences that can be attributed to the theoretical considerations behind the OMT coding system. First, the bifurcation between hope and fear components of *n*Power are explicitly incorporated into the coding system (for a further discussion see Schüler, Baumann, Chasiotis, Bender & Baum, 2018). Secondly, the OMT incorporates two affective sources of motivation (positive vs. negative) in combination with self-regulated versus incentive-driven forms of motivation into its coding system.

The first level of *n*Power, prosocial leadership, in the OMT results from self-regulated positive affect (e.g., helping without being asked for help, giving advice or passing along wisdom, protecting others). The second level, inspiring others, arises out of the combination of positive affect with an external incentive (e.g., superficial assistance, persuading others, and captivating others). The third level, coping with power-related threats, represents self-regulated coping with negative affect (e.g., taking charge despite obstacles, granting autonomy, and integrating different views). The final level that represents approach behavior is the dominance category

with the motivational constellation of incentive-driven reduction of negative affect (e.g., dominance, conflict, and inhibited power). Finally, the fifth level represents the fear component of power with no active coping mechanism. Thus, although there is a large overlap in the themes of the two coding systems, the underlying theory behind the coding systems differ. The PSE and OMT coding systems were found to significantly correlate at $r = .15$ (Schüler et al., 2015). Therefore, we can assume we have two distinct measures of the same construct, but because of the underlying theoretical differences, there needs to be separate and thorough examinations of the causal validity of both measures.

Table 3.1

nPower Coding Systems for the Picture Story Exercise (PSE) and Operant Motive Test (OMT)

PSE *n*Power (Winter, 1994)	OMT *n*Power (Scheffer & Kuhl, 2012)
(1) Strong forceful actions that impact people or the world at large	(1) Prosocial leadership
(2) Control or regulation	(2) Inspiring others
(3) Attempts to influence, persuade, convince or make a point	(3) Coping with power-related threats, self-assertiveness
(4) Giving help, advice or support that is not explicitly solicited	(4) Dominance over others
(5) Impressing others or the world at large: mention of, or concern about, fame, prestige, and reputation	(5) Fear of being powerless
(6) Strong emotional reaction in one person to the actions of another person	

Present Research

McClelland argued that instruments assessing implicit motives should be sensitive to experimental arousal of motivational states just like "a thermometer is sensitive if it responds in a linear fashion as a lighted match is moved closer to it" (1980, p. 34). The first studies arousing *n*Power within motive disposition theory did so by having participants experience power situations first-hand or observe power in action (for a discussion see Winter & Stewart, 1978).

Winter (1973) argued that films, specifically films depicting charismatic leaders, were the best option to capture all aspects of power. Thus, Winter's research included showing political and inspirational speeches (Stewart & Winter, 1976; Winter, 1974). Films have subsequently been used to arouse *n*Power to examine the effects of aroused motivational states on immune functioning (McClelland & Kirschnit, 1988) and hormone concentration (Schultheiss, Wirth & Stanton, 2004; Wirth & Schultheiss, 2006).

It is important that the OMT also demonstrate causal validity because the OMT not only assesses implicit motives, but also includes the motivational processes behind behavior aimed at satisfying such motives in its coding system thus expanding the insight users gain when assessing implicit motives. As the OMT was developed based on the PSE and has shown good prognostic validity (Baumann, Kazen, & Kuhl, 2010), we hypothesize that the OMT will be sensitive to similar arousal techniques used in previous research. In this paper, we focused on examining the causal validity of the OMT for *n*Power. In two studies, we employed films (Study 1) and real political speeches (Study 2) as stimuli to arouse *n*Power in participants. We expected that participants in the aroused conditions would have higher *n*Power scores than participants in neutral conditions, which would provide evidence for the causal validity of the OMT.

Study 3

In Study 3, we examined whether motivational cues from movies that have strong power content could arouse *n*Power in a non-laboratory setting. Previous studies have shown that movies can successfully arouse *n*Power in participants (McClelland & Kirshnit, 1988; Schultheiss, Wirth, & Stanton, 2004; Wirth & Schultheiss, 2004); however, these studies were conducted in laboratories in group settings and used the TAT/PSE as a measure for *n*Power. Our participants viewed the movie clips using an online survey platform and completed the OMT as a measure of *n*Power. As the OMT has a different format than the PSE (answering specific questions vs. open format) and a slightly different coding system than the PSE, it is necessary to examine whether the OMT is sensitive to the arousal of *n*Power.

Participants were shown clips of *The Godfather, Part II* or *Elizabeth.* The former was selected as it has successfully aroused *n*Power in a previous study (Schultheiss et al., 2004). Although previous research has shown that *n*Power can be aroused in both men and women using the same stimuli (see Steele, 1977, Schultheiss et al., 2004), we showed a group of participants *Elizabeth* to see whether a film with a powerful female leader asserting her power would also arouse *n*Power in participants. We expected that both films would arouse *n*Power in participants as compared to a neutral video containing no power cues.

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists and advertisements at a German university. A total of 263 participants completed the study. Participants' age ranged from 17-58 years ($M = 22.6$ years, $SD = 5.71$ years). $N = 220$ (83%) of the participants were female and $N = 245$ (93%) were students. University students were offered course credit for participation in the study.

After opening the link to the survey site, participants were randomly assigned to the control group ($N = 69$), to *The Godfather, Part II* group ($N = 67$), or the *Elizabeth* group ($N = 69$). An additional 58 participants viewed the film *Billy Elliot* to examine the effects of the film on the arousal of dispositional autonomy; however, their data is not relevant to the current study and will not be further reported.[1] After viewing the film, participants then completed 8 pictures of the OMT, an explicit measure of power and autonomy motives, answered control questions, and provided demographic data.

Arousal Conditions

Participants viewed around 16 minutes of their respective films. The films were cut so that the scenes that had the most powerful motive cues were shown. This could make it difficult for viewers to follow the plot. Therefore, participants were told before viewing that they did not have to understand the film in its entirety they only needed to empathize with the film.

The Godfather, Part II (director Francis Ford Coppola) depicts the story of "godfather" Michael Corleone taking on the role of family leader after the death of his father. Our participants viewed scenes that included a discussion about a concession for a casino, a business discussion at a party, a conversation between Michael and his sister, and a scene in which a friend of the family asks Michael to disengage in business with another family in Brooklyn. The scenes were scored using the OMT manual and were judged to contain mainly cues for power motivation and less for affiliation and achievement.

Elizabeth (director Shekar Kapur) tells the story of a young Queen Elizabeth I ascending to the throne after her half-sister Mary dies. A subplot of the film depicts her romance with Robert Dudley; however, participants did not view scenes concerning this romance. Instead, scenes in which Elizabeth learns that she is now the queen of England, is crowned the queen, discusses the use of force in a potential war, learns of the defeat of British troops, gives a

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[1] The main results do not change when the data from the Billy Elliot condition are included in the analyses.

speech in front of nobility and clergy, and the final scene in which she changes her appearance and claims she is married to England were shown. Once again, two raters familiar with the OMT scoring guide coded the scenes for motivational content. Although two of the scenes were coded as containing autonomy cues, the majority of the scenes were classified as containing overwhelmingly power motive cues.

World without People? (*Welt ohne Menschen?*, directed by Philippe Borrel) is a documentary film about the increasing use of technology in the world from perspectives of technological science, philosophy, and politics. The scenes viewed included interviews with different experts about the meaning of time, fear of numbers, a scene with a robot, an interview about changes in time, a sequence about person-machine systems, and an interview about prosthetics. The raters deemed that there were little to no power cues contained in the sequences.

Measures

Implicit power motive. Participants completed eight pictures from the OMT. As the data for this particular research question were collected together as part of a study on the implicit autonomy motive, eight items were presented that, under neutral conditions, assess power and autonomy (for the arousal potential of the pictures see Runge et al., 2016). The pictures included two individuals talking to each other at a table with a third person standing with their back to them (Picture 3), two individuals sitting across from each other at a table (Picture 4), the bust of an individual looking to the side (Picture 5), a taller individual with their hand on the shoulder of a smaller individual looking up to the larger individual (Picture 11), an individual holding a large item up in front of a crowd (Picture 12), an individual standing with their arms crossed looking at a person who is sitting at a table looking back at the individual (Picture 13), an individual looking at a crowd of people (Picture 14), and a larger individual standing in front of a smaller individual with the smaller individual looking down at the ground (Picture 15). Two coders scored the stories independently and reached a sufficient inter-rater agreement (ICC = .86) for power. Discrepancies were resolved through discussion before the final scores were analyzed. For the purposes of these analyses, number of power codings from Levels 1-5 were summed, and the power score corresponds to the result of this summation.

Explicit power motive. Participants' explicit power motive was assessed using the Motive Enactment Test (Motiv-Umsetzungs-Test, MUT; Kuhl, 2000, see also Kuhl & Henseler, 2003). Participants indicated to which extent they agree (from 1 = *"not at all"* to 4 = *"completely"*) with different statements regarding the strength of the power motive (e.g., *"Others*

often like it when I call the shots") as well as integrative (e.g., *"I feel that most of the time I can speak my mind"*), intuitive (e.g., *"I often feel superior to others"*), and controlled (e.g., *"I keep striving for higher executive positions"*) enactment strategies of the motive (16 items; Cronbach's α = .80).

Control questions. As these films were released long before our study, we felt it was necessary to ask participants whether or not they were familiar with the films (0 = *"no"*, 1 = *"yes"*). To account for disturbances that may have arisen due to the online nature of the survey, we asked participants to indicate how much they could emotionally engage in the film and coded their ratings as 0 (*"not at all"*, *"some"*) and 1 (*"mostly"*, *"completely"*).

Results

Descriptives and correlations. The means, standard deviations, and correlations between study variables across the three relevant conditions are listed in Table 3.2. Gender and age were positively correlated indicating that male participants tended to be older. The significant correlation between gender and the film contrast C2 revealed that male participants were assigned by chance to the *Elizabeth* condition more than they were to the control film. Participants wrote an average of $M = 3.38$ ($SD = 1.29$) *n*Power-related stories. *n*Power scores correlated positively with age. Film familiarity correlated significantly with film engagement. However, it is important to mention that only 19 participants (9%) indicated that they were familiar with the film: 13 with *The Godfather, Part II*, five with *Elizabeth*, and one with the control film. Nevertheless, roughly half of the participants (53%) could mostly or completely engage in the films. The significant correlations between film engagement and the film contrast C1 revealed that participants could engage less in the film *The Godfather, Part II* compared to the control film.

Table 3.2

Means, Standard Deviations, and Correlations in Study 3 (N = 205)

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)
(1) Gender[a]								
(2) Age	22.78	6.19	.41**					
(3) nPower	3.38	1.29	.01	.15*				
(4) sanPower	2.22	.040	.13	-.02	.10			
(5) Film Familiarity	0.09	0.29	.07	.11	.13	.03		
(6) Film Engagement	0.53	0.50	.05	.02	.03	.09	.20**	
*(7) C1 (*Godfather II*)*			.06	.06	.03	-.11	.25**	-.20**
*(8) C2 (*Elizabeth*)*			.14*	.10	.02	-.10	.08	-.04

[a] 1 = female, 2 = male; * $p < .05$; ** $p < .01$

Main analysis. To examine the effects of the films on the arousal of *n*Power, we conducted a hierarchical regression analysis on *n*Power. In Step 1, we controlled for age and gender. Age had a significant main effect on *n*Power $\beta = .18$, $t(189) = 2.22$, $p = .03$, $R^2_{Step1} = .02$ $p = .09$. Gender had no main effect on *n*Power. In Step 2, we entered two dummy variables contrasting *The Godfather, Part II* with the documentary film (C1) and *Elizabeth* with the documentary film (C2) as well as the variable film engagement. To build the contrasts, the relevant film was coded as 1, the control condition as -1, and the non-relevant film with 0. Higher versus lower film engagement was recoded as 1 versus -1. This variable was included to see how engagement in the film affects arousal. The significant main effect of age remained, $\beta = .18$, $t(186) = 2.21$, $p = .03$; however no other variables were significant predictors of *n*Power. This model explained 3 % of the variance, $R^2_{Step2} = .03$, $p = .38$. In Step 3, we entered the two-way interactions between the contrasts and film engagement. Age, $\beta = .16$, $t(184) = 2.03$, $p = .04$, and the interaction between C1 and film engagement, $\beta = .19$, $t(184) = 2.32$, $p = .02$, were only significant predictors of *n*Power.

This interaction is depicted in Figure 3.1. The simple slopes analyses revealed that the slope for high engagement was significant, $\beta = .42$, $t(184) = 2.03$, $p = .04$, whereas the slope for low engagement was not significant, $\beta = -.22$, $t(184) = -1.20$, *ns.* Thus, participants who were

engaged in *The Godfather, Part II* had higher *n*Power scores than participants who engaged in the documentary. This difference was not observed in participants who reported low engagement. Furthermore, the interaction between C2 and film engagement was marginally significant, β = -.15, $t(184)$ = -1.76, p = .08. The final model explained 6% of the variance, R^2_{Step3} = .06, p = .13. The interaction between C1 and film engagement remained stable when we additionally controlled for film familiarity, β = .19, $t(183)$ = 2.23, p = .03, or without controlling for gender and age, β = .22, $t(198)$ = 2.65, p = .01.

An additional analysis with *san*Power instead of *n*Power as a dependent variable yielded no significant effects. Specifically, the interaction between C1 and film engagement was not significant, β = .05, $t(184)$ = 0.60, *ns*.
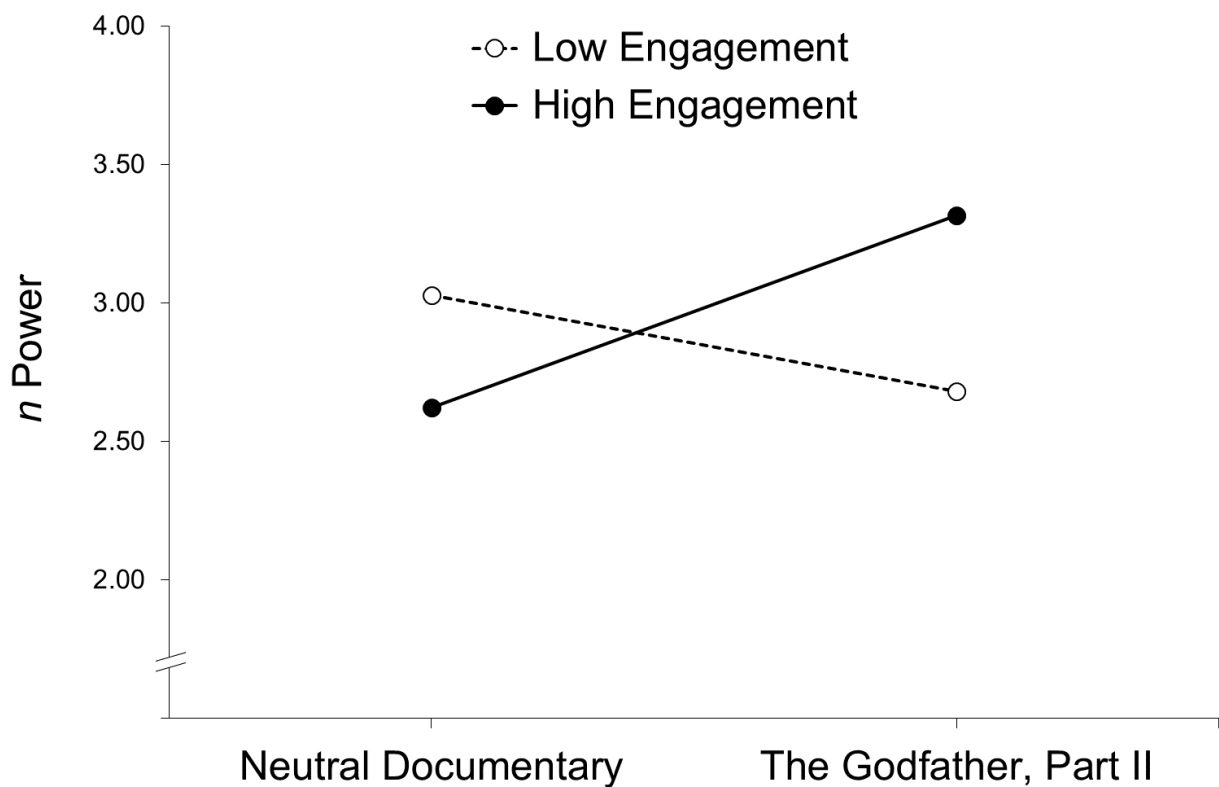

Figure 3.1. Implicit power motive (*n*Power) as a function of condition and film engagement in Study 3 (*N = 205*).

Discussion

We were able to show that participants who were highly engaged while watching clips from *The Godfather, Part II* had higher OMT power scores than participants who were highly engaged in watching a documentary film. There was no significant difference between film conditions for participants not engaged in watching *The Godfather, Part II* or the documentary film. Thus, we were able to replicate the findings from Schultheiss et al. (2004) using an online survey, different scenes, and a different measure of implicit motives. Regarding the film *Elizabeth*, we found neither a main effect of the contrast between *Elizabeth* and the documentary nor a significant interaction between this contrast and film engagement. In fact, this interaction, descriptively, revealed that high engagement in the film reduced *n*Power scores.

Film engagement was a critical variable in this study as it moderated the effects of the film on motive arousal. As our study was not conducted in laboratory conditions, we anticipated that participants would vary as to how much they could concentrate on the study and avoid distraction. It appears that for motivational cues from films to have an effect on the arousal of implicit motives, participants need to fully immerse themselves in the film and engage with the plot and characters. The participants who reported low engagement with the film either could not identify with aspects of the film or were distracted, thus lowering the effect of the power-related cues.

We can attribute the lack of effect of *Elizabeth* on *n*Power to one of two possibilities. First, it could be that the motivational content of the chosen scenes was not as strong as expected. The second possibility is that the autonomy-related scenes shown at the start of the film sequences were so strong that they overpowered the effect of the power content making participants sensitive for autonomy cues in later scenes rather than power cues. This is, however, speculation and would require further research to examine the effects of individual scenes and strength of motive content or competing motivational cues on the arousal of implicit motives.

As we were able to replicate previous findings on the arousal of *n*Power using films (McClelland & Kirshnit, 1988; Schultheiss, Wirth, & Stanton, 2004; Wirth & Schultheiss, 2004) in an online German sample using the OMT, we wanted to see if we could replicate classical studies on *n*Power using political speeches (see Winter & Stewart, 1978) given by German politicians.

Study 4

Previous studies that have been conducted on the arousal of *n*Power used political and inspirational speeches from different leaders such as John F. Kennedy, Winston Churchill, or even excerpts from *Henry V* (see Winter & Stewart, 1978). Thus, in Study 4, it was our aim to examine whether speeches from modern German politicians could also arouse *n*Power in German participants in an online study. Moreover, we wanted to see if this arousal could be detected by the five pictures in the OMT that were designed to assess *n*Power (Kuhl & Scheffer, 1999). We also wanted to contrast the effects of a prosocial inspirational speech with a dominance-oriented political speech. To this end, we showed participants either two shorter speeches from Joachim Gauck during his tenure as the President of Germany in which he broached the issues of integration and societal solidarity or a 15-minute long speech by Björn Höcke, a politician from the right-wing party Alternative for Germany (Alternative für Deutschland, AfD).

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists and advertisements at a German university. A total of 92 participants completed the study without interrupting or pausing the video. Participants' age ranged from 18-64 years ($M = 25.13$ years, $SD = 9.99$ years). $N = 70$ of the participants were female (76%). University students were offered course credit for participation in the study.

After opening the link to the website, participants were then randomly assigned to one of three conditions. Participants watched either an inspirational speech (Prosocial Condition, $N = 39$), a dominance-driven speech (Dominant Condition, $N = 28$), or a neutral tutorial (Neutral Condition, $N = 25$). Following the speeches, participants completed the five pictures from the OMT, an explicit power motive scale as well as control questions and provided demographic information.

Arousal Conditions

Prosocial power. Two speeches from the former President of Germany, Joachim Gauck, that were cut together were used as the prosocial power condition. The first part consisted of a speech that President Gauck held at the beginning of a forum dealing with the refugee crisis that began in 2015. In this speech, he discussed the need for German citizens to show empathy and understanding for refugees and possibilities for integration through working

together. The overriding topic was how to build a future together through peaceful problem-solving. The second speech was President Gauck's annual televised Christmas Address from 2015. This speech was thematically related to the previous speech because it also addressed the refugee crisis and themes related to integration. Here, President Gauck thanked all volunteers, praised the actions of citizens who had reached out to refugees, and encouraged viewers to find a way together towards integration. The type of power cues exhibited in these clips could be classified as social-integrative engagement and generativity according to McClelland's developmental stages of power (1975).

