



Power stress in primary school children

Carolin Raihala¹ · Greta Hansen²

Published online: 23 August 2018
© Springer Science+Business Media, LLC, part of Springer Nature 2018

Abstract

In this paper, we demonstrate that, in accordance with research on adults, children with high implicit power motive show power stress when their need for influence cannot be satisfied. Participants, ranging between 8 and 11 years of age, had to convince a puppet to drink apple juice after they were made aware of the puppet's dislike for the juice. Half of the children encountered a cooperative puppet; the other half encountered an uncooperative puppet that rejected attempts to get it to try the juice. Results showed participants with a high implicit power motive showed more negative affect when their efforts to convince the puppet to drink the juice failed. Implications for research on power stress in children and further directions are discussed.

Keywords Implicit power motive · Power stress · Children

Power stress has long been researched as an affective correlate of the implicit power motive (*n* Power). The term was coined by David McClelland, describing power stress as a negative reaction caused when a power stressor blocks the anticipated need satisfaction to a power-arousing situation (e.g., being in a leadership position) with individuals high in *n* Power (McClelland 1976)¹.

So far, research on power stress has focused solely on adults. There are no existing studies showing children high in *n* Power exhibit signs of power stress in a similar way. As prolonged exposure to power stress in adult individuals high in *n* Power is associated with negative health consequences (McClelland 1989), it is important to know if children high in *n* Power correspondingly exhibit signs of power stress.

Affective associations between *n* Power and power stress

The *need for Power* is conceptualized as an implicit motive, a mostly unconscious, relatively stable disposition desiring to influence other people (McClelland et al. 1989; Winter 1973) and to avoid being influenced oneself (Schultheiss 2008). Having impact and the expected pleasure derived from that impact is the incentive people high in *n* Power are striving for (McClelland et al. 1989). McClelland (1976), who contributed most of the early research on *n* Power and power stress, assumed the absence of the expected motive satisfaction, for example through defeat, is supposed to lead to stress reactions. McClelland and Jemmot (1980) provided evidence that power-related stress reactions are associated with negative affect. In their study they found individuals high in *n* Power reported significantly more feelings of anger and resentment towards others if they were experiencing concurrent power stressors in their daily lives at the time of the study. Power stressors included events like losing in a contest, academic failure, or trouble at work. Furthermore, extended exposure to power stressors and the respective power stress reactions is associated with impaired health

✉ Carolin Raihala
raihala@uni-trier.de

✉ Greta Hansen
greta.hansen.001@student.uni.lu

¹ Department of Psychology, University of Trier, Universitätsring 15, 54295 Trier, Germany

² Department of Psychology, University of Luxembourg, Luxembourg, Luxembourg

¹ According to Fodor (2010), power stress is defined as both the event blocking the satisfaction (i.e., the stressor) of the need, and the reaction to it (i.e., the actual stress). However, researchers (e.g., Green 1986) have criticized the confounding of stressor and stress. We, therefore, restrict our definition of power stress to the reaction to the thwarted satisfaction of *n* Power.

and well-being (McClelland 1976). Examples of health consequences include high blood pressure and increased susceptibility to respiratory infections due to lowered immune functions (see for an overview McClelland 1989).

Power stress as a consequence to thwarting *n* power

To further examine the conditions under which power stress arouses, (Fodor 1984, 1985; Fodor and Wick 2009; Fodor et al. 2006) induced power stress experimentally. To establish convergent validity (Fodor et al. 2006; Fodor and Wick 2009), Fodor and his colleagues measured power stress through both psychological and physiological measures. At first, psychological power stress was based solely on self-perceived affect (e.g., Fodor and Wick 2009), and later supplemented by affect towards others (Fodor et al. 2012). Physiological arousal was measured through electromyography (EMG) of muscular activity in the forearm and was supposed to add another, more involuntary level of affect (Fodor 1985; but see; Ryff and Singer 2003, for a discussion of possible discrepancies between psychological and physiological measures of affect). Fodor found the inability to manage group conflict resulted in higher levels of self-reported activity and energy (Fodor 1984) as well as higher physiological arousal in male college students in general, but particularly in those high in *n* Power (Fodor 1985). These findings were confirmed by studying the reactions of highly *n* Power motivated individuals who encountered an assertive personality: Fodor et al. (2006) had male individuals imagine being managers and watch a video of a fictitious future employee. In the experimental group, the employee acted much more dominant compared to the more submissive version in the control group. Results from both an affective self-report (e.g., feelings of anger and tension) and EMG data (recordings of eye brow muscles, representative of distress) showed that individuals who had encountered an assertive personality displayed significantly more negative affect. Again, this negative reaction was particularly pronounced for those participants high in *n* Power compared to their low-*n*-Power counterparts. Furthermore, Fodor gave evidence that these results also apply to hypothetical dating partners in another male sample (Fodor et al. 2012) and to persuasion attempts in the form of an improvised speech in front of a less-than-impressed live audience (Fodor and Wick 2009). In the latter case, participants (male and female) reacted with more self-reported anxiety (e.g., feelings of agitation and tension) and more EMG activity (eye-brow muscles) when confronted with signs of rejection by their listeners, like eye-brow lifting and explicit disinterest, especially when they were high in *n* Power.

Present research

So far, research on power stress has been limited to adult samples. Results for children are missing. However, there is evidence children show signs of emotional distress to peer rejection. In a study with 10- to 13-year-old children, Reijntjes et al. (2006) tested children's reactions to their rejection from an online group game. The participants were told that peers had voted them out based on their reported preferences and status information (e.g., hobbies, popularity). This rejection experience was associated with proportional significant decreases in mood for both boys and girls (see Sharrer and Ryan-Wenger 1995, for evidence that girls report higher self-perceived levels of stress than boys). Moreover, results show children experience low feelings of control and little enjoyment when being ignored during an online ball game (Abrams et al. 2011). Yet, these studies did not address the underlying need responsible for children's negative reactions to rejection and social exclusion. There is also no empirical evidence that peer rejection and social exclusion qualify as power stressors. Nevertheless, rejection and social exclusion prevent individuals from status presentation as well as impressing others, and rank high among self-perceived stressful events for primary school-aged children (Bagdi and Pfister 2006; Sharrer and Ryan-Wenger 1995).

