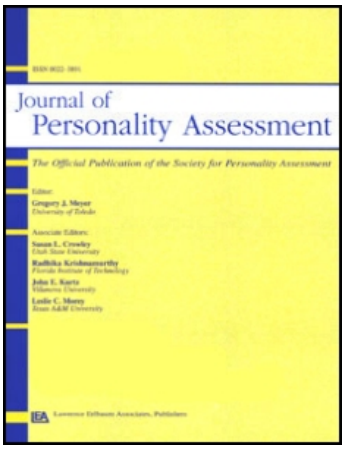

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Are Implicit and Explicit Motive Measures Statistically Independent? A Fair and Balanced Test Using the Picture Story Exercise and a Cue- and Response-Matched Questionnaire Measure

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Previous studies that have examined the relationship between implicit and explicit motive measures have consistently found little variance overlap between both types of measures regardless of thematic content domain (i.e., power, achievement, affiliation). However, this independence may be artifactual because the primary means of measuring implicit motives—content-coding stories people write about picture cues—are incommensurable with the primary means of measuring explicit motives: having individuals fill out self-report scales. To provide a better test of the presumed independence between both types of measures, we measured implicit motives with a Picture Story Exercise (PSE; McClelland, Koestner, & Weinberger, 1989) and explicit motives with a cue- and response-matched questionnaire version of the PSE (PSE–Q) and a traditional measure of explicit motives, the Personality Research Form (PRF; Jackson, 1984) in 190 research participants. Correlations between the PSE and the PSE–Q were small and mostly nonsignificant, whereas the PSE–Q showed significant variance overlap with the PRF within and across thematic domains. We conclude that the independence postulate holds even when more commensurable measures of implicit and explicit motives are used.

Since the beginning of research on implicit motives, the idea that individuals lack direct introspective insight into their fundamental motivational needs has been a basic premise behind this line of inquiry (McClelland, 1984; McClelland, Koestner, & Weinberger, 1989). As a consequence, researchers devised indirect means of assessing motive dispositions such as, initially, the Thematic Apperception Test (Morgan & Murray, 1935) and later with the advent of McClelland and Atkinson's empirically more rigorous approach to motive assessment, the Picture Story Exercise (PSE; McClelland et al., 1989). On the PSE, participants are asked to write imaginative stories in response to pictures showing people in everyday situations. Stories are later coded for motivational imagery using coding systems derived from experimental motive arousal studies.

So far, attempts to substitute the relatively labor-intensive PSE-cum-content-coding approach with questionnaire measures of motivational needs have reinforced the original premise of implicit motive research: Explicit measures of motivation, that is, instruments that rely on individuals' ability to introspect and report on their motivational preferences, have little overlap with PSE measures of needs in the same motivational domain. In a seminal first study comparing the validity of implicit and explicit measures of the need to achieve (*n Achievement*), deCharms, Morrison, Reitman, and McClelland (1955) not only demonstrated that both types of measures shared no significant variance overlap but also predicted different kinds of phenomena, with the implicit achievement motive accounting for differences in participants' performance on an anagram task and the explicit achievement motive predicting participants' tendency to make one's judgments about art similar to those of an expert. Corroborating this early observation in a meta-analysis on the relationship between and correlates of implicit and explicit n Achievement, Spangler (1992) found that across studies, PSE and questionnaire measures of achievement motivation showed a significant but minuscule amount of variance overlap (less than 1%). Moreover, the former measures excelled at predicting spontaneous achievement behavior in the presence of achievement task incentives, whereas the latter were particularly good at predicting controlled forms of achievement behavior in response to explicit social achievement cues. A pervasive lack of variance overlap and differential predictive validity has also been reported for the two other main classes of motivational needs: the need for power (or *n Power;* see, for instance, King, 1995; Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001; Stanton & Schultheiss, 2007) and the needs for affiliation and intimacy (for brevity's sake, labeled *n Affiliation* in the following; see, for instance, Craig, Koestner, & Zuroff, 1994; King, 1995; Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001).

Correlations close to zero between implicit and explicit motives can be due to a host of factors. In recent years, researchers have started searching for moderators of the statistical independence of implicit and explicit motive measures such as self-determination (Thrash & Elliot, 2002), self-monitoring (Thrash,

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Elliot, & Schultheiss, 2007), action orientation (Brunstein, 2001), identity status (Hofer, Busch, Chasiotis, & Kiessling, 2006), and state and trait differences in information processing (Schultheiss, 2008; Schultheiss & Brunstein, 1999). The common assumption behind all these approaches is that at the sample level, statistical independence between motive measures is real. Consequently, the reasons for why some people have a good match between their implicit and explicit motives whereas others do not (this, after all, is implied by correlations close to zero) must lie outside the measurement of motives itself, in other attributes of the person, or the situation in which the match between implicit and explicit motive measures is assessed.

However, what if implicit and explicit motive measures correlate close to zero because the methods that are typically used for their assessment differ so vastly that they are prone to obscure any substantive relationship between individuals' self-declared motivational preferences and the thematic content of spontaneous thoughts as expressed in imaginative stories? What if the PSE and self-report measures of motivational needs have little variance overlap mainly because they are incommensurable? In that case, statistical independence between both types of measures would represent a methodological artifact and not a true disconnect between who people think they are and what the content of their imagination reveals about them.

A closer examination of the PSE measure of implicit motives and popular questionnaire measures of explicit motives reveals two major methodological differences between both types of instruments. First, the coded content of stories written on the PSE depends critically on specific picture cues (Langan-Fox & Grant, 2006; Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001). In contrast, frequently used questionnaire measures of motivational needs, such as Jackson's (1984) Personality Research Form (PRF), use largely decontextualized items that assess how a person behaves in general but not in response to specific situational contexts.