Dominant power. A speech delivered by the right-wing populistic politician Björn Höcke comprised the dominant power condition. The speech was given in front of supporters in front of a church. In anticipation of the speech, the heads of the church decided to not light the church. Thus, shortly after Mr. Höcke took the podium, he instructed his supporters to light up the church using the flashlights on their phones. Then, he used war-like metaphors to excite the crowd telling them they need to go into battle to save their futures. Furthermore, he directly addressed and criticized the local bishop and press, claimed persecution of Christians, and called his supporters to protest. The blatant demonstration of power and rallying of the crowd corresponds to the assertive stage of McClelland's power developmental stages (1975).

Neutral video. A tutorial for a popular presentation formatting computer program comprised the neutral condition. In this video, viewers are guided through the necessary steps to create attractive slides for visual presentations. The video depicted the computer program and had a male narrator. This video was deemed as strictly informative and contained no power motivation cues.

Measures

Implicit power motive. Once again, to assess nPower, we used the OMT. This time participants only completed the five pictures that are intended to assess nPower. These include the pictures 11 through 15 that were also used in Study 3. Two independent raters coded the stories and reached an acceptable interrater reliability with an ICC of .81. Discrepancies were resolved through discussion before the final scores were analyzed. For the purposes of these analyses, number of power codings from Levels 1-5 were summed, and the power score corresponds to the result of this summation.

Explicit power motive. Participants' explicit power motives were assessed using the six-item Unified Motives Scale (UMS-6; Schönbrodt & Gerstenberg, 2012). The scale consists of three items in which participants indicate to which extent they agree to the statements, *"I like*

to have the final say," *"I would like to be an executive with power over others,"* and *"I do not have much interest in leading others."* (reversed). Then, participants rate how important the following three goals are to them: *"The opportunity to exercise control over an organization or group,"* *"be able to exert influence",* and *"to be in a leadership position in which others work for me or look to me for direction."* The internal consistency of this scale in our sample was high (Cronbach's α = .90).

Control questions. To account for disturbances that may have arisen due to the online nature of the survey we asked participants to indicate on a four-point scale (from 1 = *"not at all"* to 4 = *"completely"*) how well they could follow the video and how informative they found the video. As the speeches from the politicians dealt with sensitive issues and the fact that participants may have differing political views as the speakers, we also asked participants to indicate how convincing they found the speaker to be and to rate the likability of the speaker.

Results

Descriptives and correlations. The means, standard deviations, and correlations between the study's variables across conditions are listed in Table 3.3. Participants wrote an average of $M = 2.92$ ($SD = 1.11$) answers that were coded as containing nPower content. No significant correlations were found between the study variables and nPower scores. The control variables showed for the most part moderate positive significant correlations with each other. Significant negative correlations were found between speech contrast C2 and the variables informative (how informative was the speaker), convincing (how convincing was the speaker), and likability (how likable was the speaker). This indicates that participants found the dominant power speech of Mr. Höcke to be less informative, convincing, and likable compared to the neutral video. In contrast, the correlations between speech contrast C1 indicates that participants found the prosocial power speech of Mr. Gauck to be less informative but more convincing compared to the neutral video.

Power of Politics: Using Political Stimuli to Arouse the Implicit Power Motive

Table 3.3

Means, Standard Deviations, and Correlations in Study 2 (N = 92)

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Gender[a]										
(2) Age	25.13	9.99	.05							
(3) *n*Pow	2.92	1.11	.13	.16						
(4) *san*Pow	3.01	.98	.18	-.06	.02					
(5) Follow	3.79	1.05	.14	.11	.01	.12				
(6) Informative	2.92	1.08	-.06	-.05	-.01	-.09	.25*			
(7) Convincing	3.24	1.19	-.01	.02	-.01	-.07	.28**	.54**		
(8) Likable	3.21	1.43	-.08	-.09	-.03	-.08	.07	.56**	.71**	
(9) C1 (Prosocial)			.08	.05	-.07	.01	.02	-.23*	.22*	.19
(10) C2 (Dominant)			.01	.07	.08	.05	.01	-.58**	-.35**	-.62**

[a] 1 = female, 2 = male; * *p* < .05; ** *p* < .01

Main analysis. To examine the effects of the speeches on the arousal of nPower, we conducted a hierarchical regression analysis on nPower. In Step 1, we controlled for age, gender, and, since the correlation between dominant speech and likability was so strong, likability. None of the control variables had a main effect on nPower in Step 1. This model explained 4% of the variance, $R^2_{Step1} = .04$, $p = .28$. In Step 2, we entered two dummy variables contrasting the prosocial power speech from Mr. Gauck with the neutral video (C1) and the dominant power speech from Mr. Höcke with the neutral video (C2). To build the contrasts, the relevant speech was coded as 1, the control condition as -1, and the non-relevant speech with 0. In this step, there were significant main effects of C1, $\beta = -.33$, $t(86) = -2.16$, $p = .04$, and C2, $\beta = .40$, $t(86) = 2.15$, $p = .03$. No other variables were significant predictors of nPower. This model explained 10% of the variance $R^2_{Step2} = .10$, $p = .11$ and is depicted in Figure 3.2.

An additional analysis with *san*Power instead of nPower as a dependent variable yielded no significant effects. Specifically, there were no significant main effects of C1, $\beta = .02$, $t(86) = 0.12$, *ns*, and C2, $\beta = -.01$, $t(86) = -0.03$, *ns*.
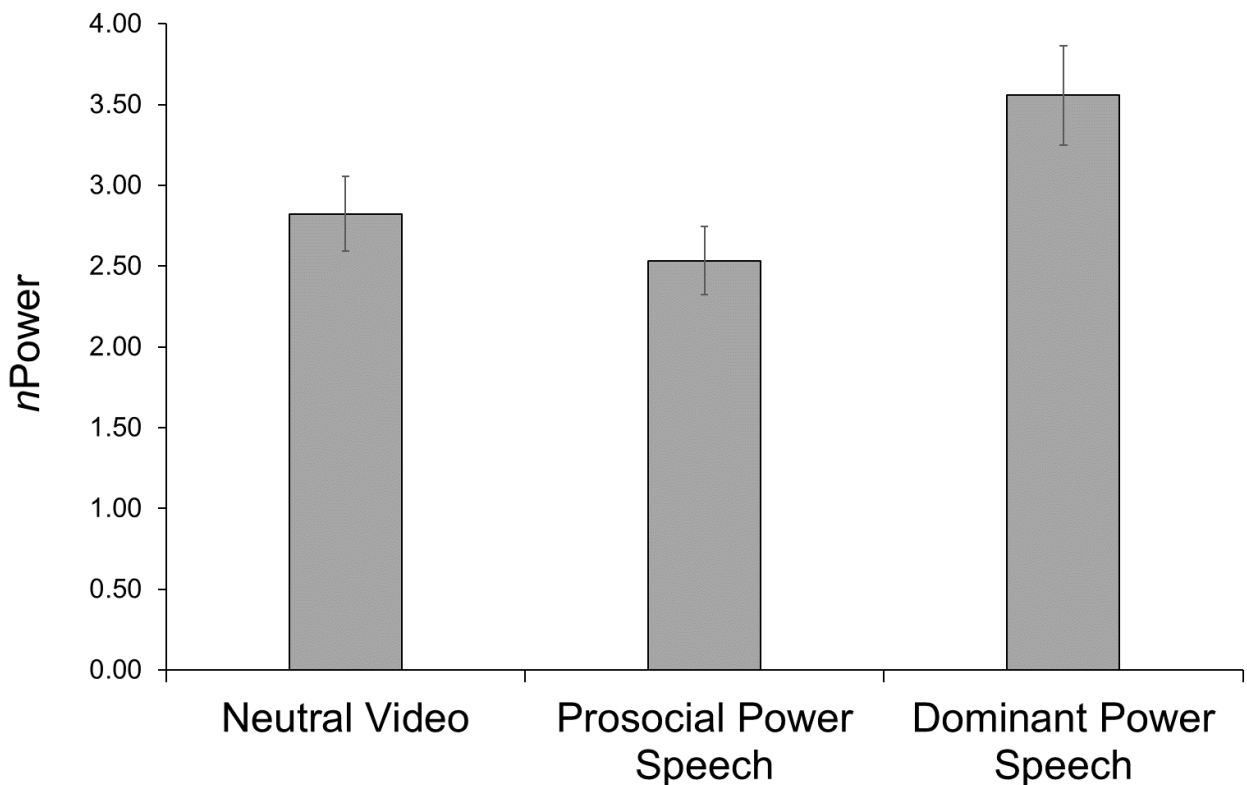

Figure 3.2. Implicit power motive (*n*Power) as a function of condition in Study 4 ($N = 92$).

Discussion

In this study, we aimed to arouse nPower using political speeches from German politicians. We were able to partially confirm our hypotheses. As both speeches contained similar amounts of, albeit different types of, power motivational cues, we expected both political speeches to arouse nPower in participants in comparison to a control video. Results showed that the speech from former President Gauck actually reduced nPower in participants as compared to the control video, whereas the speech from the right-wing populist politician Mr. Höcke aroused nPower in participants as compared to the control condition. These results were found when controlling for gender, age, and the likability of the speaker.

The differential effects of the speeches may lie in the content of the speeches or in the format in which they were presented. Regarding the latter possibility, Mr. Gauck presented his first speech to a room full of journalists and attendees of a forum that dealt with the refugee crisis of 2015. His second speech was a televised address in which he spoke directly to viewers through the camera. In contrast, Mr. Höcke's speech was delivered at a political rally where he addressed his supporters directly. The participants in our study directly observed not only his message, which, based on content alone, was deemed to have power motivation cues, but also his impact on his supporters and their reactions to his speech and to his instructions. An important aspect related to the context of the delivery of the speeches is how they were delivered. Winter (1973) used charismatic speakers to arouse nPower. It may be that Mr. Gauck, who had higher likability ratings than Mr. Höcke, was not as charismatic. Regarding the differences in the content of the speeches, it may be that Mr. Gauck's emphasis on the collective may have diminished the power-motivated content of his speech and focused our participants' attention to less individual and more collectivistic thinking. This type of thinking is not in line with European ideas of power. Mondillion et al. (2005) found that Germans tended to define power as the "liberty to violate social norms without sanction and to control the outcomes of other people" (p. 1120).

General Discussion

In the present research, we examined the casual validity of the OMT. Specifically, we examined whether the OMT could discern between participants whose implicit power motives had been aroused through film stimuli in comparison to participants who had watched motive-neutral film stimuli. We hypothesized that participants who had watched movies with nPower-related imagery (Study 3) and political speeches (Study 4) would have higher nPower scores, as

assessed with the OMT, as compared to participants in the control conditions. We did not expect any effect of the experimental conditions on participants' explicit power motives.

Our results confirmed our hypotheses. In Study 3, participants who were engaged in watching the *The Godfather, Part II* had higher *n*Power scores than participants engaged in the control condition. There was no significant difference between film conditions for participants not engaged in watching *The Godfather, Part II* or the documentary film. Our hypothesis that the film *Elizabeth* with a female protagonist would also arouse *n*Power in participants could not be confirmed. The films had no effect on the explicit power motive. In Study 4, participants who watched a video of a right-wing politician had higher *n*Power scores than participants who watched a power-neutral instructional video when we controlled for age, gender, and likability. Unexpectedly, the prosocial power speech resulted in lower *n*Power scores as compared to the control video. The videos had no effect on the explicit power motive scores of our participants.

Our study confirms that the OMT is sensitive to motive arousal in the power domain and, thus, provides evidence for the causal validity of the OMT. Our study showed that certain stimuli aroused *n*Power in our participants. Specifically, men displaying outright influence over others, in line with McClelland's first power stage, aroused *n*Power in participants. In both the film and political speech that successfully aroused *n*Power, participants observed the agent of power and the individuals who were to be influenced by the agent. We suggest that it is necessary for individuals to explicitly see *n*Power "in action" when film stimuli are used to arouse implicit motives in order for these motivational cues to be strong enough to significantly arouse this motive in participants.

Our results are significant as they substantiate the OMT as a valid instrument to measure implicit motives. Previous research has already demonstrated meaningful behavioral predictions regarding *n*Power using the OMT (Baumann, Chatterjee, & Hank, 2016; Groepel, Schoene, & Wenger, 2015; Kazén & Kuhl, 2011; Wagner, Baumann, & Hank, 2016; Wegner, Schüler, Schulz Scheuermann, Machado, & Budde, 2015) and the reliability of the OMT (Runge et al., 2016). The OMT is a valuable instrument for measuring implicit motives because it provides additional information to the motive categories. Baumann and colleagues (2010) outlined that motives consist of preconceptual (implicit motives), conceptual (self-attributed motives), and self-regulatory levels. They further state that only the OMT provides information about the self-regulatory level of motives. Thus, a practitioner or researcher applying the OMT has information about the what (motive) and how (implementation strategy) an individual strives to satisfy the motive.

The goal of the OMT is not to assess the self-regulation strategies themselves, but how they have been integrated into the motive representation within the self. Research conducted with the OMT has shown the predictive validity of these self-regulatory levels within the *n*Power domain. Baumann, Chatterjee, and Hank (2016) found that the ability to self-regulate positive affect (demand-related action orientation) was correlated with prosocial *n*Power as assessed with the OMT. Moreover, prosocial enactment of *n*Power was associated with higher explicit power motives amongst students majoring in psychology and education. Furthermore, several studies have shown relationships between prosocial enactment of *n*Power as assessed using the OMT and parenthood, generativity, helping, and volunteering across cultures (see Chasiotis & Hofer, 2018, for an overview). Finally, Ball et al. found that the strength of the power enactment based on incentive-based reduction of negative affect was influenced by sex hormone fluctuation.

The current studies were based on previous experiments conducted with the PSE (Schultheiss et al., 2004; Winter, 1973). Specifically, we used similar film stimuli as Schultheiss and colleagues (2004) and political speeches in line with research conducted by Winter (1973). Our studies expanded on previous research in several ways. First, the aforementioned studies were conducted in group settings. To our knowledge, our studies are the first *n*Power arousal studies that were conducted outside of group laboratory testing. The participants in our studies completed the experiment using an online platform. This had two advantages: the study was not just limited to a university student population and our participants viewed the videos in naturalistic settings. The second difference between our study and previous studies is that we adapted the studies to be conducted in Germany. Thus, we used the German synchronized versions of the films and German politicians. This is significant because individuals' conceptualizations of power have been shown to differ between the United States and Germany (Mondillon et al., 2005). Therefore, motive arousal studies in the *n*Power domain must be conducted in different cultures to examine which specific themes arouse *n*Power in individuals.

Limitations and Future Directions

Although we view the experimental setting of an online survey as a strength of our study, there are several risks to this methodology. We could not guarantee that participants watched the whole video without interruption or distraction. In Study 3, we examined film engagement as a variable and found that motive arousal only occurred in participants who were able to engage with the film. In Study 4, we were able to program the study to detect whether participants had watched the whole video or paused the video and eliminated these subjects from the analyses. We still could not guarantee that all participants fully watched the videos.

However, our experimental manipulations had the desired effects despite this increased noise. Future research could examine whether there are stronger arousal effects in laboratory settings as compared to an online survey.

Two of our experimental manipulations resulted in surprising effects. We expected the film Elizabeth and a prosocial political speech by former Federal President Gauck to also arouse *n*Power in participants. However, for both manipulations participants had lower *n*Power scores after engaging or watching the film or speech as compared to the control condition. This effect was, however, only significant in Study 4. As we mentioned in the earlier discussions, in the case of *Elizabeth*, the initial autonomy-related cues may have been stronger than the *n*Power related cues. Furthermore, the selected scenes did not show "power in action" in the same manner as *The Godfather, Part II* clips. In the case of the political speech, we surmise that either Mr. Gauck is not as charismatic as political orators in the speeches used in previous research or that the power cues were also not strong enough or not relevant to arouse *n*Power through observation. Future research could address these issues by systematically varying film stimuli that show "power in action" versus implied power and systematically varying longer clips and shorter clips to assess how strong the cues need to be to arouse *n*Power.

Finally, we aroused *n*Power by having participants view motive-related cues. In previous motive arousal research in the other motive domains, participants were placed in situations in which their motives were aroused in vivo (Atkinson, Heyns, & Veroff, 1954; McClelland et al., 1948; Scheffer et al., 2007; Shipley & Veroff 1952). In the power domain, Ng, Winter, and Cardona (2011) aroused *n*Power in participants by giving them decision-making control of resources and status elevation. However, they observed cultural differences in power motivation between Chinese and American participants. Future research could replicate this paradigm with the OMT. It would also be of interest to examine *n*Power arousal using the OMT in different cultures.

Conclusion

In two studies, we investigated whether the OMT was sensitive to aroused *n*Power using film stimuli with strong power themes and political speeches. Our results demonstrated the causal validity of the OMT for *n*Power. We used and adapted the methodology from previous motive arousal studies that had employed the PSE to German subjects and found that subjects engaged in watching *The Godfather, Part II* or an antisocial political speech had higher *n*Power scores as compared to participants in control conditions. The results add to the body of literature that support the use of the OMT to measure implicit motives.

4   Arousing Autonomy: Validation of an Operant Implicit Motive Measure

Abstract

We developed and investigated the causal validity of a picture set specifically designed to assess the implicit autonomy motive (*n*Autonomy). Study 5 describes the empirical selection of a new picture set for the Operant Motive Test. Three further studies examined the causal validity of these pictures. A total of 387 participants (aged 18-79 years) watched film clips with autonomy-relevant or neutral cues (Study 6), completed an online (Study 7a) or laboratory experiment with a baseline measurement (Study 7b) that aroused *n*Autonomy using the symbolic self-completion paradigm. Using the new pictures, participants who watched a film clip with high *n*Autonomy cues had higher *n*Autonomy scores than participants who watched a neutral tutorial film. Furthermore, participants who felt they could not personally express themselves while writing an essay in an online setting had higher *n*Autonomy scores than participants who felt they could. Finally, interrupting participants while writing an essay resulted in higher *n*Autonomy scores as compared to baseline. Participants who completed a personal essay had lower *n*Autonomy scores as compared to baseline, which indicates a satisfied motive. Our results support the causal validity of the new OMT pictures that assess *n*Autonomy and have wide-ranging implications for future research on *n*Autonomy.

Affiliation, achievement, and power have long been the focus of implicit motive research. Personal autonomy has, to date, surprisingly received little consideration as an implicit motive. However, even early theoretical considerations regarding the power motive described power as a resistance to coercion and finding personal freedom (Murray, 1938) or discerned between power over one's self and power over others (McClelland, 1975). These themes are related, but not identical, to the theoretical conception of autonomy as a basic need within the self-determination theory framework (Deci & Ryan, 2000). Here, autonomy is defined as "organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (p. 232). Recent research has considered these conceptualizations regarding power and autonomy and defined and examined autonomy as an implicit motive.

Implicit motives are assessed using projective measures. The Picture Story Exercise (PSE; Murray, 1943) and the Operant Motive Test (OMT; Kuhl, 2013) are two well-known measures that assess implicit motives (see Schüler, Brandstätter, Wegner, & Baumann, 2015, for a detailed comparison of the PSE and OMT). In these tests, participants are instructed to write texts to ambiguous pictures. Then, motive strength is ascertained by scoring the text using a specific scoring system. From the very beginning, researchers such as McClelland suggested that implicit motive measures have to be sensitive for conditions in which the relevant motive is aroused like "a thermometer is sensitive if it responds in a linear fashion as a lighted match is moved closer to it" (1980, p. 34). This sensitivity to motive arousal is the gold standard in implicit motive research and an indicator of *causal validity* (Borsboom, Mellenbergh, & van Heerden, 2004).

However, research conducted on the implicit autonomy motive (henceforth referred to as *n*Autonomy) used scoring guides that were primarily theoretically conceptualized. If autonomy is an implicit motive, then, similarly to the other classic motives, the instrument measuring it must be sensitive to its arousal. The present studies address this gap in research. First, we developed and empirically selected a picture set designed to capture *n*Autonomy. Then, we examined its causal validity using motive arousal methods.

Measuring Implicit Motives

Implicit motives are motivational personality dispositions thought to intuitively orient, select, and energize behavior (McClelland, 1980). McClelland, Koestner, and Weinberger (1989) distinguished implicit motives from their explicit counterparts. A main difference between implicit and explicit motives lies in the way they are measured. McClelland and

colleagues (1989) contend that implicit motives are developed in the preverbal stage of development and are stored in nonverbal networks of affective associative experiences. As implicit motives are not or only partially assessable through introspection (Thrash & Elliot, 2002), they are assessed using projective instruments, whereas explicit motives are assessed using questionnaires.

To develop a method that captures implicit motives, McClelland, Clark, Roby, and Atkinson (1948) presented participants ambiguous pictures and asked them to write stories about what they see in the pictures. Analogue to physiological needs like hunger, they suggested that aroused psychogenic needs should have an effect on the apperception of ambiguous materials (McClelland et al., 1948). Thus, they developed a scoring procedure that was derived from experiments in which they aroused the implicit achievement, affiliation, and power motives (Atkinson, Heyns, & Veroff, 1954; Shipley & Veroff, 1952; Veroff, 1957; Winter, 1973). These studies form the basis of the scoring guides for implicit motive instruments (Kuhl, 2013; Winter, 1994).