Showing off status and impressing others are core elements of *n* Power (Winter 1973), and their thwarting builds the basis for power stress (Fodor 2010; Fodor and Wick 2009). Consequently, there is reason to believe that the rejected attempt to impress others, for example, by a failure to persuade them, is an event (i.e., a power stressor) that causes power stress in children high in *n* Power. Children, in general, perceive the event of losing as aversive (Smith et al. 2011). However, the thwarting of events that trigger *n* Power (i.e., the thwarted attempt to win) should lead to particularly strong stress reactions in individuals with a high implicit power motive. Individuals low in *n* Power do not react with stress in the same way (Schultheiss et al. 2005). Therefore, in the present study, we chose an experimental approach to test the following two hypotheses: First, children show signs of stress after failing at persuading somebody. Second, and most importantly, children high in *n* Power show more stress (i.e., power stress, experienced as self-perceived affect and affect towards others) in this situation than children low in *n* Power (see Fig. 1 for a schematic representation of this hypothesis).

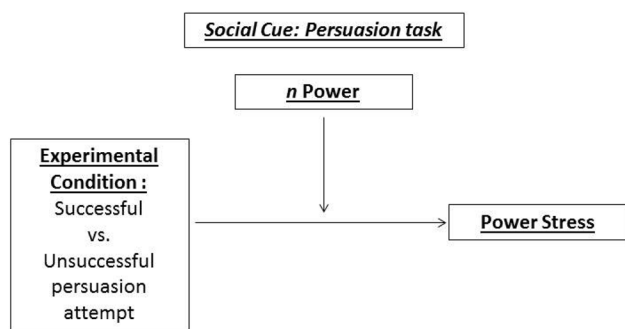


Fig. 1 Schematic diagram of the central hypothesis: children show power stress when failing at persuading someone, but particularly if they are high in *n* Power

Methods

Participants

Due to a lack of reported effect sizes in research on power stress, we used the sample size from Fodor and Wick (2009) paper as a guide when recruiting participants. We singled out Fodor and Wick (2009) study as it was similar in design to our set-up. Their sample size was $N=96$ adults. In total, we recruited 129 primary-school students from Luxembourg.

Students participated in the study's two-step procedure on-site in the schools. In step one, implicit motives were measured during regular class. In step two, children individually performed a persuasion task in a separate school room where they had to convince a puppet to drink a juice they liked (apple juice). We controlled for the 'taste' factor by asking the child to take a sip from a glass of apple juice and to state whether or not that child liked the juice (dichotomous item).

The experiment was conducted in German². Students with difficulties in German, based on teacher judgments, were excluded prior to the data collection. We excluded 21 students based on missing data (i.e., no participation in step one ($N=3$) or step two ($N=16$) due to timetable conflicts) or due to their dislike of the juice ($N=2$). The remaining 108 students were enrolled in grade 3 or 4 in three primary schools in communities outside of Luxembourg city (age range 8–11, $M=9.53$, $SD=0.90$, 59.3% female). The study was approved by the Luxembourgish Ministry of Education.

² Children in Luxembourg are instructed, and alphabetized in German from first grade on (age 6). Most children's first language was Luxembourgish (33.3%), 15.7 % spoke mainly German at home. The remaining children spoke French, Portuguese or other languages. This is, by and large, representative for Luxembourg (Grand-Duché de Luxembourg, Le Portail des Statistiques 2017).

Materials and procedure

Implicit power motive

We used the Picture Story Exercise (PSE, McClelland et al. 1989), currently the most frequently applied instrument to measure *n* Power in adults (Schultheiss and Pang 2007). Thematic apperception methods, on which the PSE is based, have been used before in a few early studies with children to assess motives other than *n* Power (e.g., Veroff 1969, for a study on children's achievement motive). Only recently, there has also been evidence for the usability of the PSE to measure *n* Power in children (Raihala and Kranz 2018).

We adapted the PSE instructions, developed for adults, to children (see Busch and Hofer 2018, for the original version). All adapted instructions can be found in Table 3 in Appendix 1. Two experimenters (one man, one woman) administered the test during a 60-min-group session in a classroom (classroom size: ca. 40–70 m²). Between 12 and 24 children, depending on class size, were tested. The children were seated in rows. The experimenters asked the children to invent fantasy stories for the five pictures they were going to see. The decision to use five pictures was based on recommendations by Schultheiss and Pang (2007). The authors suggest that a sufficient number of pictures allows for the valid assessment of implicit motives and increases variance in motive scores. Furthermore, Raihala and Kranz (2018) have shown the application of a five-picture PSE with children is a valid procedure. The children were further told to look at each picture—poster-sized prints (11.69-by-16.54-inches) held up in the air—for 30 s before the experimenters took it away. Children expressing they did not see the picture properly, were given the opportunity to take a closer look³. Then they had 7 min to write a story into a booklet before the presentation of the next picture. Each of the five pages (one page per story) contained a block of questions in the upper right-hand corner (e.g., *What are the people thinking?*, Smith et al. 1992). The children were instructed to address these questions in their story. The experimenters assisted the children in writing the story—only for the first picture—by announcing each question separately and telling the children to write an answer for it. This was done to familiarize the children with the procedure (see Winterbottom 1958, for a similar approach). We used the following picture cues: (a) two adults holding hands with a child (with a *n* Power cue strength of $M=0.18$, $SD=0.47$), (b) two kids playing with boxes ($M=0.34$, $SD=0.61$), (c) three kids with a ball, talking ($M=0.71$, $SD=0.84$), (d) a

