Empirical Paper

Motive-Specific Affective Contingencies and Their Relevance for Personality and Motivated Behavior

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Abstract

Individuals differ in the tendency to derive pleasure out of motive-specific incentives, such as being socially included or attaining power. Multiple theoretical approaches have proposed that such motive-specific positive affective contingencies (PACs) are central building blocks of motive dispositions and personality more broadly. In the current research, we put this claim to test and investigated individual differences with regard to motive-specific PACs in the affiliation and power domains. We measured PACs via spontaneous emotional reactions to motive-specific cues, as assessed by affect ratings and electromyographic (EMG) recordings of smile responses. Both of these PAC operationalizations were highly internally consistent and moderately to highly stable across time. Furthermore, motive-specific PACs were linked in a manner consistent with theory to measures of motive dispositions and to personality traits with motivational underpinnings (i.e., extraversion, agreeableness, and narcissism). Finally, in the affiliation domain, motive-specific PACs were linked to objectively assessed, key motivational outcomes (i.e., attentional orientation, behavior in daily life, and in the laboratory). Taken together, the findings underscore the relevance of affective contingencies for the understanding of personality and motivated behavior.

Keywords

Since the early days of individual differences research and until today, prominent personality theories have placed motive dispositions at the heart of personality (Dweck, 2017; Kuhl, 2000; McClelland, 1987; Murray, 1938; Wood et al., 2015). But why do individuals differ with regard to their motives? Theoretical approaches from different research traditions, namely, implicit motive theory (McClelland et al., 1989; Schultheiss, 2008; Schultheiss & Köllner, 2021), neurobehavioral approaches to motivation (Depue, & Morrone-Strupinsky, 2005), and relational approaches (Don et al., 2020) posit that individuals differ in their motives because they vary in the degree to which they derive pleasure from corresponding motive-specific incentives. For example, a person with a strong affiliation motive is thought to derive more pleasure out of affiliative interactions than a person with a weaker affiliation motive. Likewise, a person with a strong power motive is thought to derive more pleasure out of experiences of influence and control than a person with a weaker power motive. We term the tendency to derive pleasure out of motive-specific incentives as motive-specific positive affective contingencies (PACs).

Here, we present the results of the most comprehensive investigation of motive-specific PACs to date. The research considered PACs in two major social motive domains, affiliation and power, and addressed the following three questions: Can motive-specific PACs be reliability

assessed? How do motive-specific PACs relate to measures of motive dispositions and of personality more broadly? And finally, do motive-specific PACs predict motive-relevant outcomes?

The Assessment of Motive-Specific PACs

Early learning experiences are thought to play an important role in the development of motive-specific PACs. According to McClelland's theory (McClelland, 1987; see also McClelland & Pilon, 1983), across development, and particularly in early childhood, individuals experience differences in how much their motive-specific incentive-seeking behavior is socially rewarded across situations and contexts. Out of these experiences, an affectively toned

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associative network of motive-specific situational cues and instrumental behaviors is assumed to develop, which then determines the strength of the respective motive. Due to the theorized importance of learning experiences in early childhood and the associative "stimulus-response" character of motive-specific PACs, assessing them via self-report questionnaires, which require deliberative self-reflective processes, is not ideal. A better approach would be to present positive-motive specific cues and to assess the immediate affective response.

Dufner et al. (2015) took such an approach and assessed affiliation-specific PACs by measuring facial expressions associated with positive affect in response to positive affiliative stimuli. They presented participants with picture cues displaying positive affiliative scenes and recorded their facial EMG responses indicative of (subtle) smiling. The EMG scores (hereafter referred to as PAC$_{EMG}$) were internally consistent, correlated with affiliation self-reports and (marginally) with Picture Story Exercise (PSE; for details see Pang & Schultheiss, 2005) scores and predicted affiliative outcomes, such as video-observed socializing behavior. In a follow-up investigation (Dufner et al., 2018), affective contingencies specific to three major motives (affiliation, power, and achievement) were not only assessed via EMG responses but also via affect ratings. That is, participants rated their affective experience during the presentation of motive-relevant picture cues (hereafter referred to as PAC$_{Rat}$). It was found that both operationalizations (PAC$_{EMG}$ and PAC$_{Rat}$) predicted motive-specific online social network (Facebook) content in all three motive domains. A second follow-up study (Bassler et al., 2022) used the same operationalizations to predict motive observer-reports by unacquainted observers. Both PAC$_{EMG}$ and PAC$_{Rat}$ measures predicted observer reports in two out of three motive domains (affiliation and achievement). In all aforementioned studies, the PAC measures predicted motive-specific outcomes above and beyond motive self-reports, which indicates that they captured motive-relevant constructs that were not part of individuals' explicit self-concepts.

Despite the promising initial evidence, the PAC measures in these studies had several methodological limitations. First, the PAC$_{EMG}$ power scale of Dufner et al. (2015, 2018) was internally inconsistent ($\alpha = 0.33$; Hess et al., 2017). Second, the PAC$_{EMG}$ measures showed unclear test–retest reliability. Test–retest reliability was low-to medium, but it was possibly undermined by the relatively long, 16-month time interval between measurements (Hess et al., 2017). Third, some PAC$_{EMG}$ scales were substantially correlated across content domains, questioning the discriminant validity of the measures. Creating measures that address these limitations is necessary for future research on motive-specific PACs.

Motive-Specific PACs and their Relations to Motive Dispositions and Personality

In past research, correlations between PAC measures and established motive measures (i.e., self-reports and PSE scores) were more consistent for the affiliation domain than

for the other domains (Dufner et al., 2018). This could, however, be a direct consequence of the reliability issues described above; it is entirely unclear whether a similar pattern would be present with reliable scores in all domains. Furthermore, the correlations between the PAC scales and PSE scores were very weak and often non-significant (Dufner et al., 2015, 2018). Given that PSEs are also thought to capture, at least to some extent, motive-specific PACs (Smith et al., 1992), such small to non-existent overlaps might seem surprising. Yet Dufner et al. (2015, 2018) administered the PSE in an unconventional way, having participants write one story per day for 14 consecutive days. Even though there is some validity evidence for the approach (Hagemeyer et al., 2016), it is unclear how the PAC scales relate to PSE scores assessed via the most common procedure (i.e., with 6 stories being assessed in a row at a single measurement occasion, Pang & Schultheiss, 2005).

It is also largely unclear how motive-specific PACs are linked to personality more broadly. Affect and motivation are important elements of broad personality factors, such as the Big Five (Dweck, 2017; Watson & Clark, 1992; Wood et al., 2015). Attesting to these ideas, the Big Five have been conceptualized as affective-motivational constructs (Denissen & Penke, 2008). For example, extraversion is thought to be characterized by a pronounced tendency to experience positive social interactions (Depue & Collins, 1999; McCrae & Costa, 1987) and power (Buss, 1996; Depue & Collins, 1999) as rewarding. Agreeableness is also thought to be characterized by a tendency to experience positive social interactions, but not power, as rewarding (Hogan, 1996; Hubbard et al., 2016). Thus, extraversion should be positively linked to both affiliation-specific (as in Dufner et al., 2015) and power-specific PACs, and agreeableness should be linked to affiliation-specific but not power-specific PACs. However, a comprehensive analysis of the relations between motive-specific PACs and the Big Five is still pending.