The OMT went one step further by adapting this method to examine both the strength and enactment strategies of implicit motives. The scoring guide for the OMT is based on classical motive arousal studies, but is extended to include self-regulatory processes (Baumann, Kazén, & Kuhl, 2010). In the original test, individuals are shown 15 pictures depicting ambiguous situations and are asked to think of a story or scene that describes what is happening in each picture. Next, individuals are asked to pick out one person depicted in the story and answer three questions: (1) *What is important for the person in this situation and what is the person doing?* (2) *How does the person feel?* (3) *Why does the person feel this way?* Thus, with the OMT, practitioners and researchers can ascertain the motive (what) and its enactment (how) of an individual. The enactment strategies of implicit motives are based on Kuhl's personality systems interactions (PSI) theory (Kuhl, 2001) and consist of the combination of two affective sources of motivation (positive vs. negative) and two types of motivation (stemming from the self or from external incentives). This results in four enactment strategies for the hope/approach component of a motive and a fifth fear/passive avoidance component where no regulation takes place.

Defining and Measuring *n*Autonomy

The OMT defines *n*Autonomy as a need or concern for self-integration (Alsleben & Kuhl, 2011). Self-integration describes the process of deciding which aspects are part of the self. This process includes self-definition, self-preservation, and self-growth. Actions motivated by *n*Autonomy aim at a "free internal (not necessarily conscious) experience of self through

congruency and self-awareness" (Alsleben & Kuhl, 2011, p. 114). In order to determine which motivational cues arouse *n*Autonomy we need to examine the themes and behaviors that represent *n*Autonomy. As the OMT assesses not only the what (motive content) but also the how (self-regulatory processes) of implicit motives, the scoring guide outlines a variety of behaviors and themes that belong to *n*Autonomy.

In the OMT, the first level of *n*Autonomy, *self-confidence*, results from self-regulated positive affect (e.g., self-joy and enjoying something). The second level, *status*, arises out of the combination of positive affect with an external incentive (e.g., conditional self-esteem and being the center of attention). The third level, *self-growth*, represents self-regulated coping with negative affect (e.g., restoring inner certainty and integration of negative experiences). The final level representing approach behavior, *self-protection*, has the motivational constellation of incentive-based reduction of negative affect (e.g., rigid ego boundaries, justifying oneself, and pretending to act a certain way). Finally, the fifth level, *self-devaluation*, represents the fear component of autonomy with no active coping mechanism (e.g., uncertainty and shame). If a paradigm arouses *n*Autonomy, we would expect to see any of these themes in participants' answers.

The Autonomy Motive

There is already a good empirical basis that supports autonomy as an implicit motive. Both the PSE and the OMT have been used in research to assess *n*Autonomy. In one of the cardinal studies on *n*Autonomy within the framework of the motive disposition theory, Schüler, Sheldon, Prentice, and Halusic (2016) found that participants with higher *n*Autonomy showed higher flow experience and well-being when they had high autonomy support as compared to participants with lower *n*Autonomy scores. Schüler and colleagues found this effect using both the PSE and the OMT. This result is noteworthy, as the two instruments utilize different scoring guides.

Further research on *n*Autonomy has revealed higher intrinsic motivation scores for students with high *n*Autonomy scores in autonomy-supportive physical education classes at school as compared to autonomy-restrictive classes and compared to participants with lower *n*Autonomy scores (Sieber, Wegner, & Schüler, 2016). Moreover, individuals with high *n*Autonomy dispositions showed lower stress responses, as indicated by salivary alpha-amylase, after reading autonomy-supportive vignettes as compared to controlling or neutral vignettes. The opposite pattern was observed in participants with low *n*Autonomy dispositions (Sieber, Schüler, & Wegner, 2016). Finally, *n*Autonomy correlated positively with creative production scores and teacher ratings of creativity in adolescents (Baum & Baumann, 2019a). Hence, there

is empirical evidence demonstrating that *n*Autonomy acts like other implicit motives. However, the instruments that assess this motive still need to show that they are sensitive to changes in motive arousal.

Present Research

The present research had two main goals. The first aim was to develop and test OMT-specific pictures to assess *n*Autonomy. The original OMT consists of a fixed set of 15 pictures that correspond to each of the five enactment levels of each motive (affiliation, achievement, and power). *n*Autonomy was incorporated into the OMT scoring guide in the 2013 revision. Yet no additional pictures specifically aimed at assessing *n*Autonomy were developed. Thus, following the same approach underlying the other motives, we developed five pictures to assess the five enactment strategies of *n*Autonomy.

Our second goal was to assess the sensitivity of the OMT to motive arousal. Being sensitive to motive arousal techniques is considered the gold standard in implicit motive research (McClelland, 1980). Following the tradition of implicit motive research, we expected that *n*Autonomy would be aroused by film stimuli (McClelland & Kirshnit, 1988; Schultheiss, Wirth, & Stanton, 2004; Wirth & Schultheiss, 2006) or through experiential experimental manipulations (Atkinson et al., 1954; McClelland et al., 1948; Shipley & Veroff, 1952; Uleman, 1972; Veroff, 1957).

To this end, we conducted three studies. In Study 5, we developed and tested new pictures to assess *n*Autonomy with the OMT. Next, in Studies 6 and 7, we validated the pictures using motive arousal techniques. Specifically, in Study 6, we expected that watching the film *Into the Wild* would arouse *n*Autonomy in participants as compared to a control group. Finally, in Study 7, we used a paradigm from the symbolic self-completion theory (Wicklund & Gollwitzer, 1981) to arouse *n*Autonomy in participants in online (Study 7a) and laboratory (Study 7b) settings.

Study 5

The use of pictures in implicit motive measurement is based on Murray's (1943) original idea that apperceptive techniques require images have "stimulating power" (p. 2). According to this idea, pictures must have the ability to provide a framework for a great number of fantasies. Individuals apperceive ambiguous pictures, that is, they perceive the images in relation to their previous experiences and then project the aroused needs onto the image. The pictures in the OMT are line drawings that depict one or more individuals. The test requires that an individual identify with one of the actors depicted in the story to facilitate the process of apperception.

The original OMT was designed to assess the implicit affiliation, achievement, and power motives using a set number of pictures (Scheffer, Kuhl, & Eichstaedt, 2003). Following a similar method as Schmalt, Sokolowski, and Langens (1994), the authors selected a total of 15 pictures based on their potential to arouse the motive and enactment strategy in question. The authors selected pictures that had a high, but not exclusive, ability to arouse the specific motive x enactment strategy combination (Scheffer, 2001). A recent study on the reliability of the original OMT (Runge et al., 2016) revealed that the pictures for the original OMT differed in their desired arousal effect, but in general showed good reliability for the measurement of each motive.

For this study, we followed a similar reasoning from the original OMT. Our aim was to develop pictures that had medium motive arousal effects for the individual levels of autonomy, but were also ambiguous enough to potentially capture the other motives.

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists, and advertisements at a German university. A total of 117 participants completed the study. Participants' age ranged from 18-74 years ($M = 28.9$ years, $SD = 10.74$ years). $N = 67$ of the participants were female (59%). University students were offered course credit for participation in the study.

After opening the link to the survey site, participants were randomly assigned to one of four conditions. Participants were presented one of two sets of six newly developed pictures (Set 1, Set 2) in ascending or descending order. After completing the OMT pictures, participants completed an explicit measure of the autonomy motive, a well-being questionnaire, and provided demographic data. As explicit autonomy and well-being were assessed for a different research question, they will not be further analyzed or discussed.

Materials

Implicit Autonomy Motive. Using the *n*Autonomy scoring manual of the OMT as a guide, we developed two sets of pictures that aimed to capture each enactment strategy level of *n*Autonomy. This resulted in five pictures in each set that had the intention to arouse a specific level of *n*Autonomy. As can be seen in Figure 4.1, we also tested an additional ambiguous picture in each set that we felt was promising to potentially arouse *n*Autonomy. Thus, the final picture material consisted of two sets of six pictures.

Participants answered three questions after viewing each picture (see above). The answers to these questions were first scored for the presence of motive content. The scoring procedure is as follows: Only one motive is scored per picture. If no motive content is apparent, the item is coded as zero. If motive content is identified, it is additionally scored as belonging to one of the five specific enactment strategies outlined above: (*n*Aut1) *self-confidence*, (*n*Aut2) *status*, (*n*Aut3) *self-growth*, (*n*Aut4) *self-protection*, (*n*Aut5) *self-devaluation*. Scoring was carried out by experienced coders who had achieved agreements of 85% or better in their responses to training material prescored by experts.

Results

Table 4.1 shows the percentage of answers for each *n*Autonomy scoring level as well as for the other motives (*n*Affiliation, *n*Achievement, and *n*Power). The Set 1 and Set 2 pictures 1-5 had an average arousal strength of $M = 51.3\%$ $SD = 13.5\%$ and $M = 38.0\%$ $SD = 12.90\%$, respectively, for *n*Autonomy. The pictures in both sets also showed weak to medium arousal strengths for the other motives. The picture effects from Set 2 were descriptively stronger for other motives, especially *n*Power, as compared to Set 1. Thus, the Set 1 pictures are more specific to arouse *n*Autonomy. Furthermore, the Set 1-pictures 1-5 showed good matches between the picture and intended enactment strategy. This was not as evident for the Set 2-pictures 1-5. However, Set 2-picture 1 showed a descriptively stronger and more specific arousal strength as compared to Set 1-picture 1. Set 1-picture 6 and Set 2-picture 6 both showed unspecific arousal effects. The Results of this analysis indicate that the final set for *n*Autonomy pictures consists of Set 2-picture 1 and Set 1-pictures 2-5.
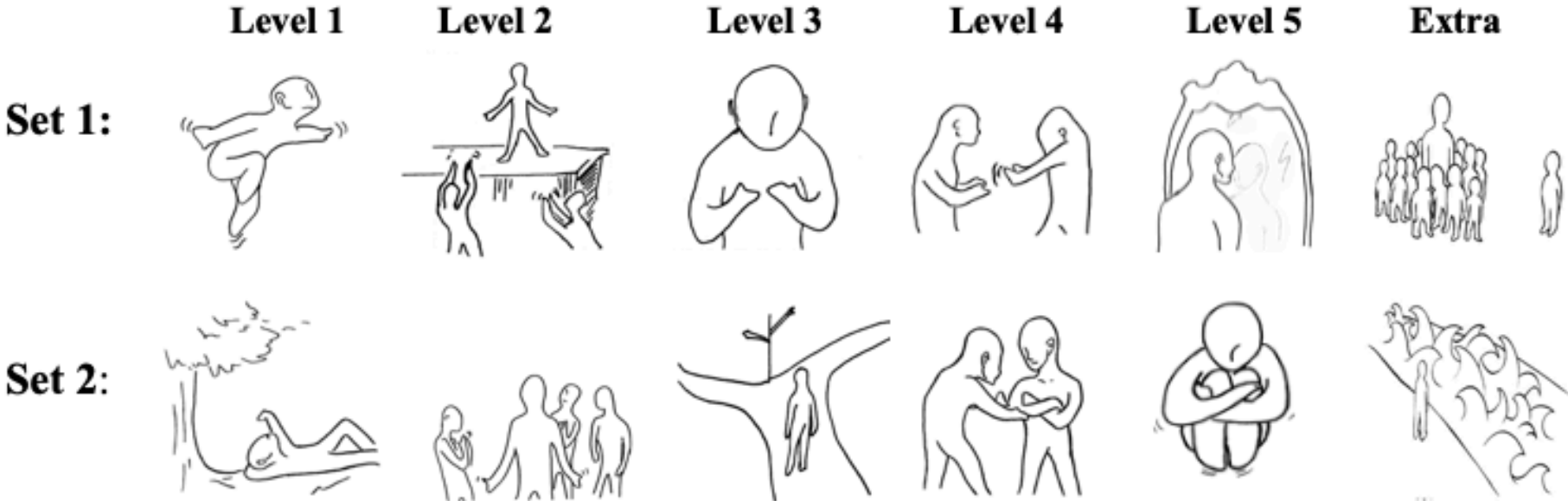
Figure 4.1. Illustration of picture sets for Study 5

Table 4.1. *Response Probability (in %) of nAutonomy, nAffiliation, nAchievement, and nPower in Study 5*

	*n*Aut1	*n*Aut2	*n*Aut3	*n*Aut4	*n*Aut5	***n*Aut**	*n*Aff	*n*Ach	*n*Pow
Set 1									
1	28.1	0.0	5.3	1.8	10.5	**45.7**	3.5	21.0	1.8
2	0.0	52.6	3.5	0.0	1.8	**57.9**	0.0	8.8	31.6
3	10.5	0.0	12.3	8.8	17.5	**49.1**	7.0	6.0	22.8
4	0.0	0.0	0.0	49.1	0.0	**49.1**	24.6	1.0	24.6
5	8.8	0.0	17.5	0.0	52.6	**78.9**	3.5	3.5	0.0
6	0.0	1.8	0.0	21.1	1.8	**24.7**	33.3	0.0	29.8
Set 2									
1	42.1	0.0	7.0	0.0	0.0	**49.1**	1.8	0.0	0.0
2	0.0	14.0	0.0	3.5	5.3	**22.8**	15.8	1.8	52.6
3	0.0	0.0	1.8	38.6	10.5	**50.9**	3.5	1.8	40.0
4	0.0	0.0	1.8	28.6	10.5	**40.9**	3.5	1.8	40.0
5	0.0	0.0	1.8	7.0	17.5	**26.3**	40.3	19.3	0.0
6	5.3	0.0	14.0	1.8	17.5	**38.6**	10.5	8.8	19.3

Discussion

Even though the OMT was revised to include a scoring guide for *n*Autonomy in 2013, no new pictures were developed specifically for assessing this motive. While the picture selection for the PSE was more guided by intuition rather than empirical work (Smith, 1992), the original OMT followed a methodology similar to Schmalt and colleagues (1994) and empirically selected ambiguous line drawings. Using this methodology, we developed 12 new pictures and assessed their motive arousal potential.

The final picture set consists of five pictures. We chose pictures that showed medium arousal strength (around 50%) across all enactment strategies of *n*Autonomy, could specifically arouse a specific enactment strategy level more than the others, and also had the potential to arouse other motives. We selected Set 1-picture 3 to assess *n*Aut3 instead of Set 2-picture 6 because of its higher arousal strength for overall *n*Autonomy, even though it demonstrated

relatively unspecific effects for the *n*Aut3 enactment strategy level. The next step is to examine the causal validity of the five selected pictures. This research question is addressed in Study 6.

Study 6

Study 6 examined whether the new *n*Autonomy pictures would capture differences in motive arousal states using a movie clip with strong autonomy-related content. This study follows the tradition of motive arousal studies within the motive disposition theory framework (see McClelland, 1980; Winter, 1973). Film clips that contain strong motivational cues have aroused *n*Power in participants (Baum & Baumann, 2019b; McClelland & Kirshnit, 1988; Schultheiss et al., 2004; Wirth & Schultheiss, 2006). In these experiments, participants watched the film clips in laboratory settings. We wanted to replicate and also extend this methodology, so we had participants view the film either in a laboratory setting or via an online survey platform.

To follow the example of previous research, we had to select a film that had high autonomy-related cues. Our participants watched a clip from the movie *Into the Wild*, because the autonomy-related themes of self-preservation, self-definition, and self-growth were present. We expected that the *n*Autonomy scores of our participants who watched the clip would be higher than the *n*Autonomy scores of participants who watched a tutorial video containing no autonomy cues.

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists, and advertisements at a German university. A total of 114 participants completed the study. Participants' age ranged from 18-66 years ($M = 23.6$ years, $SD = 7.77$ years). $N = 86$ of the participants were female (75.4%). $N = 53$ (46.5%) of participants completed the experiment in a university laboratory. University students were offered course credit for participation in the study.

Participants were randomly assigned to the arousal (*Into the Wild*; $N = 50$) or neutral (*PowerPoint tutorial*; $N = 64$) group. After viewing the video stimuli, participants completed the five newly developed *n*Autonomy pictures from the OMT. Then, participants completed an explicit autonomy motive questionnaire (Freedom Enactment Test; Kuhl, 2011) to show that only *n*Autonomy was aroused. However, due to reliability issues, we did not further analyze this data. Finally, participants answered control questions and provided demographic data.

Arousal Conditions

Into the Wild (director Sean Penn) depicts the story of a young man, Christopher McCandless, on a journey of self-realization. He breaks ties with his family and gives up a conventional life to travel across the United States. He ends up in Alaska and aims to live a solitary life in the wilderness for a period of time. Participants in our study watched the first 12 minutes of the movie. The clip depicts McCandless' journey to the Alaskan wilderness. He writes a letter during this scene in which he outlines his reasoning to leave. He is depicted being content in isolation and appreciating the beauty of his surroundings, learning how to survive, and preparing himself for the winter. The scene ends with him stating that he is experiencing "ultimate freedom." Expert raters classified the clip as containing autonomy motive-related cues as defined and assessed by the OMT.

Neutral Video. A tutorial for a popular presentation formatting computer program comprised the neutral condition. In this video, viewers are guided through the necessary steps to create attractive slides for visual presentations. The video depicted the computer program and had a male narrator. Expert raters deemed this video strictly informative and contained no autonomy motivation cues.

Measures

Implicit Autonomy Motive. Participants completed the five newly developed *n*Autonomy pictures from the OMT. Participants' answers were coded as in Study 5. Scoring was done by experienced coders who had achieved agreements of 85% or better in their responses to training material prescored by experts. Discrepancies were resolved through discussion before the final scores were analyzed. In order to compute an *n*Autonomy score, we summed the number of *n*Autonomy scorings (Levels 1-5) for each participant. This method is consistent with common protocols for projective measures (e.g., Schüler et al., 2016).

Control Questions. To account for disturbances that may have arisen due to the online nature of the survey, we had participants indicate to which extent they could follow the film and to which extent they could engage in the film using a 4-point scale ranging from 1 (*not at all*) to 4 (*completely*).

Results

Descriptives and Correlations. As presented in Table 4.2, condition (*Into the Wild* vs. autonomy-neutral video), age, and setting correlated significantly with *n*Autonomy.

Specifically, the motive arousal condition, lower age, and the laboratory setting were associated with higher *n*Autonomy scores. Other correlations of note include significant and positive correlations between condition and the control questions regarding to which extent participants could follow or engage in the film. Here, the arousal condition was positively correlated with both variables. Moreover, the more participants indicated they could follow the film, the higher they rated their engagement in the film.

Table 4.2. *Means, Standard Deviations, and Correlations in Study 6*

	M	*SD*	(1)	(2)	(3)	(4)	(5)	(6)
(1) *n*Autonomy	2.56	1.32						
(2) Setting			-.19*					
(3) Follow Film	2.96	0.82	.10	-.17				
(4) Engagement	2.73	0.89	.08	-.19*	.69**			
(5) Sex			.10	-.04	.02	-.04		
(6) Age	23.6	7.77	-.35**	.19*	.02	.04	-.14	
(7) Condition			.20*	-.06	.36**	.43**	-.07	-.02

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

Arousal Effect. To examine the effects of the manipulation on *n*Autonomy scores, we conducted an analysis of variance (ANOVA) with the factor Film (*Into the Wild* vs. autonomy-neutral tutorial). Results revealed a significant main effect of film, $F(1, 112) = 4.68$ $p < .05$. This is depicted in Figure 4.2. Participants in the *Into the Wild* condition had higher *n*Autonomy scores ($M = 2.86$, $SD = 1.26$) than participants in the autonomy-neutral condition ($M = 2.33$, $SD = 1.35$). This effect remained stable when age and setting were entered as covariates, $F(1, 110) = 4.83$, $p < .05$. Additionally, the results revealed a main effect of age, $F(1, 110) = 13.61$, $p < .001$.
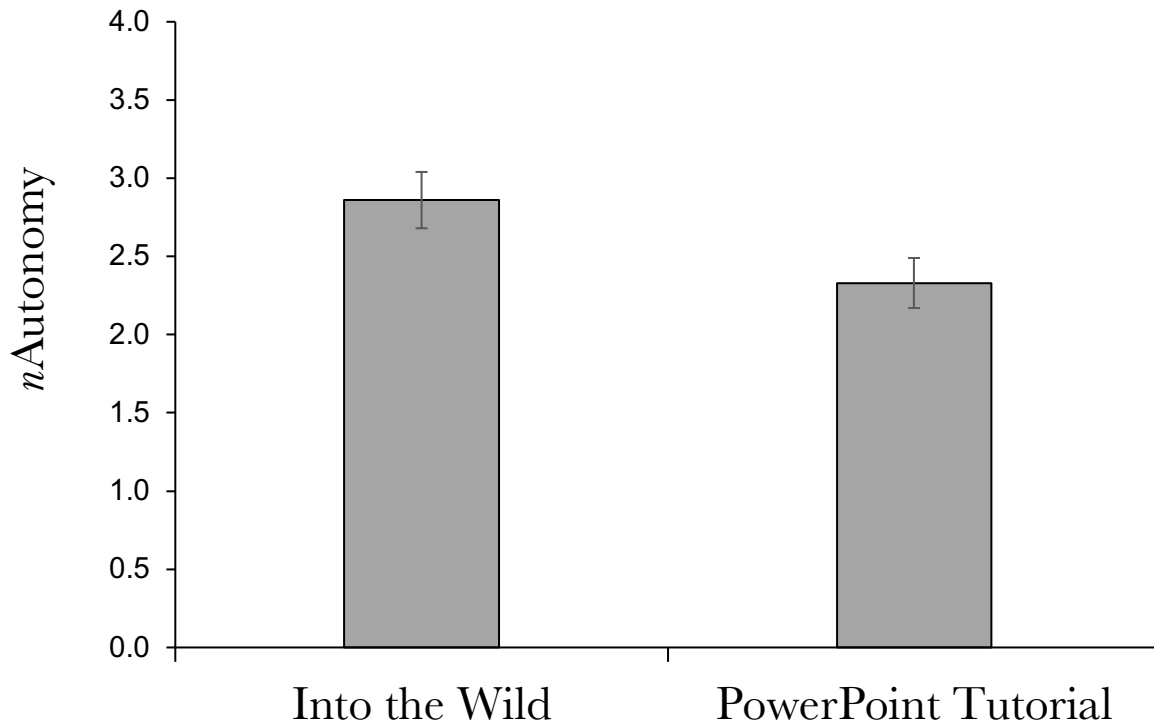
*Figure 4.2. n*Autonomy scores as a function of condition (arousal: *Into the Wild* vs. neutral: *PowerPoint*) in Study 6.