³ Only one case with deviant story content was identified. Assuming the child did not see the pictures, we re-run all analyses without this case which did not change any of the results.

group of kids playing tug-of-war ($M=0.23$, $SD=0.48$), and (e) a boy sitting at his desk ($M=0.12$, $SD=0.38$). These pictures were pretested (Busch and Hofer 2018; Raihala and Kranz 2018) and are provided in the Supplementary Material of Raihala and Kranz (2018). One sufficiently trained coder (i.e., over 85% agreement with master codings, Schultheiss and Pang 2007) coded all stories for power imagery using Winter (1994) *Manual for Scoring Motive Imagery in Running Text* (examples for power images: a child prevents another child from playing, being angry because of being prevented from playing, arguing). A second coder coded 25% of the story material to establish reliability. A two-way random, consistency, average-measures ICC was calculated. The ICC was .79, which attested an excellent agreement (Cicchetti 1994). On average, children produced about 285.29 words (range 97–502, $SD=84.98$)⁴ and 1.58 *n* Power codings (raw scores) across stories ($SD=1.48$). Due to significant correlations between *n* Power raw scores and total word count [$r(108)=.42$, 95% BCa CI (0.24, 0.57), $p<.001$], motive scores were corrected for protocol length by regression. This rendered a sufficiently normal distribution of *n* Power (K-S test: $D(108)=.07$, $p=.18$)⁵, and required no further transformation of *n* Power scores (Schultheiss and Pang 2007).

Power stressor (persuasion task: success vs. failure)

Step two followed after the PSE and took about 15 min per child. We used a standardized script, adapted from Slaughter et al. (2013) and Weiss and Sachs (1991). The set-up of the experiment was modeled after Feldman and White (1980). Children were individually brought to a separate room (a smaller class room, ca. 25 m² in size). We randomly assigned them to one of two persuasion conditions (successful persuasion, coded as – 1, and the failed attempt to persuade, coded as 1; one-factorial between-subjects design)⁶.

⁴ Due to the variety in language backgrounds, we checked if children who spoke German at home wrote longer stories than children who did not. There was no difference between these two groups [$t(105)=-0.34$, 95% BCa CI (- 47.52, 33.94), $p=.74$, $d=.09$]. Also, there was no difference in *n* Power scores between children who spoke German versus children speaking other languages at home [$t(105)=-0.05$, 95% BCa CI (- 0.73, 0.67), $p=.97$, $d=.01$].

⁵ Although the distribution of *n* Power (residualized) was skewed (value: .66, z -score: 2.81, $p<.001$, no significant value for kurtosis: .58, z -score: 1.24, $p>.05$), we based our decision to not transform *n* Power on the K-S test and the graphical representation of the distribution, which is in accordance with statistical practice (Field 2015)

⁶ We checked for the distribution of *n* Power scores in each condition (i.e., success vs. failure) to make sure that there was no bias of *n* Power in either group. According to test statistics (K-S test for success: $D(55)=.08$, $p=.20$, for failure: $D(53)=.12$, $p=.06$) and graphical representation, both distributions were approximately normal

Both of the experimenters were present. Experimenter one (female) sat down with the child at a table to explain the next task and gathered information on demographics. The child was provided with the apple juice sample and rated the liking of the juice. The child was told that the task would be to convince a puppet named Niki to drink that juice. In the meantime, experimenter two (male) left the room and re-entered with a female child-like hand puppet. He sat down at the same table and played the puppet. Experimenter one introduced Niki as a slightly younger child from another school that does not like apple juice. This was confirmed by Niki exclaiming, “Yuck! I don’t like apple juice!” The child had ten attempts to convince Niki to try the juice. Each attempt was commented by Niki and culminated in either Niki trying the juice (successful persuasion) or refusing to drink it (failed attempt to persuade)⁷. Niki’s standardized responses (in German with an English translation) can be found in Table 4 in Appendix 2.

Power stress (affective perception towards the puppet and self-perceived affect)

Immediately after the experiment, we assessed children’s reaction to the persuasion condition in the absence of the puppet. To derive a broader picture of psychological power stress, we combined different approaches (affect towards others, Fodor et al. 2012; self-perceived affect; Fodor and Wick 2009) to measure this construct. This was to examine if power stress has both an outwardly and an inwardly directed negative affect, which could result in different affective experiences (e.g., feeling aggressive towards others or feeling pressured or bad about oneself). We used a 5-point smiley scale, the Smiley Analog Scale (SAS, Pothmann 1988) to rate children’s affective perception of the puppet (question: ‘How did you like Niki?’, verbal endpoints were: 1 = *I did not like her at all*; 5 = *I liked her very much*, $M=4.24$, $SD=0.93$). Smiley scales are frequently used in research with children on various topics (e.g., Chambers et al. 1999; Davies and Brember 1994). To assess children’s self-perceived affect, we used the Self-Assessment Manikin Scale (SAM, Bradley and Lang 1994) (9-point scale, 3 dimensions: *pleasure*, $M=7.33$, $SD=1.65$; *arousal*, $M=4.06$, $SD=2.17$; *dominance*, $M=6.08$, $SD=2.10$).

⁷ We tested the effectiveness of the manipulation, posterior to the experiment, with a different sample ($N=28$, age: $M=8.25$, $SD=0.97$, range 7–11, 57.1% male) by showing them a video of both the success and the failure condition, asking, for each case, if they found the puppet cooperative or not. All 28 children correctly classified the behavior of the puppet in the success condition as cooperative. In the failure condition, 27 out of 28 children correctly identified the puppet as non-cooperative. We, therefore, concluded the manipulation is appropriate to distinguish between cooperative and non-cooperative puppet behavior in 8- to 11-year-old children.