A second difference between implicit and explicit motive measures concerns the way in which motivational responses manifest themselves. For the content coding of PSE stories, researchers have identified specific themes that indicate the presence of an aroused or chronic motivational need. For instance, n Power can manifest itself in a story character engaging in strong, forceful actions but also in trying to gain prestige and visibility or in attempts to control and manipulate others. Thus, for each motive, specific behaviors and responses of story characters are carefully distinguished that can be coded and thus contribute to the overall motive score for a given picture story (see Winter, 1994). In contrast, self-report measures of motivational needs are usually not constructed to map onto the PSE coding categories for a given motive and are therefore prone to emphasize some aspects of a motivational need much more than others. For instance, of the 16 PRF items on the Dominance scale, which is often used to measure n Power at the explicit level, 5 would fit under the n Power coding category "control or regulation" (e.g., "I try to control others rather than permit them to control me"), but not one of them fits the categories "unsolicited help, advice, support" or "elicitation of strong emotions in others," and 4 revolve around being in formal authority positions (e.g., judge, military leader; e.g., "I would like to be a judge"), which is not scored at all in some n Power coding systems (cf. Winter, 1994). Thus, although the PRF dominance scale fits the general thematic ballpark of n Power, it was not designed to capture each thematic content category of a specific n Power coding system equally well and in fact does not cover some themes that are captured by PSE content coding methods and adds others that are not included in content coding systems. Similar arguments apply to other measures of explicit power motivation and, more generally, to other instruments assessing explicit motivational needs.

We therefore argue that what is needed to fairly test the assumption that implicit and explicit needs are statistically independent is a measure of explicit motives that matches the PSE measure both in terms of the specific situational cues in whose context an item can be endorsed and in terms of the specific thematic categories represented by the response items. In this research, we addressed this issue by assessing the motivational needs for power, achievement, and affiliation at the implicit level with a PSE and at the explicit level with a carefully matched PSE Questionnaire (PSE–Q). On the PSE–Q, participants could endorse self-descriptive items that systematically covered all content categories of the content coding system we used for implicit motive assessment (Winter, 1994). This set of items was presented along with each of the pictures that we also used in the PSE, and we asked participants to use the items to describe what they would try to do if they were one of the people in the picture cues. Thus, the PSE–Q closely matched the PSE in terms of cue characteristics and response dimensions and therefore allowed us to explore the degree of variance overlap between commensurate measures of implicit and explicit motives. We also examined the variance overlap of both PSE and PSE–Q with corresponding scales from the PRF, a frequently used traditional measure of explicit motives (e.g., King, 1995; Pang & Schultheiss, 2005).

METHOD

Participants

University of Michigan (Ann Arbor) undergraduate and graduate students participated for course credit or payment of $20 in two studies on the effects of implicit motives on instrumental conditioning. These studies were advertised as studies on "Goal striving and cognition." For a subset of 190 students (116 women, 64 men) across both studies, the PSE–Q was included in the test materials in addition to the PSE and the PRF. The average age of this sample was 21 years (range = 18–34 years). Instrumental conditioning findings from these studies will be published in separate papers and are not further considered here.

Design and Procedure

We collected all data in a single testing session lasting approximately 2 hr. Participants first worked on the PSE and the PRF. Later in the testing session, after several tasks unrelated to the findings reported here, participants completed the PSE–Q.

PSE. Participants worked on an 8-picture PSE following standard instructions for computer administration described in Schultheiss and Pang (2007). The PSE was programmed in Inquisit (Version 2.0; 2005; Millisecond Software, Seattle, WA). We used the following pictures in this study: Women in Laboratory, Ship Captain, Nightclub Scene, Couple by River, Trapeze Artists, Girlfriends in Café With Male Approaching, Bicycle Race, and Boxer. These pictures have been used in previous research on implicit motives, and their cue properties and original

source are described in Schultheiss and Pang (2007). We randomized picture order for each participant. We showed each picture for 10 s, and then we replaced it by a screen with writing instructions. Participants were instructed to type their stories directly into a window on the screen, with the guiding questions appearing above the writing window. After 4 min had elapsed, a text appeared in the lower half of the screen instructing participants to finish the story and move on to the next picture along with instructions to hit "CTRL + Enter" when they were ready to proceed. Protocol length of typed stories was determined through a utility programmed in Matlab (Version 7.0; 2007; MathWorks, Natick, MA). Stories were later coded for motivational imagery by a trained scorer using Winter's (1994) *Manual for Scoring Motive Imagery in Running Text*. Table 1 provides a short description and an example for each of the manual's coding categories for n Power, n Achievement, and n Affiliation. The scorer had previously exceeded 85% interscorer agreement on calibration materials prescored by an expert that are contained in the manual. Scores were assigned to typed PSE stories by entering them directly into the text documents and were then extracted by a utility programmed in Matlab that automatically wrote each participant's motive scores into a data file.

PSE protocol length ($M = 942$, $SD = 265$) was significantly correlated with participants' overall scores for *n*Power ($M = 5.16$, $SD = 3.04$), $r = .45$; *n*Achievement ($M = 5.56$, $SD = 2.83$), $r = .37$; and *n*Affiliation ($M = 6.65$, $SD = 3.15$), $r = .36$; all $ps < .001$. We therefore corrected for the influence of protocol length on motive sum scores by regression and converted the residuals to *z*scores.

PSE–Q. The PSE–Q was programmed in MediaLab (2006; Empirisoft Corporation, New York, NY) and used the same pictures as stimuli that had also been used on the PSE. At the beginning of the PSE–Q, participants were instructed as follows:

> In the next task, you will see 8 pictures. Please imagine for each picture that you would be one of the people in the situation. After watching each picture, you will answer 14 questions about what you would think, feel, want, or try to do if you were one of the people in the situation. You will be asked the same 14 questions for each picture.