Discussion

This study examined whether the five newly developed pictures in the OMT were sensitive to an experimentally aroused state of *n*Autonomy. Following the tradition of motive arousal studies, we used film stimuli to arouse *n*Autonomy. Winter (1973) maintained that films were best suited to assess *n*Power because they were able to capture all aspects of the motive. Following this reasoning, we also used a film clip that depicted different aspects of *n*Autonomy. We showed participants a clip from a film that had strong *n*Autonomy-related motivational cues or an autonomy-neutral tutorial clip before they completed the new picture set from the OMT.

Our results showed that participants in the arousal condition had significantly higher *n*Autonomy scores than participants in the control condition. Age was also a significant predictor of *n*Autonomy. We attribute this result to the markedly left-skewed distribution of age. Although we had a large age range, 91% of participants were aged 18-28 years. Taken together, our results provide preliminary evidence for the causal validity of the newly developed OMT pictures that assess *n*Autonomy.

Study 7a

In Study 7, we wanted to replicate the findings of Study 6 by putting participants in a situation that would arouse *n*Autonomy. Other lines of motive arousal research put or observed participants in experimental situations, such as receiving feedback regarding intelligence tests (McClelland et al., 1948) or a social evaluation task (Atkinson et al., 1954) to arouse the achievement and affiliation motives, respectively. To conduct a similar experiment on *n*Autonomy, we needed to find an adequate paradigm.

The OMT defines *n*Autonomy as the need for self-integration, which comprises the elements self-preservation, self-boundaries (or self-definition), and self-growth. A well-researched theory that deals with self-definition and, thus, autonomy is the symbolic self-completion theory (Wicklund & Gollwitzer, 1981). The authors maintain that people strive to complete their self-definitions, and if indicators of self-definition are lacking, the person will strive after other symbols of self-definition. We believe that this line of research taps into autonomy motivation and provides a research paradigm to arouse *n*Autonomy.

Our research is specifically based on Wicklund and Gollwitzer's (1981) Study 3. In this study, participants were asked to write about their involvement in an activity. The authors chose this task because this involved the ego and thus created a strong symbol. Incompleteness was induced when participants were interrupted during the writing task. The authors theorized that the participants would then strive to complete this symbol by exercising influence over others in a subsequent task. The paradigm centers around threats to self-definition and, hence, threats to autonomy. Interrupting participants while they are expressing themselves arouses *n*Autonomy, as they will be in a state of incompleteness (i.e., a frustrated *n*Autonomy state). As has been demonstrated in previous research, this would be expressed through higher *n*Autonomy scores (McClelland et al., 1948; Veroff, 1957; Wiemers, Schultheiss, & Wolf, 2015).

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists, and advertisements at a German university. A total of $N = 187$ participants completed the study. Participants' age ranged from 18-79 years ($M = 29.1$ years, $SD = 15.63$ years). $N = 148$ of the participants were female (79.1%). University students received course credit for participation.

After opening the survey, participants were randomly assigned to one of four conditions. Participants wrote either personal or neutral essays and were interrupted during writing or could write the essay to completion. This created a 2 x 2 design (Personal vs. Neutral x Interruption vs. No Interruption). In the Personal condition, participants wrote an essay about

why they chose their majors/careers and what aspects were important for their majors/careers. In the Neutral condition, participants wrote about what they do in between waking up and going to university or work and what the room that they are currently in looks like. Participants in the Interruption condition were interrupted without explanation after 60 seconds and the next screen appeared. In the No Interruption condition, participants finished their essays and then clicked on a button to move on to the next screen. After the manipulation, participants completed the new picture set of the OMT, a manipulation check, a well-being questionnaire, and an explicit motive questionnaire. As in Study 6, we did not further analyze the explicit motive data due to reliability issues.

Measures

Implicit autonomy motive. As in Study 6, participants' *n*Autonomy was assessed using the newly developed OMT picture set. Scoring was done by experienced coders who had achieved agreements of 85% or better in their responses to training material prescored by experts. As in Study 6, *n*Autonomy scores were computed by summing the number of *n*Autonomy codings (Levels 1-5) for each participant.

Well-being. This variable was assessed by means of the Well-Being Index from the World Health Organization (WHO-5; World Health Organization, 1998). This measure consists of five items including "*I feel cheerful and in good spirits*" and "*I feel calm and relaxed.*" On a 6-point scale ranging from 1 (*at no time*) to 6 (*all of the time*), participants typically rate how they have felt in the past two weeks. We had participants rate the statements based on how they felt on that particular day (Cronbach's α = .78).

Manipulation check. To check if participants were actually interrupted during writing, we asked them to indicate whether or not they felt interrupted. In addition, we asked participants whether or not they felt that they could personally express themselves (1 = *yes*, 0 = *no*).

Results

Descriptives and correlations. As presented in Table 3.3, results showed a significant negative correlation between *n*Autonomy and perceived expression. This indicates that participants who felt that they could not personally express themselves had higher *n*Autonomy scores than participants who felt they could personally express themselves. Perceived personal expression also had significant correlations with perceived interruption and the Interruption condition. Thus, participants who felt they could not personally express

themselves perceived that they were interrupted and were also more likely to be in the Interruption condition. Perceived personal expression did not correlate with the type of story. Participants in the Personal condition reported higher well-being. Well-being negatively correlated with perceived interruption and the experimental condition Interruption.

Table 4.3. *Means, Standard Deviations, and Correlations in Study 7a*

	M	SD	(1)	(2)	(3)	(4)	(5)
(1) *n*Autonomy	2.98	0.94					
(2) Well-being	3.16	0.93	.10				
(3) Perceived Interruption	0.46	0.50	.00	-.15*			
(4) Perceived Expression	0.64	0.48	-.21**	.06	-.42**		
(5) Condition: Story			-.01	.09	.06	-.02	
(6) Condition: Interruption			.03	-.11	.74**	-.41**	.02

[+] p < .10; * p < .05; ** p < .01

Arousal effect. To examine the effects of the manipulation on *n*Autonomy scores, we conducted an ANOVA with the condition factors Story (Personal vs. Neutral) and Interruption (Interruption vs. No Interruption). No main effects or interactions were significant p > .05. Participants in the Personal/Interrupted condition (M = 2.95, SD = 0.15) did not significantly differ in average *n*Autonomy scores from participants in the Personal/Not Interrupted condition (M = 3.00, SD = 0.14). Similarly, participants in the Neutral/Interrupted condition (M = 3.06, SD = 0.13) did not significantly differ in average *n*Autonomy scores from participants in the Neutral/Not Interrupted condition (M = 2.93, SD = 0.13).

Discussion

In this study, we used the symbolic self-completion paradigm from Wicklund and Gollwitzer (1981) to arouse *n*Autonomy. We expected that participants who were interrupted, especially while writing personal stories, would have higher *n*Autonomy scores than participants who were not interrupted. Our main hypothesis could not be supported, as there was no significant difference in mean *n*Autonomy scores between conditions. However, *n*Autonomy

correlated negatively with participants' perception of personal expression. Thus, the feeling of not being able to personally express oneself, independent of Story condition, resulted in aroused *n*Autonomy.

We have two possible explanations for these results. We conducted the study online, which gave us access to a wider and more diverse population than a laboratory study. However, we could not observe how much participants had written before they were interrupted. Thus, we may have interrupted them too soon in the Personal condition. This did not give them the opportunity to engage in expressing something that defines themselves. Furthermore, there were participants who felt they could not express themselves in all conditions. Although this was more prevalent in the participants in the Interruption condition, this perception may have been stronger than our experimental manipulations. Thus, we conducted Study 7b to address these issues.

Study 7b

Study 7b employed the same paradigm as in Study 7a. However, we conducted 7a using an online survey and there was no way to see how much participants had actually written before we interrupted them. We conducted 7b in the laboratory to observe participants and then interrupt them in the middle of the task. Furthermore, we controlled for differences in baseline *n*Autonomy by having participants complete the OMT before coming to the laboratory. Then, we followed Wicklund and Gollwitzer's (1981) Study 3 more closely and had participants in the Personal condition write about their activities. To ensure that the Neutral condition was really neutral, we had participants describe the room they were sitting in and not about their daily routine.

Participants and Procedure

A total of $N = 114$ participants completed both T1 and T2 measurements. $N = 28$ participants had more than 6 picture stories that were scored as zero in the 20-item version of the OMT. These participants were eliminated from the analyses (e.g., Poeller, Birk, Baumann, & Mandryk, 2018). This resulted in a final sample consisting of $N = 86$ participants aged 18-32 years ($M = 23.1$ years $SD = 3.00$ years). $N = 53$ participants were female (61.6%). University students were offered course credit for their participation.

Participants were recruited in lectures on the university campus. At the end of the lecture, students were invited to complete the 20-item version of the OMT for course credit. Then, students were given the opportunity to sign up for a study that would take place two weeks later.

Upon arrival in a university laboratory, participants were randomly assigned to one of four conditions and then escorted by a male or female experimenter to an individual booth with the documents for the study. Participants were told they were participating in a multi-university study on leisure activities. After completing a mood questionnaire, an experimenter instructed the participants to write a 200 word essay. In the Neutral condition, participants wrote detailed descriptions of the lab in which they were sitting. Participants in the Personal condition wrote about their hobbies/interests and were instructed to note the general area of the hobby/interest in a large box at the top of the paper. Half of participants were then interrupted when they had written about half a page of text and told that there were told that enough essays about that type of hobby (Personal condition) had been submitted or their essay was taken away without comment (Neutral condition). Participants' mood was then assessed before they completed the new OMT *n*Autonomy picture set. Finally, mood was assessed a third time and participants were briefed about the nature of the study. Participants received additional course credit for participating in T2 of the study.

Measures

Implicit Motives. Implicit motives were assessed at T1 and T2. At T1, participants completed the 20-item OMT that assesses *n*Affiliation, *n*Achievement, and *n*Power in addition to *n*Autonomy. *n*Autonomy scores were computed using the last five items of the 20-item OMT as in the previous studies. At T2, participants only completed the last five items of the OMT that assess *n*Autonomy. Scoring was done by experienced coders who had achieved agreements of 85% or better in their responses to training material prescored by experts.

Mood. Mood was assessed at the beginning and at the end of T2 using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) to more thoroughly examine changes in mood. The PANAS consists of two subscales that assess positive and negative affect, respectively. Each subscale consists of 10 adjectives such as *interested* and *excited* for positive affect (PA) and *distressed* and *ashamed* for negative affect (NA). Participants are asked to indicate the extent to which they presently feel the different adjectives on a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*) (T1: Cronbach's α = .80 for PA, Cronbach's α = .85 for NA). Immediately following the manipulation, participants completed one item that asked them to rate how good they feel right now on a 4-point scale ranging from 1 (*not at all*) to 4 (*extremely*).

Results

Descriptives and correlations. As presented in Table 4.4, T1 *n*Autonomy correlated negatively with age and with the Interruption condition. Thus, younger participants had higher baseline *n*Autonomy scores and participants who were not interrupted also had higher baseline *n*Autonomy scores than participants who were interrupted. Moreover, participants who were not interrupted had a more positive mood immediately following the manipulation as compared to participants who were interrupted. Furthermore, participants who wrote a personal essay had higher negative affect scores after completing the T2 *n*Autonomy assessment as compared to participants in the Neutral essay condition.

Arousal effects. To examine the effects of the manipulation on *n*Autonomy scores we conducted a repeated-measures ANOVA. Time was entered as a within-subjects variable (T1 vs. T2) and Story (Personal vs. Neutral) and Interruption (Interruption vs. No Interruption) were entered as between-subject variables. Consistent with expectations, results revealed a significant interaction between Time and Interruption, $F(1, 82) = 4.93$, $p < .05$ (see Figure 4.3). In the Interruption condition, a paired sample *t*-test indicated that mean *n*Autonomy scores significantly increased from T1 ($M = 2.83$, $SD = 1.12$) to T2 ($M = 3.15$, $SD = 1.07$), $t(45) = -2.10$, $p < .05$. In the No Interruption condition, mean *n*Autonomy scores did not significantly change (and descriptively even decreased) from T1 ($M = 3.45$, $SD = 0.96$) to T2 ($M = 3.18$, $SD = 1.11$), $t(39) = 1.42$, $p > .05$. Furthermore, there was a significant three-way interaction between Time x Story x Interruption, $F(1, 82) = 4.05$, $p < .05$. As depicted in Figure 4.4, participants in the Neutral condition showed little difference between T1 and T2 *n*Autonomy scores regardless of whether they were interrupted or not. In the Personal condition, participants who were interrupted had marginally significantly higher *n*Autonomy scores at T2 ($M = 3.17$, $SD = 0.92$) as compared to T1 ($M = 2.75$, $SD = 1.07$), $t(23) = -1.79$, $p = .09$. In contrast, participants who were not interrupted had significantly lower *n*Autonomy scores at T2 ($M = 2.87$, $SD = 1.18$) as compared to T1 ($M = 3.48$, $SD = 0.99$), $t(22) = 2.44$, $p = .02$. No other main effects or interactions were significant.

Table 4.2. *Means, Standard Deviations, and Correlations in Study 7b*

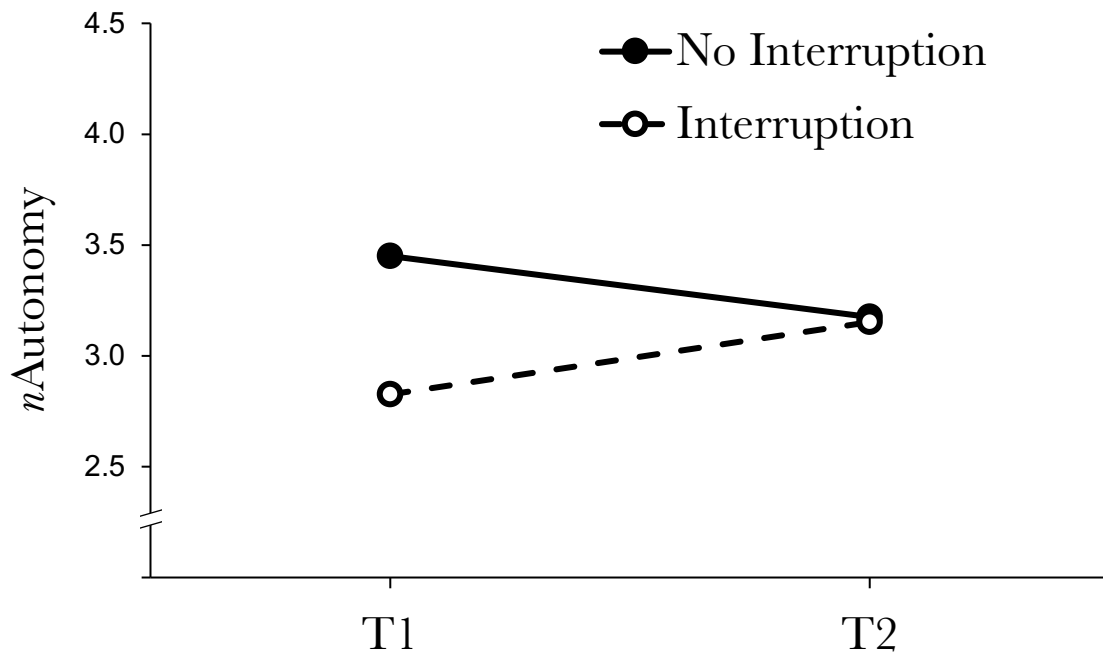|	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) *n*Autonomy T1	3.12	1.09									
(2) *n*Autonomy T2	3.16	1.08	.42**								
(3) PA T1	2.53	0.45	.02	-.24							
(4) NA T1	1.30	0.37	.06	-.01	.00						
(5) Mood	2.98	0.75	.17	-.04	.28**	-.17					
(6) PA T2	2.41	0.55	.07	.01	.68**	-.05	.29**				
(7) NA T2	1.23	0.27	.07	-.01	-.04	.42**	-.12	-.21			
(8) Age	23.15	3.00	-.26*	-.05	.30**	-.04	.14	.12	-.05		
(9) Condition: Story			-.01	-.14	.09	.05	.13	.10	.35**	-.01	
(10) Condition: Interruption			-.29**	-.11	-.06	.09	-.28**	-.10	.02	.16	-.05

* *p* < .05; ** *p* < .01

*Figure 4.3. n*Autonomy scores as a function of time and interruption in Study 7b
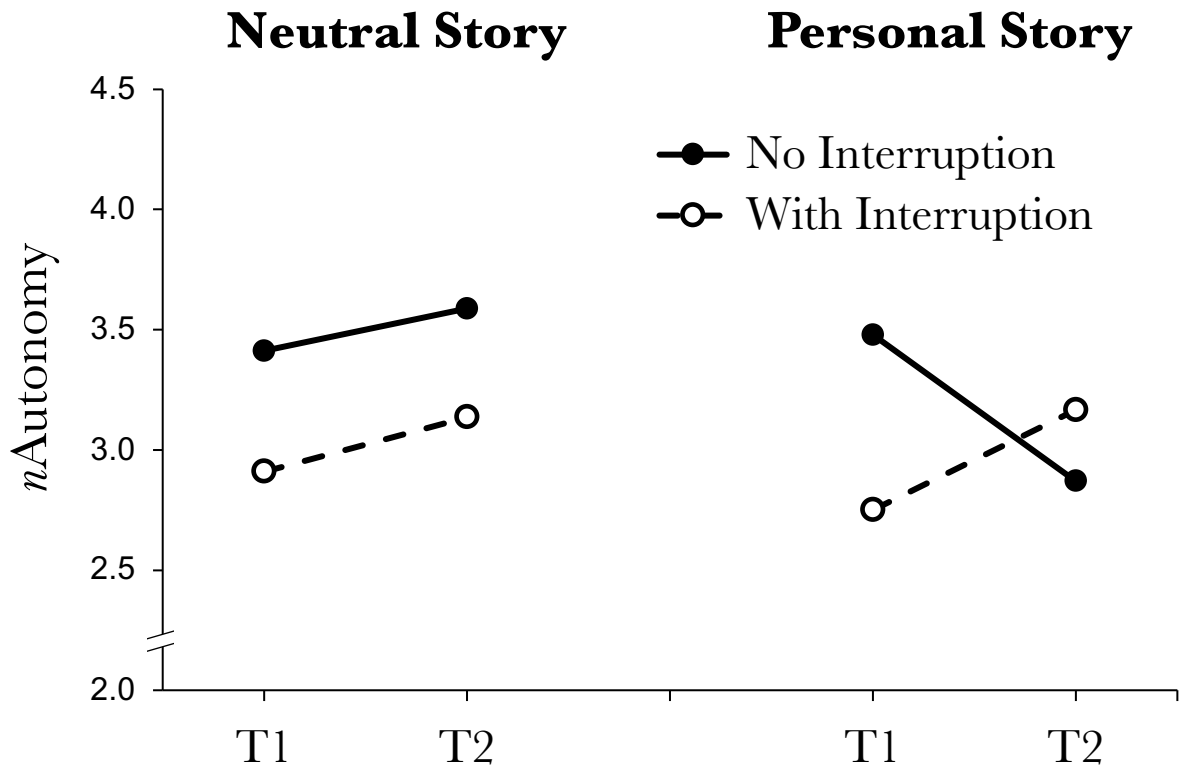

*Figure 4.4. n*Autonomy scores as a function of time, interruption, and story content in Study 7b

Discussion

In this study, we employed a symbolic self-completion paradigm to arouse *n*Autonomy in participants in a laboratory setting. We included a baseline measurement of *n*Autonomy, which was completed about two weeks before the laboratory experiment. Then, we had participants write about a personal hobby or describe the experimental booth in which they were sitting. Half of participants were interrupted while writing the essay and told to move on to the next task. As participants who felt they could not express themselves had higher *n*Autonomy scores in Study 7a, we expected *n*Autonomy to be aroused in interrupted participants. We expected *n*Autonomy to be especially aroused in participants who were interrupted while writing personal stories.