Table 1 Correlations of *n* Power, age, gender, and persuasion condition with outcome scales and their intercorrelations

Variables	1	2	3	4	5	6	7	8
<i>n</i> Power	–							
Age	.06	–						
Gender	.11	–.21*	–					
Condition	–.01	–.10	.10	–				
SAS	–.07	–.01	.36**	–.34**	–			
SAM-pleasure	–.09	–.08	.10	–.23*	.50**	–		
SAM-arousal	.04	.02	–.02	.05	–.04	–.13	–	
SAM-dominance	.21*	–.04	–.11	–.08	.15	.42**	–.23*	–

N = 108, coding of condition: – 1 = success and 1 = failure

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

Verbal endpoints for pleasure were a manikin, described as feeling bad and a manikin, described as feeling good. The endpoints of arousal were introduced as ranging from a calm manikin to an agitatedly excited manikin, while dominance was introduced as ranging from a small, weak-feeling manikin to a tall, strong manikin. Although originally developed for adults, the 9-point SAM scale has been used with children (McManis et al. 2001). These authors had also found that children's affective ratings of the SAM dimensions are comparable to those from adults, showing the application of a fine-grained measure of this kind is valid for this age group. Both the SAS and the three SAM dimensions were presented, unlabeled, in a booklet on separate pages. Power stress would be expressed by lower likings of the puppet (lower SAS ratings), by feeling bad (lower pleasure ratings), agitatedly excited (higher arousal ratings), and weak (lower dominance ratings). Subsequently, the child was thanked for its participation, granted a small gift (a flexible pencil), and brought back to the classroom.

Results

Descriptives

As research on children's implicit motives is scarce, we start with some information on associations between *n* Power and demographics. There were no significant associations of *n* Power with age [$r(108) = .06$, 95% BCa CI (–.14, .24), $p = .55$], or gender [$t(106) = -1.16$, 95% BCa CI (–0.79, 0.21), $p = .25$, $d = .23$]. Bivariate correlations of *n* Power, age, gender, and persuasion condition with the affective outcome measures as well as their intercorrelations are provided in Table 1. The data shows no correlations between *n* Power and persuasion condition indicating the success of the randomization. Persuasion condition correlated significantly and negatively with SAS and SAM pleasure, suggesting that both measures of power stress differed, depending on success versus failure. As for other significant correlations, *n* Power

correlated positively with SAM-dominance. This shows that both concepts share a small amount of variance. Also, SAS and SAM-pleasure were positively correlated, with sharing about one-quarter of variance. Thus, both measures, which were supposed to capture power stress, are not redundant but can be seen as two facets of the power stress construct. Finally, in line with research on both adults and children (McManis et al. 2001), higher ratings on SAM-dominance came along with higher SAM-pleasure ratings, while higher dominance ratings were associated with lower ratings on SAM-arousal.

Data analysis

The effects of the persuasion condition (success vs. failure) on affect towards the puppet (SAS) and self-perceived affect (SAM scales), as signs of power stress, moderated by *n* Power, were tested using simple moderation in Hayes' PROCESS macro for SPSS (Hayes 2013, version 2.16). The condition was effect-coded which did not require any further centering (Richter 2007). Due to its residualization, *n* Power was already centered. Based on the aforementioned inconsistent gender effects in stress-related research with children (Reijntjes et al. 2006; Sharrer and Ryan-Wenger 1995), we included gender (mean-centered) into all initial models as a covariate to account for potentially confounding effects^{8,9}. If gender did not make a meaningful contribution to explain variance ($p < .20$), we excluded gender in the second step in

⁸ As there were no age effects found for children with SAM or SAS (McManis et al. 2001; Pothmann and Goepel 1984), there was no necessity to include age as an additional covariate. However, for the sake of completeness, we also ran all models with gender and age as covariates. Age was above $p = .20$ in all cases. This confirmed our approach of leaving this variable out.

⁹ As there are studies reporting significant gender differences in the way *n* Power is expressed (e.g., Hofer et al. 2010; Winter 1988), we checked for interaction effects of *n* Power and gender on SAS and the three SAM scales. In this sample, none of these interactions was significant.

Table 2 Results of moderation analyses with variables predicting affect towards the puppet and self-perceived affect as signs of power stress

Outcome	SAS b (SE)	95% CI	SAM pleasure b (SE)	95% CI	SAM arousal b (SE)	95% CI	SAM dominance b (SE)	95% CI
Predictors								
Gender	.36*** (.08)	(.20, .52)	–	–	–	–	–.29 (.20)	(–.69, 0.11)
Persuasion condition	–.35*** (.08)	(–.50, –.19)	–.39* (.15)	(–.69, –.09)	.11 (.22)	(–.31, .54)	–.14 (.20)	(–.55, 0.26)
n Power	–.10 (.07)	(–.24, .03)	–.18† (.10)	(–.38, .03)	.06 (.18)	(–.28, .41)	.33† (.18)	(–.02, 0.68)
n Power x persuasion condition	–.14* (.07)	(–.27, –.01)	–.37* (.10)	(–.58, –.17)	–.05 (.18)	(–.40, .30)	–.09 (.18)	(–.46, 0.22)

*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .1$

favor of model parsimony (Sun et al. 1996). Only the final models will be reported.