Next, pictures were presented one at a time, in random order, and for each picture, 14 items were presented in random order with a True–False (1–0) response scale. In the creation of the items, which are presented in Table 1, we aimed to devise self-descriptive statements that captured the essence of each of the coding categories in Winter's (1994) running text system while keeping the wording general enough to be compatible with each of the pictures. For the categories help (n Power) and nurturant acts (n Affiliation), we generated only one item due to the difficulties associated with capturing in a succinctly phrased item the difference between power-driven helping, which typically entails help offered by a person of higher status to a person of lower status, and affiliation-driven helping, which typically entails help exchanged between two equals within the context of a close relationship. In total, participants responded to 112 items (8 pictures × 14 items) on the PSE–Q.

PRF. Participants completed the PRF scales for dominance (Cronbach's $\alpha = .81$), aggression (Cronbach's $\alpha = .72$), achievement (Cronbach's $\alpha = .68$), and affiliation (Cronbach's $\alpha = .79$). These PRF subscales capture, at the level of self-attributed motivational needs, the same motivational themes as Winter's (1994) system (both the Aggression and the Dominance scale were used to mirror key components of n Power). Each PRF subscale included 16 true–false (1–0)

TABLE 1.—Overview of Winter's (1994) running text system motive imagery coding categories, sample PSE imagery illustrating the application of each category, and PSE–Q items corresponding to each category.

Winter (1994) Coding Category	Sample PSE Imagery	PSE– Q Item
1. Power		
Strong, forceful action	"We can certainly wipe them out"	I would try to make a splash or do something really outrageous.
Control or regulation	"The reporter is trying to get the lowdown on the politician"	I would try to control the other person(s).
Attempts to influence, persuade, convince	"He tried to convince them of the necessity of his actions"	I would try to influence or persuade the other person(s).
Unsolicited help, advice, support	"She is giving advice to the manager"	I would volunteer help, advice, or support for the other person(s).[a]
Impressing others	"He wants to appear urbane and sophisticated"	I would try to impress other people.
Elicitation of strong emotions in others	"After the speech, a wave of enthusiasm swept the crowd"	I would try to startle, crack up with laughter, scare, amaze, etc. the other person.
2. Achievement		
Achievement qualifiers	"She wanted to find a better way"	I would give my best on the task at hand.
Positively evaluated goals or performances	"The surgeon had to work fast, without any mistakes"	I would aim at meeting a challenging goal.
Winning, competing with others	"We have sustained a higher growth rate than other nations"	Even if faced with difficulties on the task at hand, I would try to prevail.
Failure, doing badly	"She was angry that the weather slowed down her race"	I would be dissatisfied if I did not do well on the task.
Unique accomplishment	"She will discover a cure for cancer"	I would try to achieve something extraordinary.
3. Affiliation		
Positive, friendly feelings	"Two college friends are glad to see each other"	I would have warm, friendly feelings toward the other person(s).
Sadness about separation	"He was sad when his friend went away on a vacation"	I would be worried about losing the other person's friendship.
Affiliative, companionate activities	"After dinner, everybody sat around laughing and chatting"	I would share friendly activities with the other person(s).
Friendly, nurturant acts	"She wanted to help her dad with the yard work"	I would volunteer help, advice, or support for the other person(s).[a]

Note. PSE = Picture Story Exercise; PSE–Q = questionnaire version of the PSE. Underlined words represent short labels for each content category.

[a] The same PSE–Q item was used for the assessment of power- and affiliation-related helping.

questions that described habits and preferences consistent or inconsistent with each motive domain. We asked participants to decide how representative each statement was as a self-description. An example of an item measuring dominance is "I feel confident when directing the activities of others"; a typical aggression item is "I often make people angry by teasing them"; a typical achievement item is "I don't mind working while others are having fun"; and a typical affiliation item is "I go out of my way to meet people."

RESULTS

PSE–Q Factor Structure and Scale Reliability

To examine the dimensional structure of the PSE–Q, we averaged each item type across eight pictures and then subjected them to principal components analysis (PCA) and principal axis factoring (PAF) of the actual data and a parallel analysis using 1,000 randomly generated data sets with the same number of cases and variables as our actual data set (see O'Connor, 2000, and Steger, 2006, for discussion of parallel analysis and the virtue of using several factor-analytic approaches to gauge the dimensional structure of a data set). The first five eigenvalues produced by PCA were 4.48, 2.00, 1.79, 0.95, and 0.73. The first five eigenvalues produced by PAF were 4.00, 1.48, 1.33, 0.28, and 0.16. By the eigenvalue >1 and the scree test criteria both methods of factor analysis therefore converge on a 3-factor solution. A comparison of eigenvalues from PCA of the actual data versus the 95th percentile of those derived from PCAs of the randomly generated data sets also indicates that the first 3 factors extracted by PCA represent nonrandom dimensions of the PSE–Q (see Figure 1).

After PCA and varimax rotation of our actual data, most item loadings conformed to the a priori motivational domains (see Table 2). The exception were the power-related item impression, which loaded more strongly on the Achievement than on the Power factor, and the affiliation item separation, which loaded more strongly on the Power factor than on the Affiliation factor. To preserve maximum correspondence to the manner in which motive scores are aggregated across content categories in Winter's (1994) coding system, we decided to include the aberrant items in the motivational scales they were theoretically linked to rather than moving them to the scale they loaded on more highly. For the item that captured both the affiliation category nurturant acts and the power category help, our factor analysis strongly suggested that it was more closely associated with Affiliation than with Power. We therefore included it in the Affiliation scale only. Thus, we computed a PSE–Q Power scale by adding item scores for control, action, emotion, influence, and impression; a PSE–Q Achievement scale by adding item scores for failure, goal, winning, achievement, and accomplishment; and a PSE–Q Affiliation scale by adding item scores for help/nurturant acts, feelings, activities, and separation. Internal consistency was acceptable for research purposes for the Power scale ($\alpha = .64$), satisfactory for the Affiliation scale ($\alpha = .74$), and good for the Achievement scale ($\alpha = .84$). Scale scores could range from 0 to 40 for the scales Power and Achievement and from 0 to 36 for Affiliation. Descriptive statistics for these scales are given in Table 3.