Perspectives of personality traits as underlain by if-then affective contingencies extend beyond the Big Five. Narcissism is a case in point. Individuals high in grandiose narcissism (a form of narcissism characterized by grandiose self-perception paired with approach motivation; Miller et al., 2011) have a strong power motive paired with a relatively weak affiliation motive (Caroll, 1987). According to the Status Pursuit in Narcissism (SPIN) model (Grapsas et al., 2020), individuals high in grandiose narcissism are preoccupied with power, which they experience as highly rewarding. The narcissism sub-dimension considered primarily responsible for the pronounced power-specific PACs is narcissistic admiration (i.e., narcissistic agency). At the same time, the model suggests that individuals high in narcissism are less concerned with interpersonal affiliation because warm affiliative interactions are less rewarding for them. The narcissism sub-dimension responsible for the attenuated affiliation-specific PACs is thought to be narcissistic rivalry (i.e., narcissistic antagonism). The model thus suggests that narcissistic admiration should go along with pronounced power-specific PACs and that narcissistic rivalry should be linked with attenuated affiliation-specific

PACs. In partial support of these assumptions, Grapsas et al. (2022) assessed motive-specific PACs via self-reports and experimental (EMG) assessments and found that narcissistic admiration and rivalry were both positively linked to self-reported power-specific PACs. The evidence based on the PAC_{EMG} assessments did not uniformly support the predictions. Yet again, reliability issues impaired the interpretability of the results.

Importantly, no research has thus far investigated the relations between PACs and the second major form of narcissism, vulnerable narcissism (characterized by a defensive and insecure sense of grandiosity that obscures feelings of inadequacy, incompetence, and negative affect; Miller et al., 2011). On the one hand, it has been argued that a pronounced desire for status is an overarching theme that characterizes both grandiose and vulnerable narcissists (Mahadevan & Jordan, 2021). From this perspective, vulnerable narcissism should be positively linked to power-specific PACs. On the other hand, it has been argued that a core feature of vulnerable narcissism is interpersonal antagonism but not power striving (Krizan & Herlache, 2018). From this view, vulnerable narcissism should be negatively linked to affiliation-specific PACs and not substantially linked to power-specific PACs.

Motive-Specific PACs and the Prediction of Motive-Specific Outcomes

If affiliation- and power-specific PACs indeed influence the extent to which individuals seek motive-specific incentives, they should clearly be related to affiliative and power-related outcomes, respectively. In past research, PACEMG affiliation assessments have been linked to a variety of validation outcomes, such as video-observed socializing behavior, or situation selection in daily life (Dufner et al., 2015). Yet, the evidence based on PACRat assessments or assessments in the power domain is sparser, including only online social network content (Dufner et al., 2018) and motive observer reports at zero acquaintance (Bassler et al., 2022), with mixed results. Accordingly, a more comprehensive investigation of the links between motive-specific PACs and outcomes from the same motive domain is warranted. According to the motive disposition theory (McClelland, 1980, 1987), a valid motive measure should predict individuals' attentional orientation to motive-specific cues and behavior that aims for the attainment of motive-specific incentives. We argue that this should also be the case for a measure that presumably captures the affective contingencies underlying motive dispositions.

The Current Research

In the current research, we focused on PACs in the two major social motive domains, affiliation and power. These domains, respectively, correspond to the overarching goals in social life of *getting along* and *getting ahead* (Hogan, 1982) and the core interpersonal themes of communion and agency (Bakan, 1966). As PAC operationalizations, we considered both PAC_{Rat} and PAC_{EMG}.

Our first goal was to re-visit the reliability of motive-specific PACs. Aiming for high internal consistency, we used considerably more items than past research has. Based on this approach, we also re-investigated the test–retest correlation of the motive-specific PAC scales.

Our second goal was to examine how the two PAC operationalizations are related to established motive measures (self-reports and PSE scores) and to measures of personality more broadly. We expected that reliable PAC operationalizations would be positively related to motive self-reports and PSE scores within the same domain, both for affiliation and power. Concerning the Big Five, we predicted that both affiliation- and power-specific PACs are positively linked to extraversion and that the affiliation scales are also positively linked to agreeableness. Concerning grandiose narcissism, we predicted that narcissistic admiration is positively linked to power-specific PACs, whereas narcissistic rivalry is negatively linked to affiliation-specific PACs. Because for vulnerable narcissism divergent hypotheses can be derived from the literature, we analyzed its relations to motive-specific PACs in an explorative fashion.

Our third goal was to examine whether the PAC scales can predict motive-specific outcomes. We did so by correlating each PAC scale with motive-specific orientation reactions and with indicators of motivated behavior in daily life and in the laboratory. As our goal was not to assess individuals' self-views, but rather their actual behavior (Baumeister et al., 2007), we refrained from assessing these outcomes via self-report.

To measure motive-specific orientation responses, we used eye tracking. When individuals focus their attention on a specific visual cue, they direct their gaze toward it, and this tendency can be assessed via eye tracking (Duchowski, 2017). Thus, individuals with strong motive-specific PACs should have a pronounced tendency to focus their gaze toward motive-specific cues. In support of this possibility, previous research has found a positive link between social closeness (a construct related to the affiliation motive) and gaze fixation on affiliative stimuli (Moore et al., 2014). Furthermore, the implicit power motive has been linked to gaze aversion from angry faces, which are a disincentive for persons with a strong power motive (Janson et al., 2021). We thus hypothesized that motive-specific PACs would be positively linked to the fixation of motive-specific stimuli (relative to motive-unspecific control stimuli), as assessed via eye tracking.

As an indicator of motivated behavior in everyday life, we used daily diary assessments (i.e., repeated questionnaire assessments that are gathered on consecutive days). Daily diary assessments are a way to capture the situations individuals experience in everyday life (Abrahams et al., 2021; Nezlek, 2012), and previous research indeed found that PAC_{EMG} scores predicted individual differences in the average occurrence of positive affiliative situations (Dufner et al., 2015). We thus hypothesized that individual differences in motive-specific PACs would be positively linked to aggregated daily diary assessments of motive-specific situations.

We also observed individuals' social behavior in the laboratory. In the study by Dufner et al. (2015), affiliation

PAC$_{EMG}$ scores predicted socializing and self-disclosure behavior during dyadic interactions. Here, we focused on group interactions and assessed two major dimensions of social behavior, agency and communion, which correspond closely to the content domains of power and affiliation (Leary, 1957; Wiggins, 1979). We hypothesized that affiliation-specific PACs would be positively linked to communal behavior, whereas power-specific PACs would be positively linked to agentic behavior.

Furthermore, we investigated whether the PAC measures are related to motive informant reports. Both well-acquainted peers and even unacquainted observers often tend to make personality judgments with above chance levels of accuracy (Connelly & Ones, 2010). Importantly in the current context, in past research both PAC operationalizations correlated positively with ratings made by well-acquainted peers for affiliation (Dufner et al., 2015, 2018) and with ratings made by unacquainted observers for both affiliation and power (Bassler et al., 2022). We thus hypothesized that motive-specific PACs are positively linked to informant-reports both made by well-acquainted informants and by unacquainted observers.

Finally, we addressed the potential issue of generalized responsiveness to picture cues (including motive non-specific cues). To do so, we also presented participants with control cues showing images of objects that were neutral in valence and unrelated to both affiliation and power (stones, chairs, etc.,) and assessed affect ratings and EMG assessments. To examine whether generalized responsiveness to picture cues inflated the internal consistency estimates for the motive-specific scales, we partialled out the reactivity to the control cues from the reactivity to each of the motive-specific PAC cues and then re-computed the internal consistencies. To examine whether generalized responsiveness to picture cues has produced any artificial correlations with external variables, we examined the correlations between the PAC control scales and the motive-specific PAC scales and the ones between the PAC control scales and external variables of interest. If a control scale was linked to both the motive-specific scale and a given external variable, it qualified as a confounder and needed to be controlled for.