Power stress: perceived affect towards the puppet

The final model for the prediction of SAS contained persuasion condition and n Power as predictors, and gender as covariate. This model was significant [$F(4,103) = 11.82, p < .001, R^2 = .32$]. As can be seen in Table 2, there were significant effects for both gender and persuasion condition, but not for n Power. The interaction between persuasion condition and n Power explained a significant amount of variance in SAS [$F(1,103) = 4.61, \Delta R^2 = .04, p = .03$]. Simple slopes analyses revealed that for children low in n Power, the relationship between children’s success versus failure at convincing the puppet and their liking of the puppet was, although barely, non-significant [$b = -0.16, 95\% \text{ CI } (-0.37, 0.06), t(103) = -1.45, p = .15$]. However, as the right side of the confidence interval is close to zero, this result needs to be interpreted with care. Children with an average level of n Power [$b = -0.35, 95\% \text{ CI } (-0.50, -0.19), t(103) = -4.45, p < .001$] and children high in n Power [$b = -0.54, 95\% \text{ CI } (-0.79, -0.28), t(103) = -4.17, p < .001$, see Fig. 1) gave the puppet a significantly worse rating when they failed to convince the puppet than when they were successful.

Power stress: self-perceived affect

The final model predicting SAM pleasure from persuasion condition and n Power was significant [$F(3,104) = 6.14, p < .001, R^2 = .15$]. Table 2 reveals that, again, persuasion condition had a significant main effect, while n Power was significant only by trend. The interaction between n Power and persuasion condition accounted for a significant amount of variance in SAM pleasure [$F(1,103) = 4.61, \Delta R^2 = .09, p < .001$]. As Fig. 2 shows, there was again no significant relationship between persuasion condition and SAM-pleasure for children low in n Power [$b = 0.12, 95\%$

CI (– 0.28, 0.51), $t(104) = 0.58, p = .57$]. Children with an average level of n Power [$b = -0.39, 95\% \text{ CI } (-0.69, -0.09), t(104) = -2.55, p = .01$], as well as children high in n Power ($b = -0.88, 95\% \text{ CI } (-1.31, -0.47), t(104) = -4.19, p < .001$] felt significantly worse when they failed to convince the puppet than when they had success. Again, as the right side of the confidence interval for the average level of n Power is close to zero, this result needs to be interpreted with care (Fig. 3).

The final model with n Power and persuasion condition predicting SAM arousal was not significant [$F(3,104) = 0.16, p = .92, R^2 = .01$]. As can be seen in Table 2, all predictors were beyond any meaningful statistical significance.

The final model with n Power and persuasion condition predicting SAM dominance and gender as covariate was significant only by trend [$F(4,103) = 2.39, p = .06, R^2 = .07$]. As can be seen in Table 2, all predictors were non-significant, except for a significant effect by trend for n Power.

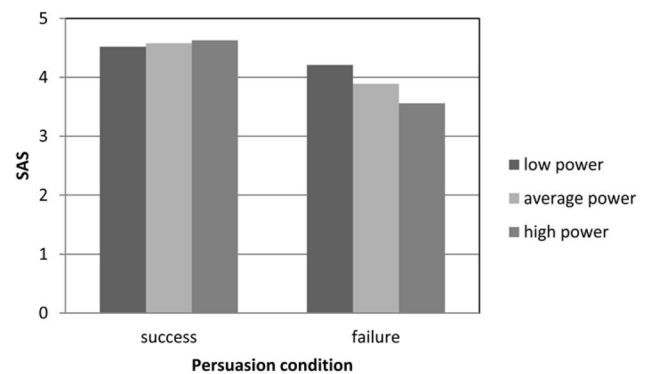


Fig. 2 Interaction of the persuasion condition (independent variable) and n Power (moderator), predicting affective perception of the puppet (outcome: SAS)

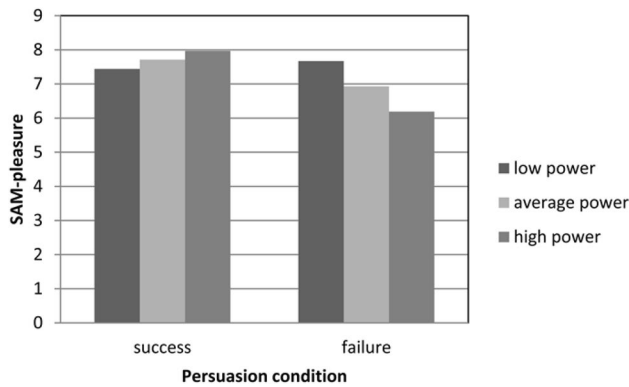


Fig. 3 Interaction of the persuasion condition (independent variable) and *n* Power (moderator), predicting self-perceived affect (outcome: SAM-pleasure)

Discussion

Our goal of this study was twofold. First, we assumed children react with negative affect when they are failing at influencing somebody. Second, and foremost, we hypothesized that this negative affect is especially pronounced in children high in *n* Power. Our results confirmed this assumption for two of our outcome variables. Compared to successful persuasion, children in general, but especially those high in *n* Power not only liked a puppet less but also felt worse when they failed to convince that puppet. Children low in *n* Power did not rate the puppet significantly different in both conditions (i.e., successful versus failed persuasion). This is in line with the negative affect adults, especially those high in *n* Power, showed in response to an assertive personality (Fodor et al. 2006) and to negative audience reactions (Fodor and Wick 2009). Thus, there is reason to believe that not only adults but also children high in *n* Power are especially sensitive towards the thwarting of their need to exert influence. Furthermore, in line with Fodor and Wick (2009) and Fodor et al. (2012), we were able to show power stress was expressed by two facets of affective perception, namely, an outwards-oriented form of power stress (children's negative affective perception of the puppet) and an inwards-oriented reaction (children's lowered self-perception of pleasure). Our results, therefore, show, also for children, both outwards- and inwards-oriented expressions of affect might be relevant to the study of power stress.

Interestingly, there was a significant effect of gender on the affective rating of the puppet, but not for self-perception of affect. This result confirms research that found gender differences in children's stress perceptions (Sharrer and Ryan-Wenger 1995). Why this result is only limited to the outwards-oriented stress reaction should be subject to further investigation.