TABLE 2.—Rotated factor loadings of PSE–Q items.

Item	Power	Achievement	Affiliation
Control	**.75**	.13	−.27
Action	**.75**	.06	.11
Emotion	**.67**	−.07	.25
Influence	**.39**	.35	.11
Impression	**.24**	*.58*	−.00
Failure	.03	**.80**	−.05
Goal	.13	**.77**	.14
Winning	.01	**.75**	.31
Achievement	−.11	**.73**	.24
Accomplishment	.38	**.71**	.13
Help/nurturant acts	.10	.17	**.83**
Feelings	.12	.11	**.82**
Activities	.13	.16	**.79**
Separation	*.69*	.17	**.28**

Note. PSE−Q = questionnaire version of the Picture Story Exercise. Items loadings on designated factor are given in bold; aberrant loadings (i.e., highest loading is on another factor than the designated one) are italicized.

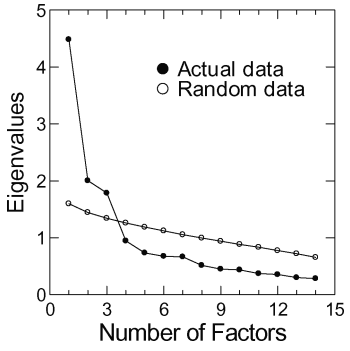

FIGURE 1.—Plot of eigenvalues from principal components analysis of the actual questionnaire version of the Picture Story Exercise data versus the 95th percentile of eigenvalues derived from a parallel principal components analysis of random data.

Correlations at the Sum-Score Level

To examine the relationship between the PSE content-coding measure of implicit motives with the PSE–Q and the PRF measures of explicit motivation, we first explored correlations between overall sum scores from all instruments. As shown in Table 3 and illustrated in Figure 2, although all correlations between the PSE and the PSE–Q were positive for each motivational domain, they were generally low and only significant in the case of power. Because both the PSE and the PSE–Q showed significant within-instrument overlap of scale scores, we also examined whether between-instrument overlap would increase once shared within-instrument scale variance was controlled for. For this purpose, we calculated bipartial correlation coefficients that represent the overlap between a PSE motive score (partialed for the other two PSE motive scores) and a PSE–Q scale score (partialed for the other two PSE–Q scale scores). For the domains of power, achievement, and affiliation, bipartial correlation coefficients were, respectively, .170, .095, and .084, with $p < .05$ for power and ps $> .10$ for achievement and affiliation. Thus, the low between-instrument correlations for the PSE and the PSE–Q could not be attributed to suppressor effects of other scales within a given instrument. To examine whether the overall variance represented by the three PSE motive scores had any significant overlap with the overall variance represented by the three PSE–Q scales, we used set

TABLE 3.—Descriptive statistics and intercorrelations for content-coding (PSE), contextualized-questionnaire (PSE–Q), and traditional-questionnaire (PRF) measures of motivational needs.

Questionnaire	*M*	*SD*	Min	Max	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
PSE														
1. Power	0.00	1.00	−2.26	2.36	—									
2. Achievement	0.00	1.00	−2.17	2.42	.24***	—								
3. Affiliation	0.00	1.00	−2.50	3.56	.19*	.31***	—							
PSE–Q														
4. Power	20.80	6.17	4.00	39.00	.18*	.02	.06	—						
5. Achievement	32.72	5.57	14.00	40.00	.03	.11	.13	.36***	—					
6. Affiliation	19.25	5.05	5.00	32.00	.08	.02	.12	.40***	.38***	—				
PRF														
7. Dominance	9.44	3.79	1.00	16.00	.02	.10	.12	.20**	.07	−.00	—			
8. Aggression	8.17	3.19	1.00	16.00	.06	−.02	.08	.23***	.01	−.03	.29***	—		
9. Achievement	10.50	3.20	1.00	16.00	.02	.08	−.06	.02	.14	.10	.23***	−.03	—	
10. Affiliation	10.11	3.54	1.00	16.00	.01	.11	.21***	.17*	.21***	.08	.31***	.07	.11	—

Note. PSE = Picture Story Exercise; PSE−Q = questionnaire version of the PSE; PRF = Personality Research Form.
*$p < .05$. **$p < .01$. ***$p < .005$.

correlation analysis, the multivariate generalization of multiple regression analysis (Cohen & Cohen, 1983). In set correlation, the overall overlap between two sets of variables, X and Y, can be estimated and tested for significance. Set correlation yields an overall measure of association between the variances of both sets, $R^2_{X,Y}$, which, like r^2, can vary between 0 and 1 and is symmetrical for the direction of the prediction (i.e.., from X to Y or Y to X). In this research, we exploited two of the most basic functions of set correlation, namely, its ability to provide (a) an omnibus significance test of the presence of substantial overlap in the elements of a correlation matrix made up of two sets of variables and (b) a measure of the shared variance between the two sets. When we ran a set correlation analysis with PSE motive scores as set X and PSE–Q scales as set Y, we found that the two sets had no significant variance overlap, $R^2_{X,Y} = .063$; Rao $F(9, 448) = 1.34$, $p > .10$.

Correlations between the PSE and the PRF were low and mostly nonsignificant, too. The only exception was the significant positive correlation between the PSE and the PRF in the domain of affiliation. Within each domain, bipartial correlations for PSE motive scores (partialed for other PSE motive scores) and PRF scales scores (partialed for other PRF scale scores) were low and mostly nonsignificant, too. For Power (PSE) × Dominance (PRF), it was –.031; for Power (PSE) × Aggression (PRF), it was .070; and for the domains of achievement and affiliation, it was .078 and .170, respectively. Of these bipartial correlations, only the last was significant at $p < .05$. A set correlation analysis of the overlap of the overall PRF scale score variance and the overall PSE motive score variance indicated that the two instruments did not share significant variance portions, $R^2_{X,Y} = .082$; Rao $F(12, 476.5) = 1.31$, $p > .10$.