Our results largely supported the hypotheses. As expected, we found that interrupted participants had higher *n*Autonomy scores after the manipulation as compared to their baseline *n*Autonomy scores. No significant difference between baseline and postmanipulation *n*Autonomy scores were observed for participants who were not interrupted. Additionally, participants who wrote personal essays and were interrupted had higher *n*Autonomy scores after the manipulation as compared to their baseline *n*Autonomy scores. This difference was marginally significant. Finally, participants who wrote personal essays and were not interrupted had lower *n*Autonomy scores after the manipulation as compared to their baseline *n*Autonomy scores.

Frustrating or stressing a motive is a technique that has been widely used to successfully arouse implicit motives (McClelland et al., 1948; Veroff, 1957; Wiemers et al., 2015). In line with these findings, the present study found that *n*Autonomy increased by interrupting participants who wrote an essay. This effect showed a tendency to be stronger when participants wrote personal essays. Inversely, the significant drop in *n*Autonomy scores in the Personal/No Interruption condition indicates that the implicit autonomy motive might be satisfied instead of aroused. This has been demonstrated in previous research; satisfaction reduces implicit motive scores because the strength of motivational tendencies declines when they are satisfied (Atkinson & Birch, 1970).

General Discussion

The present research developed and subsequently examined the causal validity of pictures that were specifically designed to assess *n*Autonomy. In Study 5, we developed a new set of pictures for the OMT. Next, in Studies 6, 7a, and 7b, we examined the causal validity of the set by experimentally arousing the autonomy motive and examining its impact on

participants' scores. In Study 6, we found that participants who viewed autonomy-related film stimuli showed higher levels of *n*Autonomy compared to an autonomy-neutral video condition. In Studies 7a and 7b, we found that the symbolic self-completion paradigm (Wicklund & Gollwitzer, 1981) experimentally aroused *n*Autonomy. Taken together, the present findings provide consistent evidence for causal validity of the newly developed OMT picture set.

The results strengthen the body of research on *n*Autonomy. Specifically, the findings are in line with recent research demonstrating that nAutonomy acts as other implicit motives. A major difference between implicit and explicit motives lies in their measurement. Implicit motives are assessed using projective measures and can be aroused through imagery (Woike, 1994), films (McClelland & Kirshnit, 1988; Schultheiss et al., 2004; Wirth & Schultheiss, 2006), and experimental situations (McClelland et al., 1948; Atkinson et al., 1954; Shipley & Veroff, 1952; Uleman, 1972; Veroff, 1957). Our studies show that *n*Autonomy can also be aroused using films and experimental situations. Thus, our results show that the OMT validly assesses *n*Autonomy, and this measurement is sensitive to changes in arousal states just as other implicit motives.

Our results also have implications for the use of the OMT to assess *n*Autonomy. The OMT is a reliable (Runge et al., 2016) and valid instrument (Baumann et al., 2010) to assess implicit motives. Baumann and colleagues (2010) maintain that only the OMT explicitly assesses motives on two levels: at the preconceptual (implicit motive) and self-regulatory levels (implementation strategy). The present work expands the OMT to assess *n*Autonomy using pictures that are specifically designed to also assess the self-regulatory level. Thus, researchers and practitioners are able to ascertain information about how self-regulatory strategies have been integrated into autonomy motive representations within the self. The next step of research would be to examine the predictive validity of these implementation strategies for *n*Autonomy as has been done for other motives (Baumann, Chatterjee, & Hank, 2016; Busch, Chasiotis & Campos, 2013; Hofer & Busch, 2011).

A further implication of our study is that we demonstrated that symbolic self-completion affects *n*Autonomy. This was shown in two studies. Symbolic self-completion maintains that people actively engage in self-definition by attaining symbols in relevant areas (Wicklund & Gollwitzer, 1981). If symbols are lacking, the authors theorize that individuals will strive after further alternative forms of self-definition. Our results implicate that symbolic self-completion may be a form of self-integration; individuals use symbols to demonstrate what aspects they deem to be a part of the self. Our results showed that participants who felt they could not personally express themselves, which created an incomplete symbol, had higher *n*Autonomy

scores. Furthermore, interrupting participants while writing a personal story, which likewise created an incomplete symbol, descriptively raised their *n*Autonomy scores. Participants with a complete symbol showed the lowest *n*Autonomy scores. This is indicative of a satisfied motive. Thus, our results connect symbolic self-completion to *n*Autonomy.

Limitations and Future Directions

Although our research has positive implications for the assessment of autonomy as an implicit motive using the OMT, there are a few issues that need to be addressed in future research. First, we had two unexpected correlations between *n*Autonomy and age. In Study 2, we attributed this to the distribution of age in our population. However, this explanation cannot account for this relationship in Study 3b. Although implicit motives have generally been regarded to be stable across the lifespan, recent research suggests that they may adapt to life situations (Denzinger & Brandstätter, 2018). The development of autonomy is an important task in adolescence and adulthood (Haase, Tomasik, & Silbereisen, 2008; Kins, Beyers, Soenens, & Vansteenkiste, 2009). Hence, future research should examine possible age differences in *n*Autonomy scores in a larger and more evenly distributed population. Future research should also aim to confirm the motive arousal strength of the selected pictures in other samples.

The OMT's definition of *n*Autonomy is related to the definition of autonomy as a basic explicit need within the framework of self-determination theory. A major difference between the two approaches is that self-determination theory focuses more on the social contexts that lead to the fulfillment of the need rather than the individual differences within persons regarding the strength of the needs (for an overview, see Schüler, Baumann, Chasiotis, Bender, & Baum, 2019). For the PSE, the origin scoring system (deCharms & Plimpton, 1992) is employed to assess *n*Autonomy (Schüler et al., 2016). Here, stories are scored as belonging to *n*Autonomy when they deal with individuals being the origin of their behavior. However, this scoring system's causal validity has not been examined yet.

Finally, more research is needed on autonomy as an implicit motive in general in order to confirm its position next to affiliation, achievement, and power as a main implicit motive. Future research should examine whether *n*Autonomy has a hormonal correlate, as has been established for the other motives (Schultheiss, 2013). Furthermore, *n*Autonomy's perceptual orienting function (McClelland, 1980) must also be examined. Our findings regarding the measurement of *n*Autonomy provide an important basis for this future research.

Conclusion

Autonomy has recently been investigated as an implicit motive; however, a methodologically robust assessment for this motive was lacking. In a series of four studies, we developed and empirically tested a new picture set to assess *n*Autonomy within the OMT. Using different experimental arousing approaches, our findings supported causal validity of the new picture set. The present study provides a test that will advance research on *n*Autonomy, which has wide-ranging implications for implicit motive research. Our research provides a foundation for future research on the implicit autonomy motive by providing a valid tool for its measurement.

5 Perceiving Autonomy: *n*Autonomy's effect on perceptual readiness

Abstract:

We examined the orienting function of *n*Autonomy in two preliminary studies. Specifically, in we examined the effects of *n*Autonomy on performance in a combined word recognition and word completion task (Study 8, N = 132) and in an implicit learning task (Study 9, N = 124). Furthermore, participants in both studies completed a word categorization task using the stimuli from the experiments. We expected participants with high *n*Autonomy scores to show heightened perceptual readiness for autonomy-related stimuli. In Study 8, participants with high *n*Autonomy indicated that they recognized a letter string as a word faster when the letter strings were the start of predetermined autonomy-related words in comparison to participants with low *n*Autonomy. Furthermore, in both studies participants with high *n*Autonomy categorized more words as being autonomy-related as compared to participants with low *n*Autonomy.

A phenomenon most of us are familiar with is the moment when something becomes relevant to us and suddenly, it pops up everywhere. For instance, when we buy a new car, we now see this type of car on the road all the time. Another example is when we are thirsty, everything reminds us of something to drink. This change in perception, or perceptual readiness (Brunner, 1957), describes the accessibility of categories to afferent stimulus inputs (p.148). The more relevant or accessible a category is, the less input we need to be able to categorize relevant stimuli. Postman, Bruner & McGinnies (1948) found that needs and values of participants affected their perceptual readiness.

McClelland related this phenomenon to a main function of implicit motives (1980). Implicit motives orient, select, and energize behavior (p. 13). The orienting function of motives refers to the effect of implicit motives on perceptual readiness. Research has demonstrated this effect for the implicit achievement, affiliation and power motives (Atkinson & Walker, 1956; McClelland & Liberman, 1949; Schultheiss & Hale, 2007). The recent body of work on the implicit autonomy motive (henceforth referred to as *n*Autonomy) has shown that it acts as other implicit motives: there are individual differences in its strength (Schüler, Sheldon, Prentice & Halusic, 2016), it is sensitive to motive arousal techniques (Baum & Baumann, 2020), it energizes creative behavior (Baum & Baumann, 2019a), and, when satisfied, has implications for well-being (Sieber, Schüler, & Wenger, 2017). Thus, we expect that *n*Autonomy also has an orienting function. The present research provides a preliminary examination of the orienting function of *n*Autonomy using two different paradigms: word recognition and incidental learning.

Perceptual Readiness

Bruner (1957) suggested that perception is a mere process of categorization. Perceptual readiness refers to the accessibility of categories that can be used to code or identify environmental events. When categories are accessible, individuals need less input for categorization because here is a wider range of input characteristics that indicate a stimulus belongs to a category. As a result, other categories are suppressed. To use Bruner's example, when the category "apples" is accessible, apples will be more easily recognized, a wider range of items will be identified or misidentified as apples, and potentially better fitting categories will be masked.

Perceptual readiness has been researched regarding value orientations, explicit goals, and physiological states. In one of the primary studies on this subject, Postman, Bruner & McGinnies (1949) found that the strength of value orientations predicted the time it took for

participants to recognize words related to that value. Thus, value orientations activated perceptual readiness for acceptable stimulus objects. Regarding physiological states, more recent research has demonstrated the physiological state of thirst enhanced the perceptual readiness of individuals for action-relevant stimuli (Aarts, Dijksterhuis, & Vries, 2001). Specifically, thirsty participants responded faster to drinking-related items in a lexical decision task and performed better on an incidental recall task of drinking-related items. Taken together, research has demonstrated that both psychological and physiological needs affect perceptual readiness.

The Orienting Function of Implicit Motives

Early implicit motive research related physiological needs to psychological needs. The first studies aimed to show that different intensities of hunger had effects on perception (McClelland & Atkinson, 1948) and apperception (Atkinson & McClelland, 1948). McClelland and colleagues subsequently argued that psychogenic needs functioned similarly to physiological needs (i.e. hunger). In a series of experiments, participants' achievement motives were experimentally induced, and this induction affected both perception and apperception (McClelland et al. 1948; McClelland, Atkinson, & Clark, 1949).

Although McClelland subsequently described implicit motives as a disposition to experience specific incentives as rewarding, which in turn, orients individuals towards cues related to the incentive (1987), only a handful of studies has demonstrated the effects of implicit motives on attention orientation and perceptual readiness. Individuals with high implicit achievement motives (*n*Achievement) recognized tachistoscopically presented positive achievement-related words faster than participants with lower *n*Achievement scores (McClelland & Liberman, 1949). This effect was more pronounced when *n*Achievment had been previously aroused (Moulton, Raphelson, Kristofferson & Atkinson, 1958). During a facial recognition test, face stimuli stood out the most to individuals with high implicit affiliation motives (nAffiliation) more often than to individuals with low nAffiliation scores (Atkinson & Walker, 1956). Once again, this effect was also stronger when *n*Affiliation was aroused as compared to a neutral condition.

A more recent study by Schultheiss and Hale (2006) examined the orienting function of implicit motives using an attention paradigm. Their results demonstrated that individuals with high *n*Power oriented attention towards faces signaling low dominance, whereas individuals with high *n*Affiliation oriented attention towards rejection cues, when the cues were presented for a longer period. Furthermore, participants with high nAffiliation also directed attention to

faces signaling high acceptance; however, this effect was not strong. Taken together, the research that has been conducted on this issue shows that implicit motives influence perception and attention of motive-relevant cues.

Implicit Autonomy Motive

In order to select stimuli that could be relevant for *n*Autonomy, we must first define *n*Autonomy and outline research that supports its conceptualization as an implicit motive. Alsleben and Kuhl (2011) define *n*Autonomy as the need for self-integration. Self-integration describes the process of an individual determining what is a part of the self. This process is characterized by self-definition, self-preservation, and self-growth. Typical themes for *n*Autonomy include self-joy, status (conditional self-esteem), self-growth, rigid self-boundaries, and, in its avoidance form, self-devaluation.

As described above, recent research has laid an empirical basis to the conceptualization of autonomy as an implicit motive. Schüler, Baumann, Chasiotis, Bender and Baum (2019) outline how to measure *n*Autonomy using the Picture Story Exercise and the Operant Motive Test (OMT; Kuhl, 2013) and described a new line of research which examines autonomy as an implicit motive. First, established implicit motive instruments that were adapted to assess *n*Autonomy have revealed individual differences in *n*Autonomy (Schüler et al., 2016). Specifically, participants with high *n*Autonomy derived more flow experience from felt autonomy as compared to participants with weak *n*Autonomy. Furthermore, in a separate study, individuals with high *n*Autonomy had lower stress reactions (salivary alpha amylase) in autonomy-supportive contexts, and the opposite effect was observed in individuals with low *n*Autonomy (Sieber, Schüler, and Wegner, 2016).

Moreover, Baum and Baumann (2020) found that *n*Autonomy could be aroused in participants. This was achieved using a film that had strong autonomy-related cues and by interrupting participants while writing an essay. Finally, Baum and Baumann (2019) found evidence for the energizing effect of *n*Autonomy. Specifically, high school students with high *n*Autonomy had higher scores on a creative production task and had higher teacher ratings regarding innovative behavior compared to students with low *n*Autonomy. Altogether, there is a good empirical foundation for the implicit autonomy motive. However, research has not yet addressed the orienting function of *n*Autonomy.

Present Research

The present research provides a preliminary examination of the orienting function of *n*Autonomy. The orienting function is important for the conceptualization of implicit motives and has been shown in some aspect for each motive (Atkinson & Walker, 1956; McClelland & Liberman, 1949; Schultheiss & Hale, 2007). This function is essential for the concept of implicit motives, as it describes what motives do; motives first and foremost affect the perception of a situation and thus steer need-related behavior by making individuals attend to motive-relevant factors (Kuhl, 2013).

Motive research has employed paradigms that examined perceptual thresholds for motive-relevant stimuli (Atkinson & Walker, 1956; McClelland & Liberman, 1949; Moulton et al., 1958) or examined attention for motive-relevant stimuli (Schultheiss & Hale, 2006). Research on perceptual readiness also originally used perceptual threshold methods (Postman et al., 1948), but has, more recently, employed word recognition and learning paradigms (Aarts et al., 2001). For the following studies we also used a variety of paradigms to examine *n*Autonomy's effect on perceptual readiness and attention. Specifically, in two studies we examined the effects of *n*Autonomy on performance in word recognition task (Study 8) and in an implicit learning task (Study 9). We expected participants with high *n*Autonomy scores to show heightened perceptual readiness for autonomy-related stimuli.

Study 8

In Study 8 we used a combined word recognition and word completion task to examine the effects of *n*Autonomy on perceptual readiness. Specifically, we used a paradigm similar to the one used by Aarts and colleagues (2001). In their experiment on the effects of thirst on perceptual readiness, they showed participants letter strings. Participants' task was to indicate whether a letter string was a word or non-word. Aarts and colleagues found that thirsty participants reacted faster to drinking-related words as compared to non-thirsty participants. In our study, we examined whether participants with high *n*Autonomy recognized *n*Autonomy-related words that appeared letter by letter faster than participants with low *n*Autonomy. We also examined whether participants with high *n*Autonomy completed word fragments with autonomy-related words. Finally, as perceptual readiness increases the likelihood of a stimulus being categorized to a need-related category, we expected participants with high *n*Autonomy to categorize more words as belonging to the category "Autonomy" as compared to participants with low *n*Autonomy.

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists and advertisements at a German university. A total of 132 participants completed the study. Participants' age ranged from 17-46 years ($M = 20.78$ years, $SD = 3.76$ years). $N = 116$ of the participants were female (87.9%). University students were offered course credit for participation in the study.

After arriving in the laboratory, participants completed an implicit motives measure before completing the word recognition task. Then, participants completed a categorizing task before answering control questions regarding the aims of the study.

Word Recognition Task. In the word recognition task, single letters that comprised a word appeared on a single screen in succession until the word was complete. First, a fixation cross appeared on the center of the computer screen for 1500ms. Then, each letter appeared with a 1500ms delay between letters. The words were between 4 and 8 letters long and the first letter always appeared at the same position on the screen. Participants were instructed to press the space bar as soon as they felt they could complete the word. It was only possible to press the space bar after the second letter appeared. After participants pressed the space bar, a new screen appeared with a text box in which they typed the rest of the word.

Participants first completed four practice trials before reading the instructions again. Then, they completed two blocks consisting of 45 trials each with a one-minute break in between blocks. The stimuli consisted of 40 autonomy-related words and 50 autonomy-neutral words. The word lists were created by two experts who used the OMT scoring guide as a basis for word stimuli. The word stimuli were presented in a quasi-randomized order so that at the most three autonomy-related or three autonomy-neutral stimuli appeared in a row.

Categorizing task. In the categorizing task, participants categorized all word stimuli from the word recognition task as belonging to the general term "autonomy/freedom" or "neutral." Participants were instructed to consider positive and negative aspects of autonomy when making their decision. The words were also presented in a quasi-randomized order as in the word recognition task.

Materials

Implicit Motives. Implicit motives were assessed using the 20-picture version of the OMT that assesses implicit affiliation, achievement, power, and autonomy motives. In the test, participants were presented ambiguous line drawings. Then, participants asked to pick a main protagonist, think of a story involving this person, and then answer three questions as spontaneously

as possible: "What is important to this person in this situation and what is the person doing? How does the person feel? Why does the person feel this way?" The answers to these questions are first coded for the presence of motive content. Only one motive is coded per picture. If no motive content is apparent, the item is then coded as zero. If motive content is identified, it is then additionally coded as belonging to one of five specific enactment strategies that can be approach or avoidance motivated and represented by the following categories: (1) self-confidence (stories include self-joy, being in the moment, and enjoying something), (2) status (conditional self-esteem, receiving praise, and being the center of attention), (3) self-growth and self-regulation (restoring inner certainty, integration of negative experiences, inner freedom, and working out new insights), (4) self-protection (setting rigid ego-boundaries, justifying oneself, or pretending to act a certain way), and (5) fear of self-devaluation and uncertainty.

The stories were coded by a rater who had undergone training with the OMT scoring guide. Difficult items were resolved through discussion before the final scores were analyzed. Consistent with common protocols for projective measures (Schüler et al., 2016; Winter, 1994), we summed up all subcategories across all pictures to compute participants' implicit autonomy scores.

Results

Word recognition task. We calculated three different values to examine differences in reaction times for autonomy versus autonomy-neutral stimuli. These were calculated by subtracting the mean reaction time of the autonomy-neutral words from the mean reaction time for the autonomy-related words. First, we calculated the difference between the mean reaction time for two categories as determined before the experiment (predefined categories) $M = 201.33$ms, SD = 266.02ms. Then, we calculated the difference between the mean reaction times of the words completed by participants, which we subsequently categorized as being autonomy-related or autonomy-neutral (completed words) $M = 919.39$ms, $SD = 585.71$ms. Finally, we calculated the difference between the mean reaction times of the words that participants categorized as being autonomy-related and words that participants categorized as autonomy-neutral (categorized words) $M = 43.43$ms, $SD = 304.44$ms. Table 1 shows the correlations between these values and nAutonomy scores. In line with our hypotheses, participants with higher nAutonomy scores reacted faster to nAutonomy-related words. No other difference value was significant $p > .05$.

Table 5.1: *Bivariate Correlations of difference values with nAutonomy*

	Predefined Categories	Completed Words	Categorized Words
*n*Autonomy	-.19*	-.15+	-.01

We conducted an additional, more differentiated, analysis of the effects of motive strength on perceptual readiness. We created four percentile groups of *n*Autonomy scores and conducted an ANOVA with the four groups as the fixed factor and the difference reaction time value for predefined categories (autonomy-related minus autonomy-neutral) as the dependent variable. The difference between the groups was marginally significant $F (3, 128) = 2.23$, $p = .09$. Post hoc Tukey tests revealed that the biggest difference between groups was between the first percentile (M = 294.00ms SD = 57.25ms) and the fourth percentile $M = 109.94$ms $SD = 46.38$ms. This difference was marginally significant $p = .06$.