Methods

open science statement

The study was not preregistered. A study codebook containing all questionnaire items and relevant materials is available online (https://osf.io/vwyje?view_only=2ef564e2a1ce4d83adfb69339f27e62d). Due to copyright restrictions, a compilation of the original pictures that have been used for the assessment of PACs cannot be provided. However, a compilation of highly similar pictures can be found here: https://osf.io/u9sre/?view_only=2ef564e2a1ce4d83adfb69339f27e62d. The data and analysis code necessary to reproduce the current results are available online (https://osf.io/ad3gw?view_only=2ef564e2a1ce4d83adfb69339f27e62d). The Supplemental Online Material (SOM) can also be found online (https://osf.io/mfktd/?view_only=2ef564e2a1ce4d83adfb69339f27e62d).

Participants and Design

Data collection took place as part of larger study (Leipzig Context Study; *LeiCo*), approved by the Ethics Commission of the German Psychological Society (DGPs). A detailed description of the study design and a comprehensive list of all measures can be found in the study codebook. Two investigations on different research topics have thus far also analyzed *LeiCo* data (Grosz et al., 2020; Rau et al., 2021). Only the measures that are relevant for the current research question will be described here. Participants were recruited via notice boards (e.g., on the university campus), flyers, and online social networks. Psychology students were not allowed to participate, as they might have been familiar with some of the measures and test materials.

The study included 256 participants (78% female, 21% male, 2% did not specify their gender), aged 18–35 years ($M = 24.6$, $SD = 4.38$). Most participants were university students (79%).

The sample size was determined by the available resources. To gauge the power for the analyses, we averaged the effect sizes testing relations between measures of affective contingencies and motive-specific outcomes from past research (Dufner et al., 2015, 2018; Bassler et al., 2022; see Supplementary Table S1) and found that the average effect size was $r = 0.24$. With a sample size of $N = 256$, the likelihood of detecting such an effect with a two-sided test and an alpha level of 0.05 was >97%.

The study contained five parts. Part I was an online self-report questionnaire, which was completed from home before the laboratory sessions. To prevent fatigue, the questionnaire was divided into two separate parts (the completion of each part took approximately 45 mins).

Part II was an informant-report online questionnaire, which was also completed before the laboratory sessions. To gain informant reports, we requested participants to invite at least three persons ($M = 3.23$, $SD = 1.13$) who knew them well and who would be willing to provide ratings about them as target persons. Informant raters were friends (60%), romantic partners (14%), or siblings (10%), with the remainder classifying as "other" or not providing information about their relationship with the target person (16%). Informant raters were not allowed to participate as target persons in the study themselves.

Parts III and IV were laboratory sessions that took place at the University of Leipzig. Part III was a laboratory session, in which participants were tested individually and which involved PAC$_{Rat}$, PAC$_{EMG}$, and eye tracking assessments. A randomly selected sub-set of participants ($n = 101$, 74% females, 25% males, 1% did not specify gender; $M_{age} = 24.74$, $SD = 4.69$) re-visited the laboratory approximately 15 weeks on average after the initial Part III testing session ($M = 103.20$ days, $SD = 19.96$) and completed the assessments again, so that retest correlations could be examined.

Part IV consisted of laboratory group sessions, in which participants interacted with each other in randomly composed same-sex groups consisting of four to six previously

unacquainted persons (there were 12 groups consisting of 4, 20 groups of 5, and 18 groups of 6 persons). Each participant took part in two laboratory group sessions (Group Session A and Group Session B). Session A involved three tasks in which participants had to compete with each other, and Session B involved tasks that were communal, or cooperative, in nature (a detailed description of the tasks can be found in the study codebook). The two sessions were seven days apart from each other, and their ordering was balanced. Participants, with their consent, were filmed by four unobtrusive video cameras during the group interactions.

Part V consisted of a daily diary assessment period. Participants were requested to complete the same questionnaire in the evening for at least five consecutive days. The questionnaire included standardized assessments of the occurrence of pre-formulated affiliation- and power-relevant situations. These assessments took place between the two laboratory group sessions of Parts III and IV. On average, participants completed their diary entries on 5.18 days ($SD = 0.62$). After participants had completed all study parts, they were thanked and debriefed. Participants received a monetary compensation of 70 Euros.

Measures

Positive Affective Contingencies. The PAC measures (PAC_{Rat} and PAC_{EMG}) were assessed in the individual laboratory sessions (Part III). Participants were shown a total of 76 different pictures (each picture was shown one time; the same pictures were shown during the retest session).[1] Thirty-three of these pictures depicted affiliation-related content, such as, for example, groups of friends or romantic couples. Thirty-one of these pictures depicted power-related content, such as, for example, a person on a stage facing a crowd or status symbols. The remaining 12 pictures, which were used as control pictures in the analyses, displayed neutral content, such as, for example, a chair or a stone. Each picture was preceded by a fixation cross (presented for 1000 ms) and remained on the screen for 4000 ms (afterward, the fixation cross re-appeared, then the next picture was shown, and so on).

PAC_{EMG}. Our approach to recording and processing EMG data was identical to the one taken by Dufner et al. (2015). Because positive affectivity is characterized by high zygomaticus activity paired with low corrugator activity (Cacioppo et al., 1986; Larsen et al., 2003), we recorded the activity of these two muscles. We followed standard procedures (Fridlund and Cacioppo, 1986) to record muscle activity from the left side of the face (technical details in SOM). Due to technical difficulties, some participants had a large amount of missing data. We excluded all cases with less than 60% valid data points, and after doing so, EMG data for 236 participants were still available (applying the same rule for the EMG retest data, 4 participants were excluded). For each muscle, we aggregated muscular activity from 1001 to 4000 ms after stimulus onset (EMG reactions to picture cues usually come with a delay of approximately 1 s; Tassinary et al., 2012). To control for baseline muscular activity, we partialled out activity during fixation cross presentation from

mean activity during picture presentation. From the resulting residual score variables, extreme values across participants ($> M + 3\ SD$ or $< M - 3\ SD$), which were likely caused be artifacts such as head movements and sneezing, were set to missing. To gain general indicators of positive affective responses, we subtracted the baseline-controlled corrugator score from the baseline-controlled zygomaticus scores for each picture and averaged these scores for each picture class (affiliation, power, and control). These scores were used as PAC_{EMG} indicators.

PAC_{Rat}. After a picture had been presented, participants indicated the feelings the image triggered in them across a single-item scale ($1 = very\ negative$ to $5 = very\ positive$). These scores were again averaged for each picture class and served as PAC_{Rat} indicators.

Motive Dispositions and Personality. Measures of motive dispositions (self-reported motives and PSE scores) and personality were assessed in the online questionnaire (Part I).

Self-reported Motive Dispositions. We assessed self-reports for the affiliation, intimacy, and power subscales from the Unified Motive Scales (UMS-10; Schönbrodt & Gerstenberg, 2012). Because affiliation and intimacy can be viewed as facets of an overarching communal motive (Hagemeyer et al., 2016; Winter, 1994) and because the PAC measures did not separate between affiliation and intimacy, we aggregated across the affiliation and intimacy items, as was also done in past research (Dufner et al., 2015, 2018; Hagemeyer et al., 2016).