We also examined the overlap between the PSE–Q and the PRF. As shown in Table 3, the PSE–Q Power scale was significantly and positively correlated with the PRF scales Dominance, Aggression, and Affiliation. The PSE–Q Achievement scale correlated positively with the PRF scales Achievement (although the effect was only marginally significant, $p = .06$) and Affiliation. PSE–Q affiliation did not correlate significantly with any PRF scale. Analysis of bipartial correlations between PSE–Q scales (partialed for all other PSE–Q scales) and PRF scales (partialed for all other PRF scales) yielded the following correlation coefficients: PRF Dominance × PSE–Q Power, .122 ($p < .10$); PRF Aggression × PSE–Q Power, .199 ($p < .01$); Achievement, .103 ($p > .10$); and Affiliation, –.012 ($p > .10$). When we ran a set correlation with all PSE–Q variables in set X and all PRF variables in set Y, the variance overlap between the two sets was significant, $R^2_{X,Y} = .150$; Rao $F(12, 476.53) = 2.51$, $p < .005$, suggesting that the correlations we observed between individual scales do not represent chance effects.

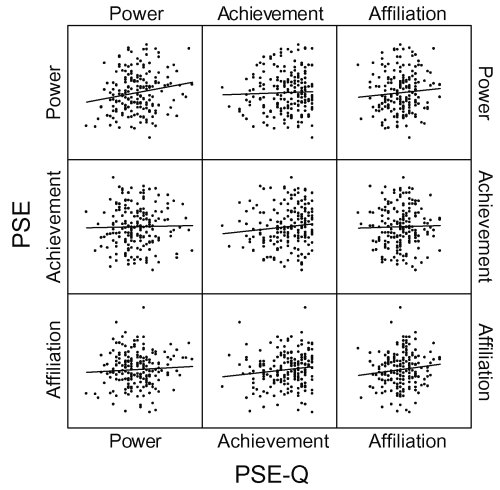

FIGURE 2.—Scatter plot matrix of Picture Story Exercise (PSE) scores (vertical axis) and the questionnaire version of the PSE (PSE–Q) scores (horizontal axis) with regression lines.

Correlations at the Picture Level

Next, we explored whether the generally low within-domain correlations between PSE and PSE–Q at the sum score level masked more substantial correlations at the level of individual picture scores. We therefore created, for each picture separately, PSE–Q scale scores according to the same aggregation rules we had used for the global PSE–Q scores and correlated these scores with individual-picture PSE motive scores (partialed for each picture's word count). Results for within-picture correlations are presented in Table 4. Although all PSE–Q × PSE correlations were positive, only 6 out of 24 were significant: for the domain of power, we obtained significant correlations for the pictures

TABLE 4.—Descriptive statistics, intercorrelations for content-coding (PSE; partialing for PSE word count) and contextualized-questionnaire (PSE–Q) measures of motivational needs, broken down by picture cue, and between-profile correlations for each thematic domain.

	Power					Achievement					Affiliation				
	PSE		PSE–Q			PSE		PSE–Q			PSE		PSE–Q		
Picture Cue	*M*	*SD*	*M*	*SD*	$r_{PSE \times PSE-Q}$	*M*	*SD*	*M*	*SD*	$r_{PSE \times PSE-Q}$	*M*	*SD*	*M*	*SD*	$r_{PSE \times PSE-Q}$
Laboratory	0.77	0.94	2.14	1.20	.05	1.21	0.99	4.67	0.71	.09	0.16	0.48	2.25	1.28	.02
Boxer	0.54	0.83	2.72	1.31	.01	1.36	1.11	4.59	0.80	.13	0.17	0.49	1.31	1.46	.03
Trapeze	0.49	0.73	2.54	1.22	.01	0.84	0.86	4.75	0.63	.11	0.47	0.78	2.90	1.01	.16*
Bridge	0.39	0.68	2.40	1.27	.09	0.06	0.28	3.17	1.69	.06	1.99	1.27	3.40	0.83	.05
Captain	0.67	0.77	2.72	1.28	.17*	0.15	0.43	4.05	1.28	.12	0.26	0.57	2.02	1.39	.16*
Nightclub	0.68	0.81	3.12	1.34	.20**	0.11	0.36	3.44	1.63	.08	1.70	1.10	3.02	1.15	.26***
Cafe	0.79	0.83	2.61	1.33	.10	0.09	0.33	3.33	1.56	.06	1.74	1.14	3.12	1.07	.05
Bicycle race	0.85	0.85	2.54	1.30	.10	1.72	1.08	4.72	0.71	.10	0.16	0.44	1.24	1.29	.19**
Profile correlation$_{PSE \times PSE-Q}$			.00					.87***					.83*		

Note. PSE = Picture Story Exercise; PSE–Q = questionnaire version of the PSE. Pictures on which 50% or more of all participants wrote at least 1 scoreable motive image are underlined.

*$p < .05$. **$p < .01$. *** $p < .005$.

captain and nightclub; for the domain of affiliation, correlations for these pictures were significant, too, and so were the correlations for trapeze artists and bicycle race. None of the within-picture correlations for the achievement domain reached significance. Set correlations for the eight PSE–Q scores (set *X*) and the eight PSE scores (set *Y*, partialed for total word count) indicated that the overall variance in PSE–Q variables had no significant overlap with the overall variance in PSE variables for the domains of power, $R^2_{X,Y} = .339$, Rao $F(64, 1004.33) = 1.17$, $p > .10$; and achievement, $R^2_{X,Y} = .279$, Rao $F(64, 1004.33) = 0.92$, $p > .10$, suggesting that the two significant picture effects we had found for power represent chance effects and that no significant variance overlap exists both for on-diagonal elements (i.e., PSE–Q × PSE correlations for identical picture cues; displayed in Table 4) and off-diagonal elements (i.e., PSE–Q × PSE correlations for nonidentical picture cues; omitted from Table 4). For the affiliation domain, the set correlation between PSE–Q and PSE was significant, $R^2_{X,Y} = .423$; Rao $F(64, 1004.33) = 1.57$, $p < .005$. Examination of the 8 PSE × 8 PSE–Q partial correlation coefficients revealed that 29 out of 64 coefficients had a negative sign, 14 out of 64 were significant at $p < .10$ or better (10 of them represented off-diagonal elements), and 4 of these 14 significant coefficients had a negative sign. These findings indicate that for the affiliation domain, PSE–Q picture scores and PSE picture scores shared significant variance overlap but that this overlap was not only attributable to positive correlations between PSE and PSE–Q picture scores but to some extent also to negative correlations.