There was no interaction effect for either children's self-reported arousal or dominance. From a theoretical point of view, this result is surprising. According to Bradley and Lang (1994), arousal is represented by manikins ranging from calm to excitation. Fodor and his colleagues found that individuals high in *n* Power reacted with negative affect, like agitation or being tense (Fodor et al. 2006, 2012; Fodor and Wick 2009) when their implicit power motive was thwarted. The negative pole of arousal in our study was meant to indicate an agitated form of excitement, depicted by a manikin with a star-like explosion in the middle of the figure. It is very likely that children were confused by this depiction, and interpreted the manikins as either positively or negatively excited. This might have resulted in the lack of significance we found. In a similar vein, we had expected children high in *n* Power to feel weaker, as another form of negative affect, when experiencing failure. However, asking children to place themselves on a dimension of weakness versus strength might have triggered socially desired responses that biased their affective evaluation. Thus, the adequacy of the SAM arousal and dominance dimensions to measure power stress in children should be subject to further investigation.

Limitations

Despite the frequent use of EMG in research to measure physical signs of power stress, we focused on affective self-reports only. Affective measures are less invasive and enabled us to test the children in their natural environment. Furthermore, affective self-reports are valid instruments to assess affective reactions to power stress (Fodor and Wick 2009) and emotional responses of primary school-aged children (Reijntjes et al. 2006), especially when they are based on non-verbal self-reports (Davies and Brember 1994). The fact that our choice of affective instruments is limited to one-item measures each does not impair the instruments' validity (Patrician 2004). Beyond, Schug et al. (2013) found that smiley scales are suitable to assess the liking of hypothetical puppet group members. Nevertheless, we still recommend replicating our findings on power stress in children with EMG measures in a laboratory setting. The application of on-skin instruments like EMG measures might reduce the ecological validity of the design, especially through the intrusiveness of the apparatus and the artificial environment. However, it is necessary to associate the implicit power motive with an implicit measure of power stress in order to fully confirm that also children experience power stress.

Furthermore, our findings prevent us from drawing conclusions on real-life interactions between peers which might be crucial in the case of implicit motives. In Fodor and Wicks (2009) study, for example, the participants were facing a real-time audience whose reaction was based on

nonverbal cues. These cues are supposed to shape high *n* Power adults' attention (Schultheiss and Hale 2007). In contrast, verbal instructions did not arouse *n* Power (Schultheiss and Brunstein 1999, 2002). In our study, the puppet's reactions were limited to intonations and verbal content to express its refusal. An alternative is to use in vivo rejections as they were proposed by Reijntjes et al. (2006). Here, children were rated out of a game by allegedly participating online peers. Adapting this situation to the arousal of *n* Power, for example through the rejection of persuasion statements through an online-jury of children, could enhance the ecological validity of the results in a future study.

Another shortcoming was the lack of a baseline level mood test. We asked children about their pleasure, arousal, and dominance, as well as about the appraisal of the puppet after the experiment. However, we missed establishing how they generally felt before they went through the experiment. Children's mood change due to the experimental manipulation and their general state of mood are therefore confounded in our study. In order to allow for this distinction, future research should include a baseline-level mood measure.

Finally, compared to some studies with adults (e.g., Donhauser et al. 2015) the averaged number of power images seems low, although still within normal range (Schultheiss and Pang 2007). Given the lack of research on *n* Power in children, judgments about children's power motive imagery production are currently difficult to make. More data is needed to assess children's range of *n* Power codings in PSE stories.

Outlook

In this paper, we were able to show that primary-school aged children in general, but especially those high in *n* Power react with negative affect (called power stress in the case of individuals high in *n* Power) when confronted with a counterpart that refuses to give in to their persuasion attempts. So far, these results were only limited to adults. We, therefore, delivered a first hint that power stress might be a phenomenon not limited to adulthood, but that it is present at earlier stages in life already; this applied to both outwards- and inwards-oriented reactions. Further replications provided, one important future step would be to examine the consequences of these different reactions.

As for the outwards-oriented affect of power stress, there is value in examining behavioral consequences to power stress, beyond self-reported resentment. For example, it is possible that power stress leads to negative interpersonal behavior (e.g., aggression). Research on both children and

adults has shown that there is a link between thwarted goals and aggressive behavior (Breuer and Elson 2017; Hanratty et al. 1972; Leander and Chartrand 2017). However, so far, the connection between *n* Power, power stress, and aggressive behavior has not been empirically proven yet.

Concerning inwards-oriented reactions, it would be worthwhile to examine if children's power stress is related to health consequences in the same way it is in adults. There is evidence that children who are particularly reactive to stressors (e.g., challenging performance tasks or stressful family events) are more susceptible to respiratory infections (Boyce et al. 1995). In this study, children's reactivity to stressors was measured through increased heart rate and blood pressure. Although implicit motives have not been examined by Boyce et al. (1995), the consequences of children's exposure to stress are similar to those of adults high in *n* Power. It is on future research to examine what role *n* Power and the thwarting of this need play in children who are particularly reactive to stress.

The final comment concerns the origin of the sample. As Luxembourg is a westernized nation, we assume our results to be representative of, but limited to Western Europe. To broaden the scope for generalizing the results, future research on power stress should not only focus on individualistic cultures, but compare them with collectivistic societies. According to Hofstede (2001), cultures differ in their strictness of hierarchical organization (*power distances*) which affects the degree to which individuals accept authorities and unequal distributions of power. Power stress might vary, depending on the culturally specific extent of power distances. However, so far, cross-cultural comparisons of power stress are still amiss for both children and adults.

Thus, the research of *n* Power and power stress in children is a relevant topic with many open questions that need to be addressed.

Acknowledgements We would like to thank Patrick Victor for his essential role in data collection, Jan Hofer and Holger Busch for very helpful comments on earlier drafts of this manuscript, and Nora Hogebe, and Ellen Kerpen for proofreading. The study reported in this paper was not pre-registered.

Author Contributions CR: contributed to the study design, data analysis, and manuscript writing. GH: have contributed to the study design and the data collection.