Picture Story Exercise. We used the six-picture version of the PSE by Schultheiss and Pang (2007). The presented pictures were *Boxer, Bridge, Captain, Laboratory, Nightclub,* and *Trapeze.* After each picture was displayed, participants were requested to write their story (there was no time limit). Two trained coders scored the PSE stories in accordance with Winter's (1994) coding system. We summed the motive codings across stories for each participant and each coder. The inter-coder consistency across the two coders was ICC(3,k) = 0.89 for affiliation and ICC(3,k) = 0.72 for power. The two coders' scores were then averaged to obtain motive raw scores. Mean values for these raw scores are presented in Table 1. On average, participants wrote $M = 735.49$ words ($SD = 426.12$) across all stories. Motive raw scores were positively correlated with the length of the stories (as indicated by the word count; $r = 0.72, p < .01$, for affiliation, and $r = 0.73, p < .01$, for power). To avoid confounding with verbal fluency, we residualized the raw scores for story length in a linear regression and used the corrected motive scores in all further analyses (Pang, 2010).[2]

Big Five. We assessed the Big Five personality factors using the Big Five Inventory 2 (BFI-2, Soto & John, 2017; German version by Danner et al., 2016). The instrument allows an assessment of domain scores as well as three facet scores per domain. Descriptive statistics, reliabilities, and intercorrelations for the Big Five domain and facet scores are presented in Supplementary Table S2.

Table 1. Descriptive statistics, reliabilities, and intercorrelations for PAC measures and measures of motive dispositions.

Variable	M	SD	α	ω	r_{tt}	1.	2.	3.	4.	5.	6.	7.	8.	9.
Affiliation														
1. PAC$_{Rat}$	3.99	0.47	0.92	0.92	0.84**									
2. PAC$_{EMG}$	−0.07	0.61	0.94	0.95	0.51**	0.36**								
3. SELF	4.07	0.65	0.87	0.86		0.30**	0.07							
4. PSE	6.72	4.14	0.47	0.44		0.16**	0.07	0.07						
Power														
5. PAC$_{Rat}$	3.42	0.41	0.86	0.86	0.78**	0.47**	0.06	0.12*	−0.01					
6. PAC$_{EMG}$	−0.08	0.41	0.85	0.86	0.35**	0.16*	0.61**	0.03	−0.03	0.16*				
7. SELF	2.93	0.71	0.91	0.91		0.05	0.11	0.17**	−0.09	0.24**	0.20**			
8. PSE	5.00	3.45	0.59	0.61		−0.07	−0.07	0.03	−0.03	−0.06	−0.03	−0.14*		
Control														
9. PAC$_{Rat}$	3.29	0.30	0.65	0.64	0.72**	0.08	−0.01	−0.06	0.00	−0.20**	0.04	−0.12	0.01	
10. PAC$_{EMG}$	−0.09	0.65	0.80	0.81	0.18	0.14*	0.43**	0.01	0.07	0.01	0.55**	0.07	−0.06	0.18**

Note: α = Cronbach's alpha; ω = McDonald's omega; PAC_{rat} = motive-specific positive affective contingencies, assessed via affect ratings, PAC_{EMG} = motive-specific positive affective contingencies, assessed via EMG; SELF = self-report, PEER = peer-report, PSE = Picture Story Exercise scores, r_{tt} = test–retest correlation, * indicates $p < .05$. ** indicates $p < .01$.

Narcissism. We assessed the major sub-dimensions of grandiose narcissism (i.e., admiration and rivalry) separately with the Narcissistic Admiration and Rivalry Questionnaire (NARQ, Back et al., 2013). Finally, we assessed vulnerable narcissism with the German Version (Morf et al., 2017) of the Hypersensitive Narcissism Scale (HSNS, Hendin & Cheek, 1997). Descriptive statistics, reliabilities, and intercorrelations are reported in Supplementary Table S3.

Motive-Specific Outcomes. Descriptive statistics for all outcomes, their reliabilities, and their intercorrelations are presented in Supplementary Table S4.

Orientation. We used eye tracking as an indicator of attentional orientation during the course of the individual laboratory session (Part III). A remote eye tracker was used to collect the gaze data. The system works via the pupil center corneal reflection method, in which participants' eyes are illuminated with a weak infrared light. This creates corneal reflections whose geometry is used to compute the gaze orientation and fixation time.

Participants were positioned in front of the eye tracking device with a distance of 60–80 cm to the screen. After a calibration phase, the actual assessments started. Each participant saw 25 pairs of pictures, of which one showed motive-relevant content and the other was a neutral control stimulus. As affiliation-specific stimuli, we used pictures showing positive affiliative scenes (e.g., friendships, families, and couples). As power-specific stimuli, we used pictures portraying influence, success, prestige, and dominance. For each motive-specific picture, we simultaneously presented a control stimulus that had no motive-relevance but that was similar in terms of color and brightness. The arrangement of the pictures was randomized (i.e., the motive-specific stimuli were located unsystematically alternating left and right), and the order of the pictures was fixed.

As an indicator of attention, we used the relative fixation time of the motive-specific picture. That is, we first computed the total time a participant fixated on any of the two pictures and then computed the relative proportion of this time that was spent viewing the motive relevant picture.

Six subjects were excluded from further eye-tracking analyses. For one participant, there was an erroneous transfer of data into the analysis program. The other five participants were excluded due to unusually frequent missing gaze data. Presumably, in these cases a de-calibration of the eye tracker had occurred due to excessive head movements because participants wore glasses or contact lenses, and in one case, because a participant wore a glass eye.

Behavior in Everyday Life. We assessed behavior in everyday life via daily diary (Part V). The link for the first daily diary assessment was sent via email one day after the first group session (see Part III). The ensuing daily diary questionnaires were sent automatically one day after completing the previous assessment. We used a list of positive affiliation- and power-related situations that had been developed by Dufner et al. (2015). There were three positive affiliation-related situations (sample item: "I spent time with a person whom I like a lot") and also three positive power-related situations (sample item: "I asserted my opinion against resistance"). Participants indicated each day to what extent the respective situation had occurred (*1 = does not apply at all* to *5 = fully applies*). For each situation, we averaged scores across the five days of the daily diary assessments and across situations.

Behavior in the Laboratory. Raters estimated participants' social behavior during the group interactions (Part IV). They focused on communal behavior, which is instrumental for creating warm, affiliative bonds (Hogan, 1982) and should therefore be predicted by affiliation PACs, and on agentic behavior, which is instrumental for attaining social influence (Anderson & Kilduff, 2009), and should therefore be predicted by power PACs. Each participant's behavior was rated by 8 raters who were all undergraduate psychology students. Half of them rated behavior based on the

observations in Session A, the other half based on the observations in Session B. The raters made their ratings using items from the Interpersonal Adjectives Scales (IAS, Wiggins, 1979; German version by Jacobs & Scholl, 2005), which were created to measure the octants of the Interpersonal Circumplex (Leary, 1957). This approach has already been successfully used in previous research (Dufner et al., 2016) to assess agentic and communal behavior. Agentic behavior was coded via two items from the high-agency octant of the Circumplex (e.g., "assertive") and two reverse-scored items from the low-agency octant (e.g., "shy"). Analogously, communal behavior was coded using two items from the high-communion octant (e.g., "soft-hearted") and two reverse-scored items from the low-communion octant (e.g., "cruel"). The mean interrater agreement across the two sessions was $ICC(3,k) = 0.80$ for agentic behavior and $ICC(3,k) = 0.69$ for communal behavior. Ratings of agentic behavior were positively correlated between the two sessions ($r = 0.56$, $p < .001$) and the same was true for ratings of communal behavior ($r = 0.37$, $p < .001$). As we were interested in predicting participants' typical behavior, we averaged scores for agentic and communal behavior over the two sessions and used these composite scores in all subsequent analyses.