In addition to these individual-level analyses, we also examined at the sample level whether the incentive cues inherent in each picture were similar for the PSE and the PSE–Q. For each motive domain, we correlated the eight average PSE picture scores with the eight average PSE–Q picture scores (i.e., the M_{PSE} and the M_{PSE-Q} columns in Table 4). For the domain of power, PSE picture scores had no overlap with PSE–Q picture scores, indicating that picture cues' pull for power imagery was independent of how participants typically interpreted these pictures when responding to PSE–Q items. For the domains of achievement and affiliation, PSE picture score profiles closely resembled PSE–Q picture score profiles. This suggests that at the sample level, the picture cues exerted similar pulls for implicit achievement and affiliation motive imagery and for explicit endorsement of corresponding declarations of motivation, whereas at the individual level, picture cue pull on the PSE and the PSE–Q did not correlate in the domain of achievement and showed slight correlations in the domain of affiliation.

Correlations at the Content-Category Level

Finally, we also examined whether the low within-domain correlations between PSE and PSE–Q at the sum score level masked more substantial correlations at the level of specific content categories (PSE) or items (PSE–Q). We therefore created total scores for each coding category (PSE) or item (PSE–Q)

TABLE 5.—Descriptive statistics and intercorrelations (partialling for PSE word count) for content-coding (PSE) and contextualized-questionnaire (PSE–Q) measures of motivational needs, broken down by content category.

	PSE		PSE–Q		
Measure	*M*	*SD*	*M*	*SD*	$r_{PSE \times PSE-Q}$
Power					
Action	0.97	1.43	3.17	2.33	.10
Control	0.28	0.57	3.04	1.96	.01
Influence	1.38	1.24	4.81	1.83	.16*
Impressing	0.84	1.06	6.27	1.62	.13
Help	0.09	0.31	5.53	1.54[a]	.08
Emotions	1.59	1.53	3.53	1.82	.04
Achievement					
Achievement	1.50	1.32	6.97	1.25	.15*
Goals	2.83	1.78	6.32	1.36	.04
Winning	0.62	0.77	7.02	1.33	.07
Failure	0.03	0.18	6.44	1.60	−.01
Accomplishment	0.59	0.90	5.96	1.67	.07
Affiliation					
Feelings	3.28	2.34	5.16	1.58	.11
Separation	0.09	0.35	3.11	2.01	.11
Activities	3.17	1.92	5.45	1.56	.11
Nurturant acts	0.11	0.35	5.53[a]	1.54[a]	.13

Note. PSE = Picture Story Exercise; PSE–Q = questionnaire version of the PSE.

[a] PSE categories for power − and affiliation − related helping were correlated with same PSE − Q helping scores.

*$p < .05$.

by summing scores across pictures. Within-category correlations are presented in Table 5. Of the 15 correlation coefficients, 14 were positive, but only 2, for the categories influence and achievement, were significant. Set correlations for the PSE–Q item scores (set X) and the PSE coding category scores (set Y, partialed for total word count) as grouped in Table 5 indicated that the overall variance in PSE–Q item scores had no significant overlap with the overall variance in PSE category scores for the domains of power, $R^2_{X,Y} = .194$, Rao $F(36, 780) = 1.09$, $p > .10$; and achievement, $R^2_{X,Y} = .115$, Rao $F(25, 666.50) = 0.90$, $p > .10$, again suggesting that the significant category effect we had found for power represents a chance effect and that no significant variance overlap exists both for on-diagonal elements (i.e., PSE–Q × PSE correlations for same content categories; displayed in Table 5) and off-diagonal elements (i.e., PSE–Q × PSE correlations for different content categories; omitted from Table 5). For the affiliation domain, the set correlation between PSE–Q and PSE was significant, $R^2_{X,Y} = .149$; Rao $F(16, 553.60) = 1.88$, $p < .05$. Of the 4 (PSE) × 4 (PSE–Q) partial correlations, 13 were positive and 4 were significant at $p < .10$ or better (all of them were off-diagonal elements). Thus, from the perspective of specific content categories, PSE and PSE–Q shared some reliable variance, although this effect was not due to within-category overlap.

Discussion

In devising the PSE–Q, we had aimed at constructing a measure of explicit motives that closely matches a widely used PSE measure of the implicit needs for power, achievement, and affiliation in terms of the specific picture cues to which participants responded and in terms of the nature of their responses. This has allowed us to explore the degree of overlap between implicit and explicit motives with an explicit measure that was considerably more commensurate with the PSE than the decontextualized explicit-motive questionnaire used for this purpose in numerous previous studies.