In the completion portion of the task, we examined the proportion of words that were autonomy-related as compared to autonomy-neutral. Participants wrote an average of $M = 16.15$ % $SD = 7.27$% autonomy-related words. This, however, did not correlate with *n*Autonomy $p > .05$.

Categorization task. Participants categorized $M = 42.52$ $SD = 10.67$ words as belonging to the "autonomy/freedom" category. *n*Autonomy correlated positively with the number of words that were categorized as belonging to the "autonomy/freedom" category $r = .21$ $p = .01$.

Discussion

We examined the effects of *n*Autonomy on perceptual readiness for autonomy-related verbal stimuli. We executed this using a task that combined word recognition, word completion, and word categorization. Autonomy-related and autonomy-neutral words were spelled letter by letter and participants indicated when they felt they could complete the word. In a next step, participants completed the word. Finally, after completing the word recognition and completion task, participants categorized the experimental verbal stimuli as being autonomy-related or neutral.

Our results mainly confirmed our hypotheses. *n*Autonomy correlated negatively with the reaction time for the predetermined autonomy-related words. Thus, participants with higher *n*Autonomy scores had shorter reaction times for autonomy-related stimuli. This

supports the notion that participants high in *n*Autonomy have a higher perceptual readiness for autonomy-related stimuli. There was a trend for the same pattern for completed autonomy-related words. This means that participants descriptively reacted faster to letter strings that they subsequently completed with autonomy-related words. However, we did not observe this pattern for words that participants subsequently categorized as being autonomy-related.

A more differentiated analysis revealed that the largest difference in reaction times for predetermined autonomy-related stimuli was between participants with the lowest and the highest *n*Autonomy scores. Although this difference was only marginally significant in post-hoc tests, it is similar to McClelland and Liberman's (1948) results. Their results showed perceptual readiness was most relevant for participants with the highest *n*Acheivement scores and not so for medium and low *n*Achievement scores.

A further notable finding is *n*Autonomy correlated positively with the number of words subsequently categorized as being autonomy-related. This is in line with the concept of perceptual readiness as outlined by Bruner (1957); perceptual readiness heightens the chances of a stimulus being categorized as belonging to the relevant category and lowers the chances of it being categorized as belonging to a perhaps better fitting category.

The non-significant findings regarding completed words may be due to word completion requiring explicit cognitive processes that *n*Autonomy do not affect. Participants may have tended to responded faster to letter strings that they subsequently completed with autonomy-related words, but they only completed 16% of the letter strings with such words. Hence, participants generally completed the letter strings with autonomy-neutral words. Taken together, *n*Autonomy appears to affect spontaneous perception in both the recognition and categorizing task and not so much on the cognitive completion task.

Study 9

In Study 9 we used an incidental learning task and subsequent categorization task to further examine the effects of *n*Autonomy on perceptual readiness. Aarts and colleagues (2001) found that thirsty individuals remembered more drinking-related items in a waiting room as compared to non-thirsty individuals. This effect reflects the pop-up effect of implicit motives that makes motive-relevant stimuli salient for aroused motives (Kuhl, 2013). Incidental learning tasks are suitable to assess the effects of implicit motives on perceptual readiness as they rely on spontaneous non-effortful processes and the fact that more accessible, in our case, motive-relevant information is more likely to be encoded and recalled (Higgins, 1996).

In this preliminary examination of the effects of *n*Autonomy on incidental learning, we introduced verbal stimuli to participants in a rating task. Then, after a distractor task, participants completed an old-new recognition task. We expected that participants with high *n*Autonomy would remember autonomy-related stimuli better than participants with *n*Autonomy. Furthermore, as in Study 8, we expected participants to categorize more words as being autonomy-related in a subsequent categorization task.

Participants and Procedure

Participants were recruited using online social networks, university email mailing lists and advertisements at a German university. A total of 124 participants completed the study. Participants' age ranged from 18-51 years (*M* = 23.65 years, *SD* = 6.11 years). N = 104 of the participants were female (84.7%). N = 9 participants had more than 3 items that were scored as zero in the 5-item version of the OMT. These participants were eliminated from the analyses. University students were offered course credit for participation in the study.

The experiment was conducted using an online survey platform. After opening the link to the study, participants completed an implicit motive measure. Then participants completed an incidental or intentional learning task with verbal stimuli. Following a subsequent distractor task, participants completed an old/new recognition task. Finally, participants gave demographic information.

Incidental learning task. Participants intentionally or incidentally encoded 40 nouns that were autonomy-relevant (N = 20) or autonomy-neutral (N = 20). As in Study 1, autonomy-relevant words were selected based on the OMT's scoring guide for *n*Autonomy. Furthermore, research has shown enhanced memory for words with strong positive or negative valences (Buchanan, Etzel, Adolphs, & Tranel, 2006; Kensinger & Corkin, 2003). Therefore, we selected 12 autonomy-relevant and 12 autonomy-neutral words with similarly positive valences and 8 words each with similarly negative valences. The strength of the valences was determined using a word list based on affective norms for English words (Schmidke, Schröder, Jacobs & Conrad, 2014). Moreover, we took enhanced memory for frequent words into account (Dewhurst, Brandt, & Sharp, 2004; McCormack & Swenson, 1972) by selecting words that had similar frequencies within the valence groups. Word frequency was determined using the University of Leipzig's corpus-based Dictionary (Goldhahn, Eckart & Quasthoff, 2012).

Participants in both the incidental and intentional learning conditions rated pleasantness of the verbal stimuli on a six-point scale ranging from 1 (*very unpleasant*) to 6 (*very pleasant)* in the encoding task. Each word was presented for 4000ms. Prior to beginning the task, participants

in the intentional group were told to remember the words as a recognition task would follow. Participants in the incidental group were only instructed to rate the words.

Distractor Task. After the incidental learning task, participants completed a distractor task consisting of 20 addition and subtraction problems. Participants had 90s to complete as many problems as possible before they were automatically directed to the next portion of the experiment.

Old/New Recognition Test. We conducted the old/new recognition test using the 40 words from the encoding task as well as 40 additional autonomy-neutral words. Participants were instructed to decide intuitively and fast whether the word appeared in the pleasantness rating task or not. Participants cold indicate that the word was *old* or *new*.

Categorization Task. participants completed a categorization task of the original 40 words as in Study 1. In this study, we provided participants Alsleben and Kuhl's (2011) definition of *n*Autonomy before they completed the task.

Materials

Implicit Motives. We assessed implicit motives using the the five items of the OMT that specifically assess *n*Autonomy. A rater who had undergone training with the OMT scoring guide coded the stories. Difficult items were resolved through discussion before the final scores were analyzed. As in Study 8, we summed up all subcategories across all pictures to compute participants' implicit autonomy scores.

Results

Old/New Recognition Task. To examine the effects of learning condition and *n*Autonomy on recognition memory we conducted a repeated-measures ANOVA with the within-subject factor word type (correctly identified autonomy-related words vs. correctly identified autonomy-neutral words) and the between-subjects factors learning group (incidental vs. intentional) and *n*Autonomy (low vs. middle vs. high). Results revealed a main effect of word type $F(1, 100) = 51.78$, $p < .01$. Participants recognized $M = 17.24$ $SD = .20$ autonomy-related words and $M = 18.52$, $SD = .14$ autonomy-neutral words. The interactions between word type and learning group as well as word type and *n*Autonomy were not significant. The three-way interaction between word type, learning group, and *n*Autonomy was not significant.

Categorization Task. In line with our hypotheses, results revealed a significant correlation between *n*Autonomy and the number of autonomy words that were categorized as autonomy-related $r = .27$, $p < .01$. An ANOVA with the fixed factor *n*Autonomy (low vs. middle

vs. high) and the number of autonomy words categorized as autonomy-related as the dependent variable was significant $F(2, 103) = 3.67$, $p < .05$. Post-hoc Tukey tests revealed a significant difference between the low nAutonomy group $M = 13.73$ $SD = .44$ and the high nAutonomy group $M = 15.40$, $SD = .43$. Furthermore, there was a marginally significant correlation between nAutonomy and the number of words that were categorized as autonomy-related $r = .16$, $p = .08$.

Discussion

In this study we used an incidental learning task and subsequent categorization task to further examine the effects of nAutonomy on perceptual readiness. Participants incidentally or intentionally learned autonomy-related or autonomy-neutral words. In the incidental and intentional learning conditions, participants rated the pleasantness of word stimuli. In the intentional condition, participants were additionally told that a recognition task would follow. After a distractor task, participants completed an old/new recognition test with the learned stimuli and new stimuli. Finally, participants categorized the learned stimuli as being autonomy-related or autonomy-neutral.

The results of Study 9 partially supported the hypotheses. We found no effect of nAutonomy on incidental learning of autonomy-related words. In general, participants recognized autonomy-neutral words more than autonomy-related words. We observed no significant effects of learning group, nAutonomy, or their interactions on recognition performance. However, as in Study 8, we found effects of nAutonomy on performance in the categorization task. Specifically, participants with high nAutonomy categorized more autonomy words as being autonomy-related. Furthermore, participants with high nAutonomy tended to categorize more words in general as being autonomy-related. This effect was only marginally significant.

There are several possibilities as to why we did not find the expected effect of nAutonomy on incidental learning for autonomy-related words. First, we observed no difference in performance in the incidental and intentional tasks. Participants also performed very well in both conditions creating ceiling effects that make it difficut to differentiate between groups. Several changes to the task may reduce ceiling effects: 1.) such as having participants engage less with the meaning of the words (i.e. count number of letters), 2.) adding more word stimuli, or 3.) selecting infrequent words. Furthermore, the effects of nAutonomy on incidental learning may be so subtle that an aroused nAutonomy state is required for effects to be observed.

Our results in the categorizing task replicated the results from Study 8. We, once again, showed that participants with high *n*Autonomy are more likely to categorize words as being autonomy-related. In this study, the effect was strongest for autonomy words and reached marginal significance for all words from the learning phase. The effects in this study may be weaker as there were less words to categorize as compared to Study 8. Furthermore, we provided participants a definition of *n*Autonomy before the task which may have reduced the spontaneity of participants' answers. Taken together, however, this finding provides more evidence for the effects of *n*Autonomy on perceptual readiness.

General Discussion

Motive disposition theory theorizes that implicit motives have an orienting effect (McClelland, 1980). That is, they orient attention and heighten perceptual readiness to/for motive-relevant stimuli. The so-called pop-up effect is a central function of motives (Kuhl, 2013). We examined the effect of nAutonomy on perceptual readiness and attentional orienting in three preliminary studies using three different experimental paradigms. Specifically, we conducted word recognition (Study 8) and incidental learning (Study 9) experiments. Furthermore, we had all participants complete a categorization task in which they categorized the verbal stimuli presented in the studies as being either autonomy-related or autonomy-neutral.

We had mixed, but promising, results. In Study 8, in line with our hypothesis, participants with high *n*Autonomy indicated that they recognized a letter string as a word faster when the letter strings were the start of predetermined autonomy-related words in comparison to participants with low *n*Autonomy. Furthermore, in both studies participants with high *n*Autonomy categorized more words as being autonomy-related as compared to participants with low *n*Autonomy. In Study 8, this effect was observed for all stimuli, whereas in Study 9 this was significant for predetermined autonomy-related words and marginally significant for all stimuli.

Our results in the word recognition task are similar to results in perceptual threshold studies (Atkinson & Walker, 1965; McClellend & Liberman, 1949; Moulton et al., 1958). The effects of *n*Autonomy on reaction time in the task support the notion that *n*Autonomy increases perceptual awareness for motive-relevant stimuli. This is a remarkable finding, as it is the first empirical finding that supports the one of the central functions of implicit motives. Faster reaction times for autonomy-relevant stimuli reflect one of the characteristics of perceptual readiness; individuals need less input to be able to categorize the stimulus (Bruner, 1957). In

implicit motives, this describes the pop-up effect of motives (Kuhl, 2013). Hence, autonomy-related stimuli stand out more to individuals with high *n*Autonomy as compared to individuals with low *n*Autonomy.

The results in our categorizing tasks provide further support for the effects of *n*Autonomy on perceptual readiness. This finding also provides evidence for the orienting function of *n*Autonomy. Increased perceptual readiness also increases the likelihood that a stimulus will be categorized as belonging to the relevant category and decreases the likelihood of a stimulus being categorized as belonging to a better suited category (Bruner, 1957). Our participants with high *n*Autonomy categorized more verbal stimuli as being autonomy-related than participants with lower *n*Autonomy. This effect was relatively stable over two studies and slightly different tasks, which speaks for its robustness. Furthermore, this is the only study known to the authors that empirically demonstrates this effect for implicit motives. In summary, our results show that a high disposition of *n*Autonomy increases the likelihood of individuals perceiving stimuli around them as being related to autonomy.

As our studies were preliminary in nature, we first used verbal stimuli in a variety of paradigms to examine the orienting effects of *n*Autonomy. We used words because we were able to select appropriate verbal stimuli closely based on the OMT's scoring guide for *n*Autonomy. As participants had already completed the OMT before the experimental tasks, we can exclude semantic priming of the verbal stimuli used in the tasks as an explanation for our results. It is more likely we slightly aroused *n*Autonomy in participants by having them complete the OMT before the tasks. The pictures that assess *n*Autonomy are designed to arouse this motive in individuals (Baum & Baumann, 2020). Researchers found stronger effects of implicit motives on perceptual readiness when the motive was previously aroused (Atkinson & Walker, 1956; Moutlon et al., 1958; Schultheiss & Hale, 2007). Hence, our sequencing of tasks may have facilitated the effects of *n*Autonomy on perceptual readiness by making this motive relevant.

Limitations and Directions for Future Research

Although we had two substantial findings, we could not confirm all hypotheses. As our studies were preliminary in nature, we believe there are ways to optimize the experiments that could reduce some of the error variance. First, our incidental learning condition should be, for lack of a better term, more incidental in future studies. By instructing our participants to rate the pleasantness of the words, participants in both the intentional and incidental conditions dealt with the meaning of the words, which may have facilitated encoding. Future research could have participants in the incidental condition count the number of letters in a word.

Furthermore, several words could be presented at once and participants could count the vowels to prevent participants engaging with the meaning of the words.

We focused on verbal stimuli in all our tasks because we based our research on previous studies. *n*Autonomy is similar to *n*Achievement in its focus on the individual rather than interpersonal processes like *n*Affilaiton and *n*Power. Thus, we believe verbal stimuli are best suited to test the effects of *n*Autonomy on perceptual readiness, as verbal stimuli have been used in studies on *n*Achievement (McClelland & Liberman, 1949; Moulton et al., 1956). However, future research could use pictorial stimuli to examine how *n*Autonomy affects attentional orientation to autonomy-relevant cues in one's surroundings.

Overall, our research provides a solid foundation for future studies on the orienting effects of *n*Autonomy. Future studies could examine the effects of *n*Autonomy on perceptual thresholds in the same manner as McClelland and Liberman (1949) and Moulton et al. (1958). Specifically, participants could view stimuli at intervals beginning subliminally and gradually enter conscious awareness, then indicating indicate when they see a word. Additionally, attentional orientation to autonomy-relevant stimuli could be examined using the dot probe task or eye tracker paradigms. These studies would not only solidify our findings on the effects of *n*Autonomy on perception, but also further discern exactly how *n*Autonomy affects perception. Such research could also provide more insight to how implicit motives work. In summary, our research represents a first step to important research on the mechanisms behind the effects of implicit motives on behavior.

Conclusion

In two studies, we found preliminary evidence for the effects of *n*Autonomy on perceptual readiness. Specifically, participants with high *n*Autonomy indicated they could complete letter strings that start to spell out autonomy-related words faster than participants with low *n*Autonomy. Moreover, participants with high *n*Autonomy also categorized verbal stimuli as being autonomy-related more often than participants with low *n*Autonomy. We observed this effect in several studies. Our results are notable as they are the first to examine the orienting effect of *n*Autonomy and support the validity of autonomy as an implicit motive.

6 Autonomous Creativity

Abstract

Theories of creativity and empirical evidence have highlighted the importance of autonomy as a motivational source of creativity. However, we know little about the relationship between the implicit autonomy motive and creativity. Using a multi-method multi-informant design, we investigated the relationship between implicit autonomy motives and creative production. We assessed the implicit and explicit autonomy motives of $N = 108$ adolescents using the Operant Motive Test (OMT) and an explicit motive questionnaire. Then, participants completed a creative figural drawing task. In addition, we collected teacher ratings regarding participants' innovative behavior. Results revealed that implicit autonomy dispositions predicted not only production in a figural drawing task, but also teacher ratings of innovative behavior. These positive relationships remained stable when controlling for achievement motivations and other autonomy-related variables. In contrast, explicit autonomy dispositions could not predict creative production or teacher ratings of innovative behavior. We conclude that the implicit autonomy motive is an energizing force of creative production.

When asked to imagine a very creative person, the image that often comes to mind is a unique individual, someone who marches to their own drummer and is unbound from societal norms. We use those same characteristics, those of a creative person, to describe an autonomous person. An autonomous person functions in a self-determined manner, resists situational and interpersonal constraints, and is in touch with their intrinsic interests (Sheldon, 1995 p. 25). That the characteristics of creativity and autonomy overlap obviously suggests that they somehow go hand in hand. Indeed, empirical studies have confirmed the link between personal autonomy and creativity (Batey & Furnham, 2006; Sheldon, 1995). However, to our knowledge, research has not focused on autonomy as a motivational trait that contributes to creativity. Understanding the motivational forces behind creativity is important especially in school settings, as creativity and intelligence are closely linked (Batey & Furnham, 2006; Kandler et al., 2016; Sternberg & Lubart, 1993). In the present study, we propose and examine the hypothesis that people's inner drive, or motive, for autonomy is an energizing force for creativity.

Motivational Dispositions

The link between personality and creativity was identified in early creativity research. Guilford (1950) argued that creative production is the result of an interaction between creative abilities and motivational traits. Traditionally, research on the creative personality has mainly placed focus on the link between big five personality traits and creativity (Feist, 1998; Furnham, 2015; Silvia, Nusbaum, Berg, Martin & O'Conner, 2009) largely neglecting motivational traits, which were an important piece of Guilford's conceptualization of creativity (1950). A few studies do exist that have identified motivational aspects as a factor in creative behavior (Amabile, 1996; Prabhu, Sutton & Sauser, 2008; Sternberg & Lubart, 1993).

Of particular note are the so-called task-focusing motivators of creativity suggested by Sternberg and Lubart (1993). In their article on creatively gifted individuals, the authors present a model of creative giftedness that includes intellectual processes, knowledge, intellectual styles, personality attributes, motivational aspects, and environmental context. In regards to motivation, the authors postulated, but did not explicitly test, that task-focusing motivators are energizing sources, drives, or goals that result in individuals concentrating attention to work on a task (p. 12). These stand in contrast to goal-focusing motivators that view tasks as a means to an end (p. 12). They list the motivational traits to achieve excellence, to self-actualize one's potential, and the motivation to satisfy a desire for intellectual novelty as task-focusing

motivators and thus, energizing sources for creativity. In the motive disposition theory, sources for energizing behavior are referred to as implicit motives.

Implicit motives are motivational traits and are defined as a recurrent concern for a particular state based on a natural incentive (McClelland, 1987). Implicit motives predict spontaneous, or operant, behavior over time, and they are also thought to orient, select, and energize behavior towards achieving these states (McClelland, 1980). For example, the achievement motive is defined as the need to compete and striving to succeed against a standard of excellence in task situations in which an individual can experience either success or failure (McClelland et al., 1953). This disposition then orients, selects, and energizes behavior to satisfy the need to achieve excellence. Specifically, individuals with a high implicit disposition for achievement, i.e. a high implicit achievement motive, recognized tachistoscopically presented achievement-related words faster (McClelland & Liberman, 1949; orienting function), learned difficult materials faster (McClelland, Atkinson, Clark & Lowell, 1953; selecting function), and showed a larger number of entrepreneurial acts (Wainer & Ruben, 1969; energizing function) compared to individuals with a low implicit achievement motive. Therefore, due to their orienting, selecting, and energizing functions, implicit motives are analogous in function to the task-focusing motivators as described by Sternberg and Lubart (1993). Thus, we can expect that implicit motives act as energizing and focusing motivational traits that contribute to creativity. Moreover, the themes of the motivators identified by Sternberg and Lubart (1993), namely the motivation to achieve excellence and self-actualize are analogous to implicit achievement and implicit autonomy motives, respectively.

Consistent with Sternberg and Lubart (1993), recent research identified the implicit achievement motive as a driving force that fosters creativity. Specifically, Schoen (2015) found that the implicit achievement motive was predictive of creative problem solving in an organizational context. As both achievement and autonomy have been theoretically suggested as motivational sources for creativity, we assume that individual differences in implicit autonomy motives explain variance in creativity.