Appendix 1

See Table 3.

Table 3 PSE instructions (German original and English translation) for study 2

German instruction	English translation
Hier brauchen wir Deine Hilfe beim Geschichten-Sammeln. Im Folgenden werden Dir einige Bilder präsentiert. Ich möchte Dich bitten, dass Du Dir zu jedem Bild eine Geschichte ausdenkst und sie aufschreibst	Here, we need your help with collecting stories. In the following, we will present you with some pictures. I would like you to invent a story for each picture and to write that story down
Dabei sollst Du folgende Fragen in deiner Geschichte beantworten	You should answer the following questions in your story
1. Was passiert in der Situation, wer sind die Personen?	1. What is happening in the situation, who are the people in the picture?
2. Wie kam es zu der Situation, wie begann die Geschichte?	2. What had happened in the past?
3. Woran denken die Personen, was wollen sie und wie fühlen sie sich?	3. What is being thought and felt by the people on the picture?
4. Was wird passieren, wie wird die Geschichte ausgehen?	4. What will happen, how is the story going to end?
German instruction	English translation
Die Fragen müssen NICHT in der angegebenen Reihenfolge beantwortet werden	The stories do NOT have to be answered in this sequence
Für jede Geschichte hast Du 7 Minuten Zeit und eine ganze Seite Platz zur Verfügung	You have 7 min and a whole page to write down your story
Wichtig ist, dass Du eine zusammenhängende Geschichte schreibst	It is important that you write a coherent story
Wenn Du mit der Geschichte nicht fertig geworden bist, ist das nicht schlimm	It is not a problem if you do not get to finish your story
Keine Sorge, das hier ist KEIN TEST! Es gibt kein richtig und kein falsch!	No worries, this is NOT A TEST! There is no write or wrong answer
Ihr wollt Fantasiegeschichten schreiben. Es gibt hierbei keine guten, oder schlechten Geschichten	You want to write fantasy stories. There are no good or bad stories
Also, so geht's: Wir zeigen Dir das Bild für 30 s. Dann nehmen wir es weg. Du schreibst dann die Geschichte auf, die Dir zu diesem Bild in den Sinn kommt und versuchst dabei, die Fragen zu beantworten. Wir werden Dir sagen, sobald es Zeit ist, zur nächsten Geschichte weiterzugehen	This is how it works: We are going to show you the picture for 30 s. Then we are going to take it away. You write down the story that comes to your mind when thinking of the picture. Try to answer the questions in the story. We will tell you when it is time to move on to the next story
Wir machen jetzt erst mal ein Übungsbild!	We will do the first picture together!

Appendix 2

See Table 4.

Table 4 Standardized answers (German original and English translation) of the puppet in the experiment of study 2 (success versus failure)

Number of child argument	Response of the puppet			
	Success condition (German)	Success condition (English)	Failure condition (German)	Failure condition (English)
1	1. Nein. Ich bin mir nicht so sicher...	1. No. I am not really sure...	1. Nö	1. No
2	2. Ich denke, dass es mir nicht schmeckt	2. I think that I won't like it	2. Das schmeckt mir nicht	2. I don't like drinking it [the apple juice]
3	3. Hmm..., nein..., lieber nicht	3. Hmm..., no..., better not	3. Ich will nicht	3. I don't want to [drink apple juice]
4	4. Oooh, ich weiß nicht	4. Oooh, I don't know	4. Ich mag das nicht	4. I don't like it [the apple juice]
5	5. Aber ich möchte nicht so gerne Apfelsaft trinken	5. But I don't really want to drink apple juice	5. Aber ich trinke keinen Apfelsaft	5. But I don't drink apple juice
6	6. Nein, ich trinke keine gelben Sachen	6. No, I don't drink yellow things	6. Nein, ich trinke keine gelben Sachen	6. No, I don't drink yellow things
7	7. Hmm, ich weiß nicht. Eigentlich hab ich da gar keine Lust drauf	7. Hmm, I don't know. Actually, I don't feel like doing that [drinking apple juice]	7. Ich hab keine Lust mehr	7. I don't want to [do this] anymore
8	8. Der Apfelsaft sieht gar nicht lecker aus. Obwohl...nein!	8. The apple juice does not look yummy. Although...no!	8. Apfelsaft schmeckt eklig	8. Apple juice tastes yucky
9	9. Meinst du denn, dass mir das schmeckt?	9. Do you think that I might like it [the juice]?	9. Ich will einfach nicht	9. I just don't want to
10	10. Naaaa gut (nimmt Becher mit Apfelsaft). Schmeckt gar nicht so schlecht!	10. Aaaalright (takes the cup with the apple juice). Does not taste that bad!	10. Nein, ich will das einfach nicht trinken	10. No, I simply do not want to drink that

Standardized answers are adapted from Slaughter et al. (2013) and Weiss and Sachs (1991)