At the level of overall motive scale scores, that is, after aggregating scores across picture cues and response categories or item types, PSE and PSE–Q showed little variance overlap. For the domains of achievement and affiliation, PSE and PSE–Q showed no significant correlations. A significant positive correlation was only observed for n Power, amounting to a variance overlap of 3.2%. However, even this finding should be interpreted with some caution. When we conducted set correlation analysis of all PSE motive scores crossed with all PSE–Q scale scores, which can be considered an omnibus test of variance overlap between the two types of measures (see Cohen & Cohen, 1983), no significant overall relationship between the former and the latter scores could be detected, suggesting that the effect for n Power may have been due to chance. Similarly, a set correlation between PSE motive scores and scale scores on the PRF, a traditional measure of explicit motives, indicated no significant variance overlap between the two types of measures, a result that is consistent with many previous studies that have examined relationships between the PSE and the PRF (e.g., King, 1995; Pang & Schultheiss, 2005; Schultheiss & Brunstein, 2001). In summary, even though the PSE–Q is much more similar to the PSE than traditional self-report measures of motivation, its variance overlap with the PSE generally does not exceed that between traditional measures of explicit motives and the PSE (see also Spangler, 1992, whose meta-analysis on implicit and explicit measures of achievement motivation yielded an average correlation of .09).

In contrast, set correlation analysis for the PSE–Q and the PRF revealed that the two instruments shared a highly significant portion of variance. Correlation analyses at the scale level further indicated that the PSE–Q Power scale was positively correlated with the conceptually related PRF scales Dominance and Aggression but also with the PRF scale Affiliation, perhaps reflecting an underlying extraversion trait captured to various degrees by all of these scales (see Costa & McCrae, 1988, for a mapping of PRF scales onto the Big-Five trait dimensions). Likewise, the PSE–Q Achievement scale correlated, albeit at a marginal significance level, with the PRF Achievement scale and also with the PRF Affiliation scale. Of the three PSE–Q scales, only the Affiliation scale showed no significant overlap with the PRF scales. Perhaps this finding is due to the fact that the PSE–Q Affiliation items emphasize affiliation as a cognitive-affective stance toward others, whereas the PRF Affiliation items describe concrete affiliative actions. Overall, however, it is clear that the PSE–Q was more substantively related to the PRF, a traditional measure of explicit motives, than to the PSE, which it tried to emulate as closely as possible.

When we explored the overlap between PSE and PSE–Q by picture cue or by response category, no significant variance overlap emerged from set correlations for the domains of power and achievement, despite a few scattered significant correlations for specific pictures and content categories. For the affiliation domain, set correlations suggested that if specific picture cues or response categories were taken into account, PSE and PSE–Q had some variance overlap. However, our findings also suggest that this variance overlap must be attributed to a considerable extent to (a) correlations between nonmatching picture cues on the PSE and the PSE–Q (e.g., affiliation imagery in response to one PSE picture correlating with PSE–Q scores on another picture), (b) nonmatching response categories on the PSE and the PSE–Q (e.g., the PSE affiliation category feelings correlating with the PSE–Q affiliation category nurturant acts), and (c) to negative correlations between PSE and PSE–Q picture scores or response category scores. Thus, the significant variance overlap observed in analyses of the affiliation domain is not due to any straightforward correspondence between the PSE and the PSE–Q for specific picture cues or response categories. This conclusion is also corroborated by the previously discussed finding that, after summing PSE and PSQ-Q scores across picture cues and response categories, the two measures of affiliation motivation did not share any significant portion of variance.

We conclude from these findings that the low correlations frequently observed between implicit and explicit motives are not attributable to the incommensurability between PSE-cum-content-coding motive measures and questionnaire measures of self-attributed motivational needs. Rather, statistical independence between both construct types can also be observed when the explicit measure of motivation is made as similar as possible to the method of implicit motive assessment. Thus, even when research participants are shown the very same picture cues they have previously written imaginative stories about and are asked to describe what they would try to do if they were one of the people in the depicted situation, using response items that represent each of the content coding categories applied to the

scoring of the written stories, there is little convergence between the scores obtained with both approaches. It is hard to imagine a procedure more prone to inflate the correlation between implicit and explicit motives (e.g., through memory of what one has previously written on the PSE); yet even under these highly conducive conditions, people's implicit motives appear to stubbornly insist on their independence from what people explicitly believe they are motivated to do.

Thus, the statistical independence between implicit and explicit motives appears to be genuine and to reflect a true dissociation between the types of motivational preferences individuals spontaneously express when writing imaginative stories and what they declare their motivational needs to be when asked directly. Our findings therefore are consistent with McClelland et al.'s (1989) argument that implicit and explicit motives do not correlate because the former are rooted in early, affective, nonverbal learning processes in motivational brain systems humans share with other mammals, whereas the latter reflect the influence of verbally transmitted sociocultural expectations and norms that depend on the human capacity for symbolic language. In a similar vein, Schultheiss (2001, 2007, 2008) has argued that implicit and explicit motives are mediated by different brain systems whose functional independence has been well established in neuropsychology and research on learning and memory; and of course, our findings are also entirely compatible with the observation that implicit and explicit motives respond to different kinds of incentives and affect different kinds of behaviors (see our discussion of this issue in the beginning of this article and McClelland et al., 1989; Schultheiss, 2008).

Limitations and Future Directions

On the PSE–Q, each coding category of the PSE content coding system was represented by only one item, which may not have been sufficient to cover the entire range of thoughts, intentions, and behaviors that that particular coding category encompasses on the PSE. The inclusion of only one item for both power- and affiliation-related helping behavior is a case in point. Thus, one way to extend this line of research would be to increase the number of PSE–Q items covering each original PSE content coding category. However, this approach may require a focus on only one or two of the three major motives due to the increase in test length associated with the extension of the PSE. In this research, the PSE–Q already contained 112 items (14 content category items $\times$ 8 pictures). A mere doubling of the number of items covering each category would bring the PSE–Q to 224 items, and the desired increase in comprehensiveness may then well be offset by a concomitant increase in test-taker fatigue and carelessness.