Autonomy Motive

Individual differences in people's needs for power, achievement, and affiliation are the focus of the motive disposition theory (McClelland, 1985). Although autonomy has not been classically thought of as a motive in the motive disposition theory recent research has suggested that autonomy be considered a fourth basic motive. Schüler, Sheldon, Prentice, and Halusic (2016) found that participants with a strong implicit dispositional need for autonomy, or implicit

autonomy motive, derived more flow experience from felt autonomy as compared to participants with weak autonomy motive dispositions. In this study, the authors used and obtained similar results from the Picture Story Exercise (PSE; Schultheiss & Pang, 2007) and the Operant Motive Test (OMT; Kuhl, 2013) to assess autonomy motive dispositions. Both of these instruments are projective instruments in which participants are presented an ambiguous picture and asked to think of a story that describes what is happening in the picture. In the PSE, participants then write the story and their answers are coded for motive-related content. When completing the OMT, participants are asked to first pick a main protagonist, think of a story involving this person, and then answer three questions as spontaneously as possible: "What is important to this person in this situation and what is the person doing? How does the person feel? Why does the person feel this way?" Schüler and colleagues used the origin scoring system from deCharms and Plimpton (1992) for the PSE and the autonomy motive coding system from Kuhl (2013) for the OMT.

In the present study, we used the OMT that defines the implicit autonomy motive as a concern for self-definition, self-integration, along with self-determined behavior (Alsleben & Kuhl, 2011). Individuals high in implicit autonomy generate stories that include the themes self-joy, increases in self-esteem through praise and attention, self-growth and self-actualization, integration of negative experiences into the self, rigid self-protection, or expressions of the fear of self-devaluation. Further evidence for the implicit autonomy motive was provided by Sieber, Schüler, and Wegner (2016). They found that participants with strong implicit autonomy dispositions displayed lower stress reactions (salivary alpha-amylase) when presented autonomy supportive vignettes as compared to autonomy restrictive and neutral teaching styles. In contrast, participants with weak autonomy dispositions displayed higher stress reactions when presented autonomy supportive vignettes as compared to autonomy restrictive and control conditions.

These results demonstrate that by using methods that assess implicit motive dispositions using projective instruments, it is possible to discern between individuals with high and low autonomy motives. In other words, we can conclude that there is preliminary evidence for a motive disposition or motivational trait that represents a concern for autonomy. Furthermore, if we regard autonomy as an implicit motive, then we can also expect that it has orienting, selecting, and energizing functions for behavior. Given that research has identified autonomy as an important motivational factor in creativity, we assume that implicit motive dispositions for autonomy as assessed using the OMT fosters creative behavior.

Autonomy and Creativity

Traditionally, autonomy has been investigated as a motivational state in the self-determination theory (Deci & Ryan, 2000). The basic needs theory of the self-determination theory (Deci & Ryan, 2000) considers autonomy to be the "organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (p. 232). Research on the link between autonomy and creativity stemming from the self-determination theory has mostly focused on the benefits of autonomy supportive environments and creative production (Hennessey, 2000; Koestner, Ryan, Bernieri & Holt, 1984; Oldham & Cummings, 1996). However, some research does exist that examines autonomy orientations as a trait related to creativity that underscores the fostering role of autonomy as a motivational trait for creativity.

Individuals who are high in autonomy orientation, for example, interpret situations as being more autonomy promoting, are more self-determined, and experience a high degree of choice (Deci & Ryan, 1985). It is also assumed that autonomy oriented individuals experience more intrinsic motivation (Hagger & Chatzisarantis, 2011), which, in turn, fosters creativity (Amabile, 1996; Runco, 2004). Sheldon (1995) found a positive correlation between autonomy orientation and self-reported creativity. Furthermore, Liu, Chen & Yao (2011) found autonomy orientation also correlated with job creativity as assessed by team leaders. Thus, autonomy appears to be an important motivational trait for creativity. However, research inspired by self-determination theory has neither measured autonomy orientations beyond self-report nor expected an energizing role for behavior in the same way as implicit motives (for an overview, see Schüler, Baumann, Chasiotis, Bender, & Baum, 2018). Therefore, it is informative to test whether the implicit motive for autonomy has similar or even stronger energizing effects on creativity than explicit autonomy orientation.

Present Research

The goal of the present study was to investigate whether individuals with higher implicit autonomy dispositions (henceforth referred to as *n*Autonomy) show more creative behavior. We expect this relationship for several reasons. The autonomy motive, as defined by Kuhl and Alsleben (2011), represents a need to self-actualize and for self-growth as well as a need to define oneself as different from others. These themes represent not only the themes of the task-focusing motivators that foster creativity as postulated by Sternberg and Lubart (1993) but have also been postulated to underlie the link between autonomy and creativity (Sheldon, 1995). Furthermore, explicit orientations for autonomy have been either identified as a core

characteristic of creative individuals (Barron & Harrington, 1981) or have been related to creativity within the framework of the self-determination theory. However, the relationship between the implicit motive for autonomy and creativity has not been examined thus far.

As researchers have also identified dispositional concerns for achievement (henceforth referred to as *n*Achievement) as a potential motivational source for creativity, we also assessed the strengths of our participant's *n*Achievement. We used a multi-method and multi-informant approach in a school setting to test our hypothesis. Creativity has a long history of being examined in relationship to school performance and in school contexts thus making it appropriate for our study (Hansenne & Legrand, 2012; Runco, 2004). Furthermore, the context allowed us to obtain a multi-method multi-informant measure of creativity. We were able to not only assess creative behavior of students using a drawing task, but we could also acquire ratings of their innovative behavior from their teachers.

To assess creativity, we selected a drawing task to examine spontaneous creative behavior. The drawing task allows for individuals to "actively expand, extend, develop, and create something unique or novel that is satisfying to him/her" (Jellen & Urban, 1989). We were not interested in respondent behavior or self-reported creativity, as these are known to be more associated with the self-concept and explicit motivational system (McClelland, Koestner & Weinberger, 1989). Instead, we expected a figural drawing task to allow for more operant responses, which are defined as responses that the subject generates spontaneously (McClelland, 1980). This type of behavior is the behavior that can be predicted by implicit motive dispositions (McClelland, Koestner & Weinberger, 1989).

Participants

A total of 108 adolescents aged 13-17 years ($M = 14.12$ years, $SD = 1.10$) participated in our study. 38.7% of the participants were female ($N = 41$), five participants did not indicate a gender and one participant marked "other" as a gender. Participants attended grades eight through ten at a middle-tracked secondary school in Germany. Participation was voluntary and required parental consent. We applied for and received ethical approval from the regional school board as well as the state data protection commissioner. All participants were offered the opportunity to receive feedback regarding the assessed variables as a reward for their participation in the study.

Materials

Creativity. Creativity was assessed using the Test for Creative Thinking- Drawing Production (TCT-DP; Urban & Jellen, 1995). The test consists of a square frame containing six differing figural fragments. The participants' are told that the square frame is an unfinished drawing and it is their task to finish the drawing. They are also told that they can draw what they want, there is no wrong way to draw the picture, and that they should give their drawing a title when they are done. Participants are given 12 minutes to finish the drawing. If they finish before 12 minutes are up, then the time they took to finish the test is noted.

Drawings are then rated based on the following 13 criteria: continuations of the fragments, completions of the fragments, new elements, connections made with a line, connections made to produce a theme, boundary-breaking that is fragment dependent, boundary-breaking that is fragment independent, perspective, humor, unconventional manipulation of the material, inclusion of surreal and/or abstract elements/themes, combining figures with characters and/or symbols, and time. The ratings for each criterion are then summed up into a single score that can range from 0 to 72. Only the whole score is used as an indication of creativity and the individual creativity criteria cannot be analyzed individually (Urban & Jellen, 1995). Two independent raters scored the participants' drawings according to the test manual and they reached an interrater reliability of ICC= .90

Implicit motives. The Operant Motive Test (OMT; Kuhl, 2013) was employed to assess participants' implicit autonomy motives. We used the 20-picture version of the OMT that assesses implicit affiliation, achievement, power, and autonomy motives. The answers to these questions are first coded for the presence of motive content. Only one motive is coded per picture. If no motive content is apparent, the item is then coded with "zero." If motive content is identified, it is then additionally coded as belonging to one of five specific enactment strategies which can be approach or avoidance motivated and represented by the following categories: (1) self-confidence (stories include self-joy, being in the moment, and enjoying something), (2) status (conditional self-esteem, receiving praise, and being the center of attention), (3) self-growth and self-regulation (restoring inner certainty, integration of negative experiences, inner freedom, and working out new insights), (4) self-protection (setting rigid ego-boundaries, justifying oneself, or pretending to act a certain way), and (5) fear of self-devaluation and uncertainty. Stories that are classified as being achievement stories involve flow experiences, achieving an individual standard of excellence, coping with difficulties or failure, achieving under pressure, and fear of failure resulting in avoidance behavior.

The OMT has sufficient reliability (Runge, Lange, Engeser, Schüler, & den Hartog, 2016), and two independent raters coded the stories and reached a sufficient inter-rater agreement (ICC for both achievement and autonomy > .90). Discrepancies were resolved through discussion before the final scores were analyzed. Consistent with common protocols for projective measures (Schüler et al., 2016; Winter, 1994), we summed up all subcategories across all pictures to compute participants' implicit autonomy and achievement scores, respectively.

Teacher ratings. Teachers rated their students' creativity using an adapted version of the Innovative Work Behavior Scale (IWBS; Janssen, 2000). The IWBS consists of three scales that assess idea generation, idea promotion, and idea implementation. Teachers' indicated how often students showed different forms of innovative behavior in school on a 7-point scale ranging from "always" to "never." Items included how often students found original solutions for problems, searched for support for innovative ideas, and introduced innovative ideas systematically to the class. Innovative behavior as assessed with the IWBS has been used to assess creativity in occupational settings (Janssen, 2010; Scott & Bruce, 1994). The scales had sufficient reliabilities (Cronbach's α = .94 for idea implementation and Cronbach's α = .96 for idea generation and idea promotion).

Mood. Participants' mood was assessed before and after completing the TCT-DP. Before completing the TCT-DP participants indicated how the good they currently felt on a seven-point scale ranging from "neutral" to "very good." They also indicated how bad they currently felt on a seven-point scale ranging from "neutral" to "very bad." After completing the TCT-DP, we assessed participants using the arousal and pleasure scales of the Self-Assessment Manikin (SAM; Bradley & Lang, 1994). Participants were presented pictures of figures who depicted five levels of arousal and pleasantness, respectively, and asked to mark the figure that depicts how they feel right now.

Explicit motives. Explicit motive dispositions were assessed using the Motive Enactment Test (MET; Kuhl, 2001) and its extension to assess explicit autonomy dispositions (Freedom Enactment Test: FET; Kuhl, 2011). Students' rated to which extent a statement applies to them in their current situation using a four-point scale ranging from "not at all" to "completely". The explicit autonomy motive (e.g., "It is important for me to find personal meaning in all that I do" and "the most important thing in life is to not be led astray from your own path.") and the explicit achievement motive were included in the present analyses. The internal consistencies of the two 4-items scales were not very high in this sample: Cronbachs' α = .63 for achievement and α = .65 for autonomy.

Needs satisfaction. We assessed students' subjective experience of need satisfaction using the Basic Psychological Need Satisfaction Scale (Deci & Ryan, 2000; Gagne, 2003). In our study, students only completed the seven items related to autonomy satisfaction (e.g., "I feel free to decide for myself how I would like to live my life." and "I feel generally free to express my ideas and opinions."). Participants indicated the extent to which the statements relate to their life and how true they are for them on a seven-point scale ranging from "not true at all" to "very true." Reliability analyses revealed that Cronbach's α = .52

Other measures. We also assessed participants' action-state orientation, current stress levels, and general well-being using questionnaires that were administered to address a different research question and will not be considered in the following analyses.

Procedure

We collected data on two different occasions. During the first session, participants completed computerized versions of the implicit and explicit motive measures. Students were tested in their class groups. The second session occurred between four to six weeks after the first testing session. In the second session, students first gave mood judgments before completing the TCT-DP. Immediately following the TCT-DP, participants' mood and autonomy satisfaction were assessed in addition to the other measures which are not relevant for the following analyses. We collected the teachers' assessments of students' creativity during the second testing session.

Results

We analyzed the data using IBM SPSS 22. We conducted correlational analyses as well as regression analyses to examine the amount of variance explained by the variables of interest. As some students were not present on the days of testing sessions, the number of students in the analyses range from 108 to 78 participants.

Descriptive Statistics and Correlations

All means, standard deviations and correlations between the assessed variables are presented in Table 6.1. We found significant positive correlations between nAutonomy and all indices of creativity. Specifically, the correlation between nAutonomy and creative production, as assessed using the TCT-DP, had a medium effect size $r(79) = .39$, $p < .01$. As can be seen in Figure 6.1, nAutonomy explained 15% of the variance in creativity production scores. The correlations between nAutonomy and teacher ratings of innovative behavior also had medium

effect sizes. *n*Achievement did not correlate with creative production; however, significant correlations were observed between *n*Achievement and idea generation, idea promotion, and idea realization. Creative production also had strong correlations with the innovative behavior scales. Furthermore, we found strong inter-correlations between the scales of innovative behavior. Other correlations of note include significant positive correlations between creativity production and change in positive affect as well as *san*Autonomy and change in positive mood. Autonomy satisfaction and change in negative mood had no significant correlations with any of the assessed variables.

Table 6.1: *Means, Standard Deviations and Correlations Study 10*

|	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. *n*Autonomy	4.56	2.40										
2. *n*Achievement	2.57	1.40	.14									
3. Creative Production	26.13	9.31	.39***	.10								
4. Idea Generation	4.40	1.54	.40***	.25*	.45***							
5. Idea Promotion	4.02	1.64	.42***	.28*	.51***	.90***						
6. Idea Realization	3.74	1.60	.41***	.30*	.47***	.91***	.92**					
7. *san*Autonomy	2.67	0.53	.09	.13	.06	-.06	-.03	.05				
8. *san*Achievement	2.30	0.65	-.02	.25*	.01	.03	.06	.07	.25*			
9. Autonomy Satisfaction	32.69	5.35	.06	.07	-.03	.03	.09	.15	.15	.08		
10. Change in Positive Mood	.01	1.06	.18	-.13	.29**	.15	.15	.31	.27**	-.12	-.14	
11. Change in Negative Mood	.00	1.19	-.08	-.14	-.01	.11	.02	.03	-.10	.10	-.06	-.12

Notes. *$p < .05$, **$p < .01$, ***$p < .001$
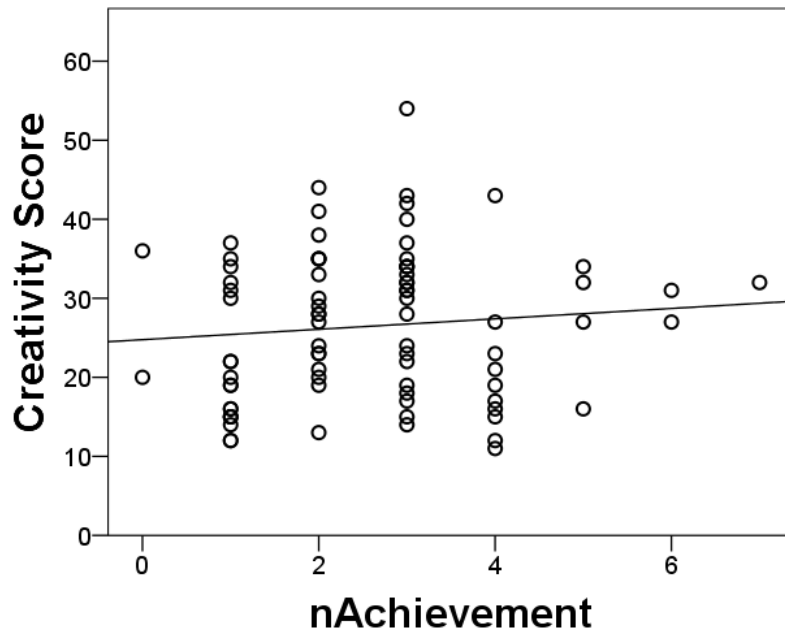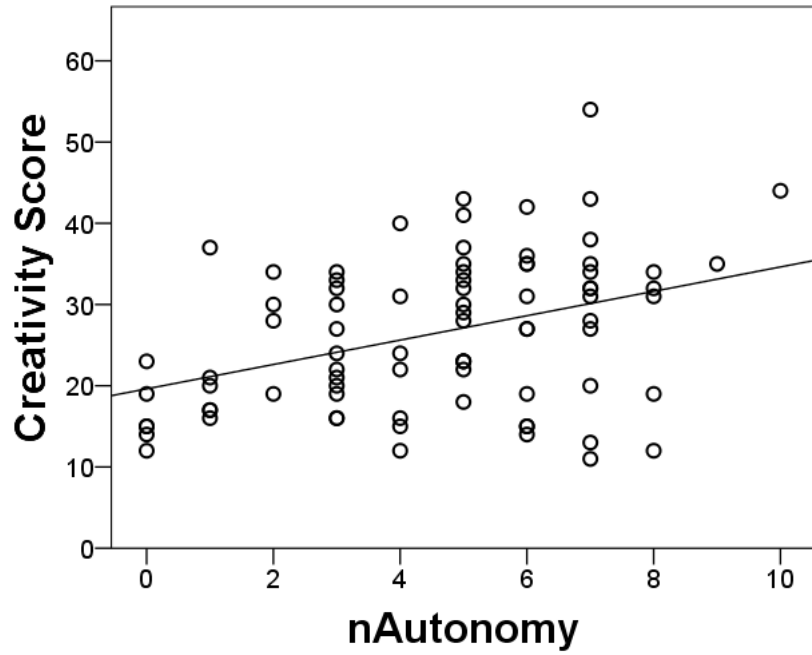
Figure 6.1: Correlations of implicit motives with creative production ($R^2 = .151$ for nAutonomy; $R^2 = .010$ for nAchievement).

Regression Analyses

To examine the robustness of the relationship between *n*Autonomy and creativity indices as well as *n*Achievement and creativity indices, we conducted four regression analysis. The results of the analyses can be seen in Table 6.2. In the first analysis, *n*Autonomy and nAchievement were entered as predictors of creative production in the TCT-DP in Step 1. In Step 2 we controlled for *san*Autonomy and *san*Achievement as well as autonomy satisfaction. In both models, *n*Autonomy was the only significant predictor of creative production $\beta = 3.56$, $t(64) = 3.23$, $p = .002$. These results remained stable when additionally controlling for age and sex. Step 2 explained 17% of the variance $R^2 = .17$ $p = .03$.

In the following analyses, *n*Autonomy and *n*Achievement were entered in Step 1 as predictors of idea generation, idea promotion, and idea realization. Again, in Step 2, we entered *san*Autonomy, *san*Achievement, and autonomy satisfaction into the model as control variables. *n*Autonomy was the only significant predictor of idea generation $\beta = 1.45$, $t(63) = 3.00$, $p = .004$. This model explained 18% of the variance $R^2 = .18$ $p = .02$. Idea promotion was predicted by *n*Autonomy as well as *n*Achievement in Step 1. However, only *n*Autonomy remained a significant predictor of idea promotion when we entered the control variables $\beta = 1.67$, $t(63) = 3.28$, $p = .002$. This model explained 20% of the variance $R^2 = .21$ $p = .008$. Finally, both *n*Autonomy $\beta = 1.63$, $t(63) = 3.18$, $p = .002$ and *n*Achievement $\beta = 1.08$, $t(63) = 2.14$, $p = .04$ were significant predictors of idea realization before and after the control variables were entered. This model explained 22% of the variance $R^2 = .20$ $p = .006$ All results remained stable when controlling for age and sex.

Autonomous Creativity

Table 6.2:

Regression analyses of implicit motives, explicit motives, and autonomy satisfaction on creativity indices.

	Creativity Performance			Idea Generation			Idea Promotion			Idea Realization		
	R^2	β	t	R^2	β	t	R^2	β	t	R^2	β	t
Step 1	.16**			.16**			.20**			.20**		
*n*Autonomy		3.62**	3.37		1.41**	2.98		1.59**	3.22		1.57**	3.14
*n*Achievement		.72	.70		.77	1.70		.98*	2.04		1.08*	2.14
Step 2	.17*			.18*			.21**			.22**		
*n*Autonomy		3.56**	3.23		1.45**	3.00		1.67**	3.28		1.63**	3.18
*n*Achievement		.69	.638		.80	1.70		.97	1.95		1.08*	2.14
*san*Autonomy		.23	.21		-.48	-1.00		-.47	-.94		-.15	-.30
*san*Achievement		.23	.19		.15	.30		.24	.45		.15	.28
Autonomy Satisfaction		-.86	-.76		-.16	-.33		.26	.51		.58	1.11

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

Discussion

In this study, we examined the implicit autonomy motive as a motivational source for creative production in adolescents. Using a multi-method multi-informant design, we examined the relationship between *n*Autonomy and production on a creative drawing task as well as innovative behavior. We expected a positive relationship between *n*Autonomy and both indices of creativity. As previous research has also identified *n*Achievement as a potential motivational trait that fosters creativity, we also examined whether our data support this assumption. *n*Autonomy significantly correlated with creative production as well as innovative behavior ratings, supporting our hypotheses, whereas *n*Achievement only correlated with innovative behavior ratings.