Informant Reports. We gathered motive informant ratings from both well-acquainted others and from persons who were unacquainted with participants. Informant ratings made by well-acquainted informants were assessed using the Unified Motive Scales (UMS-6; Schönbrodt & Gerstenberg, 2012). Informant ratings made by unacquainted informants were assessed in Part IV. The observers who rated participants' behavior also estimated participants' affiliation and power motive scores. They received a description of the two motives (see Supplementary Table S5) and were requested to rate their impression of each participant with regard to the respective motive ("This person has a strong affiliation/power motive"; $1 = do\ not\ agree\ at\ all$, $6 = agree\ completely$). The mean interrater consistency across the two sessions was $ICC(3,k) = 0.59$ for inferred affiliation and $ICC(3,k) = 0.72$ for inferred power. Inferred affiliation scores were positively correlated across the two sessions ($r = 0.45$, $p > .001$) and the same was true for inferred power scores ($r = 0.54$, $p > .001$). We again computed average scores across the two sessions and used these scores for all analyses.

Results

Reliabilities

We first investigated the internal consistencies of the PAC measures. For each measure, we computed Cronbach's α and McDonald's ω (which is based on less strict assumptions concerning item characteristics and typically provides more accurate reliability estimates; McDonald, 1999; Trizano-Hermosilla, and Alvarado, 2016). Scores were high ($\omega \geq 0.86$) for all motive-specific PAC scales (Table 1).

Table 1 also shows the internal consistencies for the self-report scales and PSE assessments. As in previous research, they were high for the former ($\omega \geq 0.86$) and substantially lower for the latter ($\omega \geq 0.44$).

We then examined the test–retest correlations for the PAC measures (Table 1). These correlations were significantly positive for all motive-specific PAC scales. In general, retest correlations were high for all PAC_{Rat} scales and lower for all PAC_{EMG} scales. For the PAC_{EMG} scales, test–retest correlations were in the medium range for affiliation and relatively low for power. Additional analyses showed that the t1 assessment of a given scale correlated descriptively more strongly with the t2 assessment of the same scale than with t2 assessments of any other scales (Supplementary Table S6).

Relations to Measures of Motive Dispositions and Personality

Subsequently, we examined the correlations between the PAC scales and established motive measures (Table 1). The PAC_{Rat} scales correlated positively with motive self-reports in both motive domains, and this was also the case for PAC_{EMG} power scale. Thus, motive-specific affective contingencies showed some overlap with people's motive self-images. Concerning the PSE, PAC_{Rat} correlated positively with scores in the affiliation domain, all other correlations were non-significant. One should also note, however, that there were some quite large correlations between PAC scales from different content domains.

We next examined correlations between the PAC scales and the Big Five (Table 2). As hypothesized, extraversion was positively linked to PAC_{Rat} affiliation and PAC_{Rat} power. Surprisingly, the positive correlation with PAC_{Rat} power was driven by the activity facet of extraversion, and not by the assertiveness facet, which taps more directly into power-related content. Unexpectedly, none of the PAC_{EMG} scales correlated with extraversion. With regard to agreeableness, the pattern of results also partly matched with our hypothesis. As predicted, there were positive correlations with the affiliation scales and no significant correlations with the power scales. However, the PAC_{EMG} scale correlated with only one of the agreeableness facets (i.e., compassion), and not with the total score, which suggests that it was not consistently linked to agreeableness. The motive-specific PACs were also linked to some of the remaining Big Five traits. PAC_{Rat} scales in both motive domains were linked to low neuroticism and high conscientiousness. In addition, there were small and inconsistent correlations between the motive-specific PAC measures and openness. We then investigated the relations between the PAC scales and narcissism. As can be seen in Table 3, the PAC_{Rat} affiliation scale was negatively linked to narcissistic rivalry and vulnerable narcissism. Yet, this pattern was not present for the PAC_{EMG} scores. Furthermore, both PAC power scales were positively correlated with narcissistic admiration.

Relations to Motive-Specific Outcomes

Both affiliation-specific PAC scales were linked to most affiliation-specific outcomes (Table 4). Yet, the affiliation-specific PAC scales were not significantly linked to any of the power-specific outcomes, which indicates that effects were highly domain-specific. The case was different for the

Table 2. Intercorrelations between the PAC scales and the Big Five factor scores and facets.

Traits	PAC_{Rat} affiliation	PAC_{EMG} affiliation	PAC_{RAT} power	PAC_{EMG} Power	PAC_{Rat} control	PAC_{EMG} control
Extraversion	0.24**	0.10	0.17**	0.10	0.03	0.08
Sociability	0.17*	0.13	0.08	0.07	−0.05	0.07
Assertiveness	0.04	0.04	0.11	0.11	0.01	0.03
Energy level	0.39**	0.08	0.23**	0.07	0.11	0.09
Neuroticism	−0.32**	−0.04	−0.23**	−0.02	−0.03	−0.03
Anxiety	−0.24**	−0.01	−0.22**	−0.01	−0.03	−0.03
Depression	−0.35**	−0.02	−0.22**	−0.01	−0.08	−0.03
Emotional volatility	−0.21**	−0.08	−0.14*	−0.03	0.03	−0.03
Agreeableness	0.30**	0.12	0.07	0.05	0.10	0.13*
Compassion	0.36**	0.13*	0.08	0.01	0.09	0.07
Respectfulness	0.13*	0.06	0.08	0.01	0.08	0.12
Trust	0.23**	0.10	0.01	0.08	0.07	0.13*
Conscientiousness	0.27**	0.03	0.18**	−0.03	0.01	−0.02
Organization	0.19**	0.01	0.11	−0.02	−0.01	−0.04
Productiveness	0.28**	0.04	0.19**	−0.01	0.02	0.00
Responsibility	0.23**	0.03	0.17**	−0.04	0.01	0.01
Openness	0.12	0.15*	−0.07	0.11	0.17**	0.12
Aesthetic sensitivity	0.13*	0.10	−0.08	0.04	0.18**	0.11
Intellectual curiosity	0.04	0.09	−0.05	0.09	0.10	0.11
Creative imagination	0.10	0.16*	−0.01	0.15*	0.11	0.06

Note: PAC_{rat} = motive-specific positive affective contingencies, assessed via affect ratings, PAC_{EMG} = motive-specific positive affective contingencies, assessed via EMG. * indicates $p < .05$. ** indicates $p < .01$.

Table 3. Intercorrelations between the PAC scales and measures of narcissism.

PAC measures	Narcissistic admiration	Narcissistic rivalry	Vulnerable narcissism
PAC_{Rat} affiliation	0.01	−0.20**	−0.17**
PAC_{EMG} affiliation	0.10	0.01	−0.04
PAC_{Rat} power	0.13*	−0.05	−0.10
PAC_{EMG} power	0.26**	0.07	0.02
PAC_{EMG} control	0.03	−0.11	−0.04
PAC_{Rat} control	0.13*	−0.06	−0.03

Note: PAC_{rat} = motive-specific positive affective contingencies, assessed via affect ratings, PAC_{EMG} = motive-specific positive affective contingencies, assessed via EMG. * indicates $p < 0.05$. ** indicates $p < 0.01$.

power-specific PAC scales. Only the PAC_{Rat} scale was significantly linked to two of the five outcomes, and effect sizes were small. Furthermore, most outcomes in both domains were predicted by motive self-reports, yet hardly any outcome was predicted by the PSE (Table 4).