Another limitation lies in our decision to create PSE–Q response items based on Winter's (1994) integrated coding system. Although this coding system has quickly become very popular among motivation researchers due to its efficiency and comprehensiveness, it was originally designed for content coding of political documents and speeches. Basing the instrument on the original coding systems for n Power, n Achievement, and n Affiliation, Winter greatly simplified the coding rules and retained only specifications for tell-tale imagery (e.g., a person trying to impress others in the case of n Power). In contrast, the original coding systems Winter drew on specify not only the types of imagery that reveal the expression of a motive but also allow to explicitly code for various aspects of the motivational sequence from wish to fulfillment of a need (e.g., anticipation of goal attainment, instrumental action, goal-related affect, blocks on the way to goal attainment, etc.). It may therefore be worth exploring whether our findings can be replicated if implicit motives are assessed using the original coding systems for n Power, n Achievement, and n Affiliation (all contained in Smith, 1992) and a version of the PSE–Q whose items match these systems subcategory by subcategory (see Thrash et al., 2007, for an attempt to do that for n Achievement). Again, however, test length may be an issue and require a focus on only one or two motives.

The unexplored validity of the PSE–Q represents a third limitation of this research. Our main goal in this study has been to compare the PSE to a questionnaire measure that resembles it as closely as possible in terms of picture cues and response categories. For this reason, we could not fall back on existing measures whose validity is well established and instead devised a measure whose validity is presently unknown and needs to be explored in future studies. However, the PSE–Q does show signs of convergent validity with a well-established measure of personality, the PRF, and it therefore appears possible that it also predicts some of the same dependent variables as the PRF. The PSE–Q has even more similarity with the Multi-Motive Grid (MMG) by Sokolowski, Schmalt, Langens, and Puca (2000). Unlike the PSE–Q, the MMG has been developed to capture hope and fear components of the needs for power, achievement, and affiliation and uses picture cues that have been drawn specifically for this test. However, it shares PSE–Q's concept that participants can endorse motive-related statements in response to each picture and sum scores for each motive are derived by adding up the endorsed items. Sokolowski et al. (2000) showed that the MMG validly predicts goal choice, self-reported task enjoyment and motivation, self-descriptive memories, and other declarative measures (Schultheiss, 2008) of motivation, which typically are also predicted by traditional measures of explicit motives (e.g., the PRF) but not by implicit motives (see, for instance, Biernat, 1989; Brunstein & Schmitt, 2004; Spangler, 1992; Woike, 2008; Woike, Mcleod, & Goggin, 2003). Given the parallels between the PSE–Q and the MMG, it therefore appears likely that the PSE–Q, too, is good at predicting declarative motivation measures. This hypothesis awaits empirical validation.

Finally, we believe that a thorough examination of the causes of the statistical independence of implicit and explicit motive measures constitutes a critical next step in motivation research. The low correlations we, and many others before us, have observed between implicit and explicit motives signify that some people hold views of their motivational needs that actually match their implicit motives (high congruence), whereas others' beliefs about their motivational needs are at odds with their implicit motives (low congruence). So what is behind such a cross-sectional snapshot of the level of people's motivational congruence? In the worst case, the person who is highly congruent this time has only low or medium congruence the next time she or he is tested, suggesting that the high congruence observed the first time is the outcome of a random stochastic pairing of variable attributes and does not reflect a stable disposition or any special introspective abilities of the tested individuals. However, given the substantial retest stability of implicit and explicit motive measures (see Jackson, 1984; Schultheiss & Pang, 2007), we consider such a dismal scenario unlikely. To the extent that

implicit and explicit motive measures are stable, the level of congruence between the two should show a modicum of stability, too, but this conjecture still needs empirical corroboration. However, even if stability of (in)congruence between implicit and explicit motives can be demonstrated,[1] the question remains what generates high or low congruence. It is still conceivable that different levels of congruence represent the outcome of a more or less stochastic pairing of stable personality attributes and that high congruence may therefore not necessarily reflect a person's awareness of her or his implicit motives. However, as we pointed out earlier in the article, a growing number of studies have found that the degree of congruence between implicit and explicit motives can itself be predicted through other personality attributes and processes, suggesting that high or low congruence is not merely due to chance.

A systematic inquiry into the causes of the dissociation between implicit and explicit motives appears particularly important because the psychological consequences of motivational incongruence for individuals' adjustment and well-being are substantial. High levels of motivational congruence contribute to people's emotional well-being and life satisfaction, whereas low congruence is a predictor of impaired emotional well-being, depressive affect, and psychosomatic symptoms (e.g., Baumann, Kaschel, & Kuhl, 2005; Brunstein, Schultheiss, & Grässmann, 1998; Hofer & Chasiotis, 2003; Langens, 2007; Schultheiss, Jones, Davis, & Kley, 2008). Or, as McClelland et al. (1989) succinctly stated, "whatever the reasons for discordance between implicit and explicit motives, it can certainly lead to trouble" (p. 700).

In a sense, then, the robust empirical phenomenon of independence between implicit and explicit motives, which is the hard-earned outcome of many studies and some conceptual battles they resulted in over the course of the past 50 years (see McClelland, 1980), brings us back to a fundamental issue that Freud, Rogers, Jung and many other theorists of personality recognized as central for a thorough understanding of human psychological functioning: the distinction between what individuals want unconsciously (implicit motives) and what they believe they want or should strive for (explicit motives), the reasons for and consequences of the dissociation between these two levels of personality, and individuals' ability to bring them into alignment. Research on implicit motives and their relationship to the motivational needs that people explicitly attribute to themselves provides the well-developed concepts and measures to address this issue with empirical rigor.

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[1]There was some evidence for this in this study. The amount of discrepancy or congruence between PSE scores and PSE–Q scores within each motive domain was positively and significantly correlated across motivational domains, suggesting that, for instance, a person with matching PSE–Q and PSE scores in the power domain also tended to have matching scores in the achievement and affiliation domains. Such lawful covariation of congruence between implicit and explicit motives was not observed when PSE and PRF scores were pitted against each other. These findings suggest that although the PSE–Q is not a measure of implicit motives, it may be a sensitive indicator for the extent to which self-attributed motives deviate from implicit needs.

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