Our results demonstrate for the first time that autonomy, assessed as an implicit motive, is related to creative production. The positive relationships between *n*Autonomy and spontaneous creative production and innovative behavior ratings confirm the notion that autonomy as a personality trait plays a role in creativity. Our results are in line with those of Sheldon (1995) and Liu, Chen and Yao (2011), who found positive relationships between creativity and self-reported autonomy orientation. Our study differs from these studies in two important ways. First, we assessed participants' implicit autonomy motives, which are thought of as the orienting, selecting, and energizing forces behind spontaneous behavior. Second, we used teacher ratings as well as actual behavior on a figural drawing test to examine creativity. It is also important to note that the relationship between *n*Autonomy and creativity indices goes above and beyond the influence of *n*Achievement. Furthermore, the results remained robust when controlling for variables such as autonomy satisfaction and explicit autonomy dispositions. Thus, our study provides the first empirical evidence for the role of *n*Autonomy in not only spontaneous creative production but also perceived innovative behavior.

*n*Achievement, on the other hand, did not predict spontaneous creative production. However, we observed positive correlations between *n*Achievement and the three teacher ratings on innovative behavior. *n*Achievement predicted idea realization even when controlling for explicit achievement dispositions and autonomy-related variables. It is of note that *n*Achievement did not predict idea generation and idea promotion when we included autonomy-related variables in the analyses. In light of our results, we suggest that generative or production-related aspects of creativity have a stronger relationship to autonomy than achievement dispositions. Although Schoen (2015) reported a significant relationship between *n*Achievement and creativity, participants' creativity in his study was operationalized as a creative problem-solving task in an organizational context and not as creative production.

Kandler and colleagues (2016) also found different predictors for perceived creativity (one's own and peers' perceptions of one's creative abilities) and figural creativity (video ratings of creativity and figural drawing task production). Thus, it is possible that different kinds of creativity exist that are predicted by different factors. We therefore suggest that our results are in line with this assumption and that *n*Achievement is more related to perceived creativity than creative production (or figural creativity).

Practical Implications

In addition to contributing to our theoretical understanding of which motivational traits contribute to creativity, the results also have practical implications. First, implicit motive measures can be used as a diagnostic tool to ascertain which students have stronger implicit motive dispositions for autonomy and foster the creative potential of such individuals. As the congruence of implicit motives and situations that satisfy these motives contributes to flow-like experiences (for an overview, see Schüler et al., 2018), it is important to identify which students have high implicit autonomy motive dispositions and give them creative tasks in which they can excel. Furthermore, the results underscore the importance of autonomy in academic settings. Previous research has identified autonomy-supportive settings as being conducive to creativity (Hennessey, 2000; Koestner, Ryan, Bernieri & Holt, 1984; Oldham & Cummings, 1996); however, our results highlight that this can occur on the individual implicit level and foster spontaneous creative production.

Limitations and Future Directions

A strength of our study is that we conducted it in the students' school setting. Thus, the setting was as close to a normal school setting as possible. As creativity and intelligence have been linked in the past (for a review, see Batey & Furnham, 2006), it would be of value to examine the relationship between *n*Autonomy, creativity, and intelligence in all school tracks. Since our population attended a middle-tracked school, it would be interesting to examine whether the same relationship between *n*Autonomy and creativity exists in students who attend academic-tracked schools.

A further aspect which should be examined in future research is the role of intrinsic motivation. Our results show that *n*Autonomy can predict creativity, but the mechanisms that drive this process are unknown. We propose that intrinsic motivation may be the link between *n*Autonomy and creative production. Research has shown that intrinsic motivation fosters creativity (Amabile, 1996) and harmonious passion, which is related to intrinsic motivation. Liu

and colleagues (2011) found that harmonious passion mediated the relationship between autonomy orientations and creativity. Thus, it may be that, as is the case with autonomy-oriented individuals, providing an environment or situation for individuals with high *n*Autonomy in which they can be creative may increase intrinsic motivation and this may foster creativity.

Finally, these are preliminary findings that validate autonomy as a motive disposition. Although individual differences in implicit autonomy dispositions have been observed (Sieber et al., 2016; Schüler et al., 2016), there are several factors that need to be addressed. First, this study provides evidence for the energizing function of *n*Autonomy. Future research must examine the orienting and selecting functions of this motive disposition. The measurement of implicit motives originates from studies in which motive states were aroused and subsequent behavior in projective tests was recorded (see McClelland, 1980). Research demonstrating the sensitivity of *n*Autonomy to arousing situations needs to be conducted as a further validation of *n*Autonomy as a motive. Our study is one piece in an important puzzle demonstrating that *n*Autonomy functions as the classic motives affiliation, achievement and power.

Conclusion

Our research substantiates the notion that autonomy is an important factor in creativity. We demonstrated that implicit autonomy dispositions predict creative production in a drawing task as well as teacher ratings of innovative behavior. Thus, we show that it is not just autonomy supporting situations that foster creativity, but also the need for autonomy within the person that drives creativity.

7 General Discussion

In the previous chapters, I presented empirical evidence for the OMT's causal validity for the measurement of *n*Affiliation, *n*Power, and *n*Autonomy as well as empirical evidence for the orienting and energizing functions of *n*Autonomy. Specifically, Chapters 2 and 3 comprised empirical studies that confirmed the causal validity of the OMT for the implicit affiliation and power motives using established methods. Then, I provided evidence for the causal validity of the OMT's measurement of the implicit autonomy motive in Chapter 4. Finally, Chapters 5 and 6 presented preliminary evidence for the orienting and energizing functions of *n*Autonomy, respectively. In the following, I will discuss the general findings from each chapter as well as the implications of my findings for motive research. Lastly, I will suggest future avenues of research on *n*Autonomy and make concluding remarks.

Main Findings

The uniting theme of chapters 2 through 4 was causal validity. As outlined in each chapter, a test has causal validity for measuring an attribute if, "(a) the attribute exists and (b) variations in the attribute causally produce variation in measurement outcomes." (Borsboom, Mellenberg, & van Heerden, 2004, p.1061). Researchers investigating implicit motives have examined this kind of validity since the beginning of implicit motive research using the TAT/PSE (McClelland, 1980). Chapters 2 and 3 adapted research methods that demonstrated the causal validity of the PSE to empirically test the validity of the OMT's nPower and nAffiliation measures.

In Chapter 2, I demonstrated that the OMT is sensitive to variations of *n*Affiliation arousal. In Study 1, I adapted a classical paradigm to a digital context to arouse *n*Affiliation; I created a fictitious online social network and asked participants to evaluate other members of this social network. Our results revealed that participants who were invited to join a group with individuals whom they had previously evaluated had higher *n*Affiliation scores than participants who were not invited to join a group and participants in a control condition. I observed descriptively higher *n*Affiliation scores in participants who were not invited to join a group compared with the control group; however, this difference was not significant. I concluded that in this paradigm, the condition that had strong approach/hope cues for *n*Affiliation OMT was the strongest to arouse *n*Affiliation. Therefore, I conducted a second study with an ostracism paradigm to arouse *n*Affiliation using strong avoidance/fear cues. The effects of the cyberball paradigm are most powerful in the exclusion condition (Gerber & Wheler, 2009). In our study, participants who were left out of the cyberball game, after being included for several rounds, had higher *n*Affiliation scores than participants in the control condition. Taken together, our

results show that the OMT is sensitive to changes in the arousal of *n*Affiliation through both hope/approach and fear/avoidance cues.

Chapter 3 also adapted established paradigms that arouse *n*Power in individuals. To test the causal validity of the OMT for *n*Power, I showed participants power-related film clips (Study 3) and political speeches (Study 4). I observed higher *n*Power scores in participants who were engaged in watching *The Godfather Part II* compared with participants who watched a power-neutral documentary film (Study 3). Furthermore, participants who watched an antisocial political speech had higher *n*Power scores than participants who watched a power-point tutorial (Study 4). Unexpectedly, participants who watched Elizabeth (Study 3) or a prosocial political speech (Study 4) did not have higher *n*Power scores compared with their respective control conditions. My results from the *n*Power experiments show that the OMT detected differences between arousal conditions when the *n*Power cues were very strong.

After I demonstrated the causal validity of the OMT for *n*Affiliation and *n*Power, I created and empirically tested new pictures to assess *n*Autonomy (Study 5). Following the theoretical and phenomenological principles of the OMT, the final picture set consisted of five pictures that had medium arousal effects for each of the five implementation strategies for *n*Autonomy. Then, I tested the causal validity of the new pictures. In Study 6, participants who viewed a clip from *Into the Wild*, a film with strong autonomy-related themes had higher *n*Autonomy scores than participants who watched an autonomy-neutral tutorial. Studies 7a and 7b implemented the Symbolic Self-Completion paradigm to arouse *n*Autonomy. In Study 7a, which I conducted online, I observed higher *n*Autonomy scores in participants who felt that they could not personally express themselves. I included a baseline *n*Autonomy measurement in Study 7b and conducted the experiment in a university laboratory. The results of this study revealed that participants who were interrupted had higher *n*Autonomy scores after the manipulation compared with their baseline *n*Autonomy scores. Additionally, participants who wrote personal essays and were interrupted had marginal significantly higher *n*Autonomy scores after the manipulation compared with their baseline scores. In contrast, participants who were not interrupted while writing personal stories had lower *n*Autonomy scores compared with the baseline measurement. In sum, I developed a picture set that has causal validity to assess *n*Autonomy.

Chapters 5 and 6 focused on further validating *n*Autonomy as an implicit motive. Implicit motives orient, select, and energize behavior (McClelland, 1980). Therefore, in Chapter 5, I conducted experiments that tested the effects of *n*Autonomy on performance in a word recognition task (Study 8) and an incidental memory task (Study 9). Finally, I present a

study in Chapter 6 that investigated the effects of *n*Autonomy on creativity in adolescents (Study 10).

The findings in Chapter 5 revealed that *n*Autonomy affects perceptual readiness for autonomy-related stimuli. Participants with high *n*Autonomy scores reacted faster to autonomy-related words that appeared letter by letter than participants with low *n*Autonomy scores (Study 8). Furthermore, in a subsequent categorization task, participants with high *n*Autonomy categorized more words as being autonomy-related than participants with low *n*Autonomy. I found no effects of *n*Autonomy on performance in an incidental learning task (Study 9). However, as in Study 8, participants with high *n*Autonomy were more likely to categorize predetermined autonomy-related words as being autonomy-related compared with participants with low *n*Autonomy. This effect was marginally significant for all word stimuli in the study. In sum, Studies 8 and 9 provide preliminary evidence for the orienting effects of *n*Autonomy.

Finally, in Chapter 6 I investigated whether *n*Autonomy energizes creativity in adolescents. In a multi-method multi-informant study (Study 10), adolescents with high *n*Autonomy scores also had higher scores on a creative production task. Furthermore, *n*Autonomy positively predicted teacher ratings regarding participants' innovative behavior. This effect remained stable when I controlled for *n*Achievement and was not observed for explicit autonomy dispositions. I conclude that *n*Autonomy is an energizing force for creative production and innovative behavior.

Implications

The findings in this dissertation have implications for *n*Autonomy as well as the OMT. In the following I will first discuss the significance of the results for *n*Autonomy. Specifically, I address the conceptualization of autonomy as an implicit motive and how its measured. Then, I will outline how my findings also support the OMT as a valid and indispensable instrument to measure implicit motives.

Before I began this dissertation, there was already a small body of research that had begun to examine autonomy as an implicit motive. Firstly, Alsleben and Kuhl (2011) created a scoring guide for an autonomy motive that could be assessed using the OMT. Secondly, in a seminal study, Schüler and colleagues (2016) then confirmed that the matching hypothesis also exists for autonomy. The matching hypothesis states that the positive effects of need satisfaction of the basic needs postulated by self-determination theory (Deci & Ryan, 2000) depend on its fit with a corresponding implicit motive (Schüler, Baumann, Chasiotis, Bender, & Baum, 2019, p.4). Specifically, implicit motives amplify the positive affects that accompany motive-corresponding

incentives. This effect has been observed for the affiliation and achievement motives (Hofer & Busch, 2011; Schüler & Brandstätter, 2013; Schüler et al., 2010; Schüler, Wegner & Knechtle, 2014). By showing that participants with high autonomy dispositions (assessed with the OMT) reported higher flow experiences in autonomy-supportive settings than participants with low autonomy dispositions, Schüler and colleagues confirmed the matching hypothesis for autonomy. Further studies replicated these findings (Sieber, Schüler, & Wenger, 2016; Sieber, Wegner & Schüler, 2016). In doing so, they provided strong evidence for an implicit autonomy motive.

The findings in this dissertation then adopted two different approaches to help build upon this finding and solidify the conceptualization of autonomy as an implicit motive. First, I showed that autonomy-relevant themes and an autonomy-frustrating paradigm aroused *n*Autonomy. Motive arousal or empirical differentiation (McClelland et al., 1953) is central to the concept of implicit motives. In order to validate the underlying assumptions of the TAT, McClelland and Atkinson (1948) argued it was necessary to first arouse the motivational or need state and examine the effects of this arousal on perception and projection. This established a precedence for all motive measurement; an instrument claiming to measure implicit motives must first demonstrate that it can distinguish between aroused and non-aroused/neutral motivational states (McClelland, 1980). My empirical arousal of autonomy, which was based on methodologies that aroused the other basic motives, provided important evidence supporting autonomy as an implicit motive; it can be implicitly aroused in the same manner as other motives.

In a second step to solidify the conceptualization of autonomy as an implicit motive, I provide preliminary evidence for *n*Autonomy's orienting and energizing effects. The effects I observed on perceptual readiness for autonomy-related stimuli and the relationship between *n*Autonomy and creative production fulfil two of the three functions of implicit motives. As stated above, implicit motives orient, select, and energize behavior (McClelland, 1980). Taken together, my findings built upon the confirmation of the matching hypothesis for *n*Autonomy and fulfilled three major criteria for implicit motives: empirical differentiation, orienting effects, and energizing effects. Therefore, in addition to the matching hypothesis, there is evidence that autonomy functions as the other motives and is sensitive to arousal. Altogether, this provides a solid body of research that demonstrates that autonomy is also an implicit motive.

The findings of this dissertation also have implications for the measurement of *n*Autonomy. Specifically, I provide five empirically selected pictures that had medium arousal strengths across *n*Autonomy's enactment strategies. Runge et al. (2016) recommended that the OMT

should include more pictures that capture all motives to increase its reliability; however, they countered that pictures that assess a specific motive may do so particularly well. My choice of pictures addresses these concerns; I chose pictures that specifically arouse the intended motive while also showing potential to capture at least two of the other motives.

I also obtained meaningful results using just the five pictures created to assess *n*Autonomy. An advantage of the OMT over the PSE/TAT is its economical scoring procedure; participants do not write elaborate stories, but just write brief answers in response to the pictures. This allows for quick scoring. However, a 20-item OMT could be tiring for participants, as it asks participants to think of 20 different stories for each picture. Although I found that participants provided meaningful and serious answers for the 20-item OMT, it may be more practical, depending on setting and research question, for participants to complete answers to five pictures instead of 20. In Studies 6, 7a, 7b, and 8 I demonstrated that I can detect aroused states of *n*Autonomy using only the newly developed *n*Autonomy pictures and replicated the correlation between *n*Autonomy and participants' increased likelihood to categorize autonomy-related stimuli as being autonomy-related. Taken together, these findings provide preliminary support for the use of five pictures to assess a specific motive.

The implications of this dissertation generalize to the OMT. Until I conducted this research, there was one published study that demonstrated the OMT's sensitivity to motive arousal (Scheffer et al., 2007). I filled this gap in research for the affiliation and the power motives and based our studies on established methods. The results of these studies confirmed the OMT's causal validity. This adds to the now substantial body of research that support the reliability (Runge et al., 2016) and validity of the OMT (see Baumann et al., 2010), and ability to make meaningful predictions in a variety of contexts and cultures (c.f. Baumann, Chatterjee, & Hank, 2016; Chasiotis & Hofer, 2018; Groepel, Schoene, & Wenger, 2015; Gröpel, Wegner, & Schüler, 2016; Kazén & Kuhl, 2011; Schüler et al., 2016; Wagner, Baumann, & Hank, 2016; Wegner, Bohnacker, Mempel, Teubel, & Schüler, 2014; Wegner, Schüler, Schulz Scheuermann, Machado, & Budde, 2015).

Together, all these findings provide a foundation for the abundance of studies that have used the OMT. As I discussed in previous chapters, the OMT measures the preconceptual and self-regulatory levels of motives (Baumann et al., 2010). In more simple terms, the OMT provides information regarding what need is relevant for a person (implicit motive) and how (enactment strategy) this person is striving to satisfy their needs. This provides practitioners valuable information about individuals' motivational constellations and how they interpret motive-relevant information, how they implicitly regulate emotions regarding this information,

and how they may respond to it (Bauman et al., 2010). By showing that the OMT is causally valid and adding empirically selected motive-specific pictures for autonomy, this dissertation supports using the OMT for clinical and research contexts.

Directions for Future Research

The research conducted in this dissertation closed several gaps in research on the OMT and the implicit autonomy motive. However, the findings also expose areas that still need to be examined and inspire new challenges for future research. In the following, I will outline several areas that still need to be addressed by researchers regarding *n*Autonomy and potential areas of interest that could provide further insights into *n*Autonomy. Additionally, I will address future studies that could further solidify the empirical basis of the OMT.

As stated above, the findings in this dissertation provide preliminary evidence for the orienting and energizing functions of *n*Autonomy. The third function of motives, the selecting function, still needs to be addressed in future research. This could be conducted using techniques such as a diary study that examines individuals' free-time activity. As self-definition is one of *n*Autonomy's defining characteristics and I satisfied *n*Autonomy by having participants write about their hobbies, a possible hypothesis is that individuals with high *n*Autonomy spend more time engaged in self-defining activities. Furthermore, I found that adolescents with high *n*Autonomy had higher scores on a creative production task and that their teachers gave them higher creativity ratings than adolescents with lower *n*Autonomy scores. A further hypothesis would be to examine whether *n*Autonomy correlates with creative/innovative careers.

A further gap in research on *n*Autonomy concerns a hormonal correlate of this motive. Motivational systems are rooted in biological processes. In an overview on the hormonal correlates of implicit motives, Schultheiss (2013) outlines the following associations between implicit motives and hormones. The implicit power motive is associated with testosterone and estradiol. Furthermore, aroused states of *n*Affiliation are associated with increases in progesterone. Finally, there is some evidence linking vasopressin and *n*Achievement. Sieber and colleagues (2016) demonstrated that individuals with high *n*Autonomy have higher stress reactions to autonomy-controlling situations, which provides preliminary evidence for the biological roots of *n*Autonomy. Further research should examine if there is a specific hormone related to *n*Autonomy.

Another phenomenon observed frequently in implicit motive research is the motive congruence effect. Congruence between implicit and explicit motives is associated with daily experiences of well-being (Brunstein, Schultheiss & Grässmann, 1998), whereas motive

incongruence is associated with lower levels of well-being and psychosomatic symptoms (Baumann, Kazen & Kuhl, 2005). Corresponding motive-related behaviors and context affect the extent of these negative and positive effects (Schüler, Job, Fröhlich, & Brandstätter, 2008; Kuhl & Kazen, 2011). Future research should first develop a reliable explicit measure for the explicit autonomy motive. Then, in a second step, researchers should investigate general effects of motive congruence/incongruence on well-being. Finally, contexts such as age or social situations where autonomy is important such as adolescence or perhaps nursing home contexts should be taken into consideration for their influence on motive congruence effects.

Future research on the OMT should also provide evidence for the causal validity of the OMT's achievement motive scoring guide. A possible arousal technique could be to replicate the paradigm used in the initial study on *n*Achievement (McClelland et al., 1948). Participants in the arousal condition thought they were completing an IQ test that was directly related to their careers and received false norms to which they compared their performance. A further possibility could be to have participants view achievement-related sequences like professional athletes achieving their goals or by using autobiographical techniques (Woike, 1994).

Finally, I demonstrated the causal validity of *n*Affiliation, *n*Power, and *n*Autonomy using the respective five pictures for their measurement. Future research could examine the validity and reliability of using just the five pictures for each motive to assess that particular motive. The conventional scoring procedure for the OMT is not stochastically independent for each motive. A possible solution for this would be to just use the five pictures for each motive to create the score for that motive. Furthermore, as stated above, it would provide an economical assessment of a specific motive. This avenue of research would add to the diverse ways that the OMT assesses implicit motives.

Concluding remarks

Autonomy is more than just a need fulfilled by a social context. Regarding autonomy as an implicit motive has wide-ranging implications for which there is a small, but compelling, body of empirical evidence. All signs point to autonomy's place next to affiliation, achievement, and power as an implicit motive. This dissertation has followed this line of research and solidified the foundation of the OMT and how it measures *n*Autonomy. Furthermore, this dissertation demonstrates that *n*Autonomy fulfills the criteria for two of the main functions of implicit motives. Taken together, the findings of this dissertation provide further support for autonomy as an implicit motive and a foundation for intriguing future studies.

8 References

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