We then examined whether the PAC scales contain motive-relevant information that is not contained in motive self-report measures. We thus tested whether motive-specific PAC scales possess incremental validity over and above self-reports. This was indeed the case for most results for the affiliation domain (Table 4, values in parentheses). Out of the 9 significant zero-order correlations, 8 (89%) remained significant when self-reports were controlled. For the power domain, the two significant zero-order correlations that were present for the PAC_{Rat} scale both dropped to non-significance when self-reports were controlled.

The Role of General Reactivity to Picture Cues

The internal consistency was also high for the PAC_{EMG} control scale ($\alpha = 0.80$; $\omega = 0.81$) and somewhat lower for

the PAC_{Rat} control scale ($\alpha = 0.65$; $\omega = 0.65$; Table 1). These results indicate that particularly for the EMG assessments, there were also reliable individual differences in affective reactivity to motive-unspecific stimuli. Furthermore, there was a substantial positive test–retest correlation for the PAC_{Rat} but not for PAC_{EMG} control scale (Table 2).

We considered the possibility that motive-unspecific reactivity might have inflated the internal consistency estimates for the motive-specific scales. To do so, we partialled out the scale score of the respective control scale from each of the motive-specific PAC items and then re-computed the internal consistencies of the motive scales with these residualized scores. The results showed that the internal consistency dropped slightly for the PAC_{EMG} power scale ($\alpha = 0.77$; $\omega = 0.80$) and remained high for all other scales ($\alpha/\omega \geq 0.86$). Thus, the high internal consistencies did not stem from motive-unspecific reactivity to picture cues.

Finally, we considered the possibility that reactivity to motive-unspecific cues might have produced artificial correlations between the motive-specific PAC scales and external variables. Only the PAC_{EMG} control scale, but not

Table 4. Correlations of motive-specific outcomes with PACs, motive self-reports, and PSE scores.

	Affiliation outcomes					Power outcomes				
Variable	Orientation	Behavior in everyday life	Behavior in laboratory	Ratings: close others	Ratings: zero-acquaintance	Orientation	Behavior in everyday life	Behavior in laboratory	Ratings: close others	Ratings: zero-acquaintance
Affiliation										
PAC_{Rat}	0.42** (0.37**)	0.23** (0.12*)	0.27** (0.25**)	0.38** (0.26**)	0.24** (0.20**)	0.07	0.06	0.01	0.11	−0.05
PAC_{EMG}	0.18** (0.16*)	0.07 (0.05)	0.24** (0.23**)	0.15* (0.14*)	0.21** (0.20**)	0.05	0.06	0.01	0.10	−0.09
SELF	0.24**	0.40**	0.09	0.54**	0.16*	0.02	0.20**	0.11*	0.19**	0.04
PSE	0.12	0.05	0.07	0.08	−0.01	0.11	0.01	−0.04	−0.08	−0.03
Power										
PAC_{Rat}	0.12	0.10	−0.04	0.14*	0.00	0.08 (0.07)	0.14* (0.08)	−0.01 (−0.06)	0.17* (0.06)	0.06 (−0.00)
PAC_{EMG}	0.01	0.00	0.11	0.11	0.11	0.09 (0.09)	0.05 (0.00)	0.03 (−0.02)	0.09 (−0.03)	−0.02 (−0.07)
SELF	0.00	0.03	−0.19**	0.03	−0.09	0.05	0.24**	0.22**	0.52**	0.27**
PSE	−0.01	−0.03	−0.08	−0.08	−0.05	0.02	−0.10	−0.04	−0.10	−0.04
Control										
PAC_{Rat}	−0.15*	0.02	0.17**	−0.05	0.11	−0.17*	−0.02	0.13*	−0.04	0.05
PAC_{EMG}	0.05	0.04	0.17**	0.11	0.16*	0.03	0.02	0.10	−0.03	0.03

Note: PAC_{rat} = motive-specific positive affective contingencies, assessed via affect ratings, PAC_{EMG} = motive-specific positive affective contingencies, assessed via EMG. SELF = self-report, PEER = peer-report, PSE = Picture Story Exercise scores. Coefficients in parentheses indicate partial correlations controlling for motive self-reports. * indicates $p < .05$. ** indicates $p < .01$.

the PAC$_{RAT}$ control scale, correlated with the motive-specific PAC scales (Table 1). Thus, only the former qualifies as a potential confounder. Two of the outcome variables were correlated with the PAC$_{EMG}$ control scale, namely, behavior in the laboratory and zero acquaintance ratings in the affiliation domain. When we re-examined the partial correlations between the affiliation-specific PAC$_{EMG}$ scale and these two outcomes while controlling for the PAC$_{EMG}$ control scale, we found that both correlations remained significant ($p < .02$). Thus, one can conclude that none of the effects reported in this research are due to general reactivity to picture cues.

Gender Differences

Given that in past research (Dufner et al., 2015) PAC$_{EMG}$ affiliation scores have been elevated among females (as compared to males), we explored gender differences in the PAC scales. The analyses showed that women scored significantly higher than men on the PAC$_{Rat}$ affiliation scale, $t(245) = 2.81$, $p = .005$, $d = 0.46$, and on the PAC$_{EMG}$ affiliation scale, $t(144.12) = 2.72$, $p = .007$, $d = 0.36$, but not on any of the other scales ($ps \geq .34$). These results thus again indicated that women might have stronger affiliation-specific PACs than men.

Importantly for the current context, gender qualified as a potential confounder with regard to the relations between the affiliation-specific PAC scales and the affiliative outcomes. We thus re-examined these relations, this time controlling for gender. With exception (correlation between the PAC$_{EMG}$ and informant reports provided by close others, $p = .061$) all effects remained significant. Thus, the overall pattern of results was not driven by gender effects.

Discussion

The current multi-method study represents the most comprehensive investigation of motive-specific affective contingencies to date. It captured PACs in two major motive domains via affect ratings and EMG assessments and tested their reliabilities, associations with established motive measures and personality, and predictive validity with regard to motive-specific outcomes.

Reliability

Addressing limitations of prior research, the findings demonstrated that it is possible to assess both affiliation- and power-specific PACs with high measurement precision. In both motive domains and for both PAC operationalizations, internal consistencies were good to excellent. Thus, with an increased number of items in comparison to past research, it was possible to capture power-specific PACs reliably. For the motive-specific PAC$_{Rat}$ scales, also the test–retest correlations were high, which indicates that they indeed captured relatively stable interindividual differences. Test–retest correlations were lower for the PAC$_{EMG}$ scales and especially so for the power-specific scale. The pattern of high internal consistency paired with low-to-medium retest correlations indicates that the EMG measures did not only capture stable individual differences but presumably also contained a fair

amount of state variance. This is not unusual for indirect measures in general (Perugini et al., 2021) and for measures of implicit motives in particular (Denzinger & Brandstätter, 2018; McAdams, 1980; McClelland & Atkinson, 1948). Researchers interested in assessing trait-like, stable motive dispositions might therefore do well to aggregate the EMG assessments across several measurement occasions (as in Dufner et al., 2015; 2018).

Relations to Motive Dispositions and Personality Traits

Concerning motive dispositions, the results showed that, with one exception (the affiliation PAC$_{EMG}$ scale), all PAC scales correlated positively with self-reports in the respective motive domain. The positive correlation between the affiliation-specific PAC$_{Rat}$ scale and self-reported affiliation replicates previous research (Dufner et al., 2018) and is therefore robust. The positive correlations between both power-specific PAC scales and self-reported power go beyond past research and demonstrate for the first time that also power-specific PACs partly correspond to people's motive self-views. More generally, the findings match with the claim that motive dispositions are rooted in affective contingencies (Depue & Morrone-Strupinsky, 2005; Don et al., 2020).

In contrast, only in one out of four cases did a motive-specific PAC scale show a significant positive correlation with the PSE score in the respective motive domain. Thus, the weak, or null, correlations between PAC measures and PSE scores in past research (Dufner et al., 2015, 2018) cannot be explained by the peculiarities of these past studies. How might the low overlap then be explained, given that PACs are considered central for the functioning of implicit motives (Schultheiss & Köllner, 2021)? A first potential explanation is that also in the current study there was a peculiarity associated with the PSE scores, namely, that the correlation between the word count and motive scores was higher than in most previous studies. Therefore, one might argue that caution is warranted in interpreting correlations with these PSE scores. Yet, motives were scored by trained coders who used Winter's (1994) prominent coding manual, and inter-rater consistency was acceptable. In any case, across studies, the current results and the findings by Dufner et al., (2015, 2018) indicate consistently that motive-specific PACs and PSE scores do not substantially overlap. The null correlations might be due to problems of the PSE method itself. After all, PSE measures have been criticized for their low internal consistency (Entwisle, 1972; but see Lang, 2014), recent research indicates that the convergent validity of different projective tests is low (Schüler et al., 2015), and in the current study, PSE scores were basically uncorrelated to motive-specific outcomes. A third potential explanation is that the PSE is valid but captures predominantly other aspects of implicit motives than affective contingencies. In any case, all available findings suggest that the PAC scales and PSE scores do not tap into the same construct and that researchers interested in assessing motive-specific affective reactions would do well to use the PAC scales.

Concerning the Big Five, the findings partly matched with our predictions. Extraversion was positively linked to both affiliation-specific and power-specific PACs, whereas agreeableness was positively linked to affiliation-specific PACs but not to power-specific PACs. These results match with the notion that the Big Five are characterized by specific affective-motivational *if-then* signatures (Denissen & Penke, 2008). However, these effects were only consistently present for the PAC$_{Rat}$ scales. Interestingly, the motive-specific PAC$_{Rat}$ scales were not only linked to extraversion and agreeableness but also to other traits. In particular, affiliation-specific and power-specific PACs were both negatively linked to neuroticism and positively linked to conscientiousness. Because this was not the case for the PAC$_{Rat}$ control scale, it seems unlikely that the correlations are purely due to method artifacts. Potentially, the same motive-specific PACs might underlie several of the Big Five factors, yet this issue should be investigated more comprehensively and with a multi-method assessment of the Big Five in future research.

The current findings also shed light on the motive-specific PACs underlying narcissism. Narcissistic admiration was positively related to power-specific PACs, and this was true for both the PAC$_{Rat}$ scale and the PAC$_{EMG}$ scale. Narcissistic rivalry and vulnerable narcissism were, in contrast, negatively related to affiliation-specific PACs, yet this pattern was only present for the PAC$_{Rat}$ scale. The findings thus indicate that grandiose narcissists' pronounced tendency to seek power and their attenuated need for affiliation, which are well documented in the literature, might indeed go back to characteristic underlying motive-specific PACs (Grapsas et al., 2020, 2022). They also provide a first insight into the affective contingencies of vulnerable narcissism—namely, that vulnerable narcissists are characterized by attenuated affiliation-specific PACs—which could partly explain vulnerable narcissists' tendency toward social isolation (Rogoza et al., 2021).

Relations to Motive-Specific Outcomes

Predicting behavioral outcomes is often considered the litmus test of any novel measure of individual differences. The findings showed that the affiliation-specific PAC scales (and particularly the PAC$_{Rat}$ scale) were consistently related to non-self-report assessments of affiliative reactions and behavior. A potential explanation for why the effects of the PAC$_{EMG}$ were slightly less consistent than in the study by Dufner et al. (2015) might be that in the 2015 study, scores have been aggregated across two measurement occasions and therefore contained less state variance. Regardless of whether or not this explanation holds, both affiliation-specific PAC scales were far more consistently linked to affiliation-specific outcomes than would have been expected by chance. Furthermore, the effects were specific to affiliation-related outcomes and did not generalize to power-related outcomes. In all cases, correlations with the outcome variables were descriptively stronger for the PAC measures than for the PSE. Furthermore, with few exceptions, the correlations of the PAC$_{Rat}$ scale were comparable in size or descriptively even stronger than the ones of affiliation self-reports. Finally, even though many outcomes were also linked to affiliation self-reports, in most cases the relations of the PAC scales and the outcomes persisted once self-reports were controlled for. The pattern of results thus indicates that affiliation-specific PACs can predict affiliation-specific orientation and behavior, and that they do so independently of people's explicit self-views.

Results were less consistent in the power domain. Few outcomes were linked to the power-specific PAC scales, and these effects did not hold once self-reports were controlled for. The fact that power self-reports were positively and significantly linked to all but one outcome renders the possibility unlikely that the power-specific outcomes were badly chosen. Instead, it seems possible that even though the power-specific PAC scales were linked to power self-reports and measures of grandiose narcissism, their validity might still have been somewhat impaired. We can conceive of three possible reasons why this could be the case. First, our selection of stimuli might not have been ideal. Many pictures were taken from the perspective of a powerful person, which was meant to trigger power-related experiences in the viewer. Yet, this assumption was not tested. We cannot rule out the possibility that (some) individuals might not have identified with powerful actors but felt threatened by or simply unaffected. Future studies should use pretested pictures to make sure that they indeed induce feelings of power. In doing so, perhaps showing photographs of submissive faces would be a fruitful approach, as submission is considered highly rewarding for persons with a strong power motive (Stanton et al., 2010). Second, it is possible that positive affect and smiling responses do not accurately capture power-specific PACs. Measuring more power-specific emotional reactions, such as the experience of pride (Tracy et al., 2014) or of strength and excitement (Job et al., 2012; McClelland, 1987), might be a better approach for future research. Third, and finally, some authors have argued that the organization of the power motive is fairly complex and contains different facets, such as status, prestige and leadership (Suessenbach et al., 2019), or even the tendency to provide unsolicited help (Winter, 1994). Thus, perhaps a differentiated assessment could have provided more nuanced results.

Are the effects indeed due to PACs in the respective motive domain, rather than to more general emotional reactivity? The PAC control scales did not show substantial correlations with any of the outcomes, which rules out the alternative explanation that effects might have been due to a general tendency to respond with positive affect to picture cues. Furthermore, in virtually no case did PAC measures of one motive domain predict outcomes in the other domain. This pattern of results rules out the alternative explanation that effects might have been due to a general reactivity to positive motivational cues. Instead, it seems safe to conclude that a tendency to associate *motive-specific cues* with positive affect accounts for the effects.

Concerning the prediction of motive-specific outcomes, a cautionary note is also warranted. Given the fairly large number of correlations that was investigated, we encourage readers to focus more on the overall pattern of results rather than on specific effects (which might in individual cases be false positives). We also encourage readers interested in interpreting individual effects to give more credence to

results that are significant at the 0.01 level (Benjamin et al., 2018).

Broader Implications and Avenues for Future Research

The current findings have implications for psychological assessment. Even though motive-specific PACs overlap with measures of motive dispositions and personality traits, at least in the affiliation domain they assess unique information that is not contained in existing motive measures and that can predict motive-specific outcomes. The PAC scales can thus be of high value for motive researchers. This is especially the case for the PAC$_{Rat}$ scales, which are easy to administer, also in online studies (for alternative, questionnaire-based measures, see Grapsas et al., 2022). In fact, PAC scales might be beneficial for the assessment of any personality construct characterized by a pronounced tendency to respond with positive affect to a specific class of stimuli, such as self-esteem (positive responses to self-related stimuli), sadism (positive responses to cruelty), or attitudes (positive responses to attitude-related objects). Supporting this possibility, a recent relationship study has shown that a partner-related PAC$_{EMG}$ measure (assessing smiling to photographs of one's partner) predicted video-observed behavior during interactions with the partner (Krause & Dufner, 2020). Whereas the major advantage of the PAC$_{Rat}$ approach is that it is highly economic, PAC$_{EMG}$ scales might be especially useful for assessments of attributes that are highly socially (un)desirable and for assessments in populations that cannot easily complete self-report affect scales (such as young children). Future studies could also explore whether the validity of PAC$_{EMG}$ assessments could further be increased by recording additional muscles that are also related to affective experience, such as, for example, the orbicularis oculi (Jänke, 1994).

Motive assessment has sometimes (e.g., Schultheiss & Schultheiss, 2014) been conceptualized from an interactionist perspective (Mischel & Shoda, 1995), according to which people systematically differ with regard to their reactions to specific classes of situational cues. The high internal consistencies of the PAC scales—which are substantially higher than the ones of traditional PSE measures—indicate that irrespective of possible idiosyncrasies in situation-specific reactions, people respond rather consistently to most stimuli from a given motive domain. In this sense, the PAC measures seem to capture context-general tendencies. Nevertheless, future research could sample motive-relevant cues more systematically with regard to social contexts (e.g., by showing affiliation with friends, the partner, and at work). If context-specific subfacets should be identifiable, it seems likely that they prove to be particularly useful for predicting behavior in the respective context.

Another interesting avenue for future research would be to investigate PACs in the context of motive arousal. Studies have repeatedly found that experimentally induced motive arousal led to elevated scores on implicit motive measures (e.g., McAdams, 1980; McClelland & Atkinson, 1948), which suggests that these measures also capture motivational states. Possibly, motive arousal would also lead to elevated scores on the PAC measures. Alternatively, PACs may be relatively stable across situations themselves but moderate how strongly motive-arousing cues elicit higher levels of state motivation. We encourage future research to address the issue empirically.

A point that should be mentioned in this context is method effects. The PAC$_{Rat}$ affiliation scale correlated substantially with the power scale, but both were virtually uncorrelated with the control scale. This pattern of results allows for two interpretations: First, it is possible that the correlation between positive affective contingencies in the affiliation and power domains is indeed fairly large, which could, for example, be explained by a strong general reward sensitivity (Corr, 2004) underlying affective contingencies in both domains. The alternative explanation would be that a common methodological aspect was present in both the affiliation- and the power-related cues but not in the control cues (e.g., persons rather than objects being shown on the photographs). For the PAC$_{EMG}$ scales, there were substantial correlations between all three scales. This pattern indicates that methodological aspects of the EMG measurement such as the placement of the electrodes, thickness of the skin, or facial expressiveness might play a role. Also for some of the outcome measures, there were quite large cross-domain correlations (Supplementary Table S4). These correlations imply that future research using any of the motive-specific PAC measures (or of the outcome measures used in this research) should not assess only one domain but at least two of them in order to rule out the possibility that effects are driven solely by the methods used to assess PAC.

Future studies might also test whether the validity of the PAC scales might differ between genders. Females are more expressive than males in response to some emotion-evoking stimuli (Bradley et al., 2001), which could imply that the PAC$_{EMG}$ scales might be more valid for females. Due to the low number of males, the current study does not have enough statistical power to test moderation effects by gender (but for exploration, see Supplementary Table S7 showing validity correlations separately for males and females). This issue should be tackled by future research.

From a broader perspective, the PAC approach might also lead to a deeper understanding of personality in general. It has been argued that motive dispositions are central for the functioning of personality, and the current results support the idea that motive-specific PACs are basic affective processing units underlying motives. This is central for the understanding of a whole variety of personality constructs including the Big Five or narcissism. Thus, by focusing on shared motive-specific PACs, one might be able to explain commonalities between motives and traits (Dweck, 2017), between different traits and trait facets (Wood et al., 2015), and between constructs from different layers of personality (McAdams & Pals, 2006). Future research on the topic would do well not to rely exclusively on personality self-reports but to also use more indirect, associative measures (see, e.g., Quintus et al., 2021).

In this context, it seems promising not to only focus on *positive* affective contingencies and resulting approach behavior, as we did here, but also on *negative* affective

contingencies, which describe the tendency to respond with negative affect to motive-specific disincentives. For example, a person with strong affiliation-specific negative affective contingencies would have a pronounced tendency to respond with negative affect to social exclusion. Such negative affective contingencies have been linked to the fear component of motive dispositions (Boyatzis, 1973; McClelland et al., 1953) and to avoidance motivation (Gable & Reis, 2001). It seems likely that traits that go along with high levels of inhibition, such as neuroticism or vulnerable narcissism, are linked to strong motive-specific negative affective contingencies.

Looking beyond the field of personality psychology, motive-specific PACs are also characteristic for certain personality disorders and other types of psychopathology. For example, psychopathy is characterized by attenuated reactivity to affiliation (Waller et al., 2021); an important aspect of avoidant personality disorder is pronounced affiliation-specific negative affective contingencies (Weinbrecht et al., 2016); and depression—which is characterized by anhedonia (Feighner, 1972)—should go along with attenuated affiliation-specific PACs in all motive domains. Future research should investigate more systematically what roles motive-specific PACs might play in these and other types of psychopathology. Such research could reveal novel parallels between conditions and would have the potential to further bridge the gap between clinical and personality psychology.

Finally, if motive-specific PACs indeed represent basic units of personality that influence motive dispositions and traits, as we have argued here, they are also likely to play a central role in personality development. It has been argued that when people enter new environments, or change their behavioral reactions to a given environment, they often change in their tendency to experience specific environmental cues as rewarding, which then subsequently leads to changes in self-perceived personality (Wrzus & Roberts, 2017). Thus, periods of personality development might often start with changes in motive-specific PACs, with changes in self-reported motive dispositions and associated personality traits following as a consequence. This possibility could be addressed in longitudinal studies.

Conclusion

The present results suggest that affiliation-specific PACs underpin personality dispositions and behaviors related to positive social interactions and communion, and that power-specific PACs seem to underpin narcissistic admiration. These findings underscore the importance of uncovering the affective building blocks of motivation and provide researchers with methods to do so. We hope that the current research and future work that build upon it will lead to a more integrative understanding of emotion, motivation, and personality.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Open science statement

Study materials, data, and analysis code are provided on the Open Science Framework at https://osf.io/6cykf/?view_only= 40db8e067f8f411da8227feba0ce00db.

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Supplemental Material

Supplemental material for this article is available online.

Notes

1. Due to copyright restrictions, we do not have the permission to provide the original stimuli in this article or an online repository. For illustration, and to provide researchers interested in the assessment of motive-specific PACs with suitable cues, we provide sample pictures that are free to use and that closely resemble the ones used in the present research online: [https://osf.io/u9sre/?view_only=2ef564e2a1ce4d83adfb69339f27e62d]. Researchers who are interested in using the original stimuli can contact the first author.
2. We also explored the correlations between the motive-specific PAC scales and the raw (non-residualized) PSE scores. The pattern of results was virtually identical: associations that had been significant with the residualized scores remained significant and ones that had been non-significant remained non-significant.

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