References

- Abrams, D., Weick, M., Thomas, D., Colbe, H., & Franklin, K. M. (2011). On-line ostracism affects children differently from adolescents and adults. *The British Journal of Developmental Psychology*, 29(1), 110–123. <https://doi.org/10.1348/026151010X494089>.
- Bagdi, A., & Pfister, I. K. (2006). Childhood stressors and coping actions: A comparison of children and parents' perspectives. *Child & Youth Care Forum*, 35(1), 21–40. <https://doi.org/10.1007/s10566-005-9001-8>.
- Boyce, W. T., Chesney, M., Alkon, A., Tschann, J. M., Adams, S., Chesterman, B., Wara, D. (1995). Psychobiologic reactivity to stress and childhood respiratory illnesses. *Psychosomatic Medicine*, 57(5), 411–422. <https://doi.org/10.1097/00006842-199509000-00001>.
- Bradley, M. M., & Lang, P. J. (1994). Measuring emotion: The self-assessment manikin and the semantic differential. *Journal of Behavior Therapy and Experimental Psychiatry*, 25(1), 49–59. [https://doi.org/10.1016/0005-7916\(94\)90063-9](https://doi.org/10.1016/0005-7916(94)90063-9).
- Breuer, J., & Elson, M. (2017). Frustration-aggression theory. In P. Sturme (Ed.), *The Wiley handbook of violence and aggression* (Vol. 1, pp. 1–12). Chichester: Wiley Blackwell. <https://doi.org/10.1002/9781119057574.whbva040>.
- Busch, H., & Hofer, J. (2018). *Parents' behavior influences the development of the implicit power motive in childhood*, Manuscript in preparation.
- Chambers, C. T., Giesbrecht, K., Craig, K. D., Bennett, S. M., & Huntsman, E. (1999). A comparison of faces scales for the measurement of pediatric pain: Children's and parents' ratings. *Pain*, 83(1), 25–35. [https://doi.org/10.1016/S0304-3959\(99\)00086-X](https://doi.org/10.1016/S0304-3959(99)00086-X).
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, 6(4), 284–290. <https://doi.org/10.1037/1040-3590.6.4.284>.
- Davies, J., & Brember, I. (1994). The reliability and validity of the 'smiley' scale. *British Educational Research Journal*, 20(4), 447–454. <https://doi.org/10.1080/0141192940200406>.
- Donhauser, P. W., Rösch, A. G., & Schultheiss, O. C. (2015). The implicit need for power predicts recognition speed for dynamic changes in facial expressions of emotion. *Motivation and Emotion*, 39(5), 714–721. <https://doi.org/10.1007/s11031-015-9484-z>.
- Feldman, R. S., & White, J. B. (1980). Detecting deception in children. *Journal of Communication*, 30(2), 121–128. <https://doi.org/10.1111/j.1460-2466.1980.tb01974.x>.
- Field, A. (2015). *Discovering statistics using IBM SPSS Statistics: And sex and drugs and rock'n'roll* (4th edn.). London: SAGE.
- Fodor, E. M. (1984). The power motive and reactivity to power stresses. *Journal of Personality and Social Psychology*, 47(4), 853–859. <https://doi.org/10.1037/0022-3514.47.4.853>.
- Fodor, E. M. (1985). The power motive, group conflict, and physiological arousal. *Journal of Personality and Social Psychology*, 49(5), 1408–1415. <https://doi.org/10.1037//0022-3514.49.5.1408>.
- Fodor, E. M. (2010). Power motivation. In O. C. Schultheiss & J. C. Brunstein (Eds.), *Implicit motives* (pp. 3–29). New York: Oxford University Press.
- Fodor, E. M., & Wick, D. P. (2009). Need for power and affective response to negative audience reaction to an extemporaneous speech. *Journal of Research in Personality*, 43(5), 721–726. <https://doi.org/10.1016/j.jrp.2009.06.007>.
- Fodor, E. M., Wick, D. P., & Conroy, N. E. (2012). Power motivation as an influence on reaction to an imagined feminist dating partner. *Motivation and Emotion*, 36(3), 301–310. <https://doi.org/10.1007/s11031-011-9254-5>.
- Fodor, E. M., Wick, D. P., & Hartsen, K. M. (2006). The power motive and affective response to assertiveness. *Journal of Research in Personality*, 40(5), 598–610. <https://doi.org/10.1016/j.jrp.2005.06.001>.
- Grand-Duché de Luxembourg, Le Portail des Statistiques. (2017). Table: Population by sex and nationality on 1st January (x 1 000) 1981, 1991, 2001–2017. Retrieved from <http://www.statistiques.public.lu/stat/TableViewer/tableView.aspx>.
- Green, B. L. (1986). On the confounding of "hassles" stress and outcome. *American Psychologist*, 41(6), 714–715. <https://doi.org/10.1037/0003-066X.41.6.714>.
- Hanratty, M. A., O'Neal, E., & Sulzer, J. L. (1972). Effect of frustration upon imitation of aggression. *Journal of Personality and Social Psychology*, 21(1), 30–34. <https://doi.org/10.1037/h0031903>.
- Hayes, A. F. (Ed.). (2013). *Methodology in the social sciences. Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: The Guilford Press.
- Hofer, J., Busch, H., Bond, M. H., Campos, D., Li, M., & Law, R. (2010). The implicit power motive and sociosexuality in men and women: Pancultural effects of responsibility. *Journal of Personality and Social Psychology*, 99(2), 380–394. <https://doi.org/10.1037/a0020053>.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations* (2. edn.). Thousand Oaks: SAGE.
- Leander, N. P., & Chartrand, T. L. (2017). On thwarted goals and displaced aggression: A compensatory competence model. *Journal of Experimental Social Psychology*, 72, 88–100. <https://doi.org/10.1016/j.jesp.2017.04.010>.
- McClelland, D. C. (1976). Sources of stress in the drive for power. In G. Serban (Ed.), *Psychopathology of human adaptation* (pp. 247–270). New York: Plenum Press.
- McClelland, D. C. (1989). Motivational factors in health and disease. *American Psychologist*, 44(4), 675–683. <https://doi.org/10.1037/0003-066X.44.4.675>.
- McClelland, D. C., & Jemmott, J. B. (1980). Power motivation, stress and physical illness. *Journal of Human Stress*, 6(4), 6–15. <https://doi.org/10.1080/0097840X.1980.9936101>.
- McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review*, 96(4), 690–702. <https://doi.org/10.1037/0033-295X.96.4.690>.
- McManis, M. H., Bradley, M. M., Berg, W. K., Cuthbert, B. N., & Lang, P. J. (2001). Emotional reactions in children: Verbal, physiological, and behavioral responses to affective pictures. *Psychopathology*, 38(2), 222–231. <https://doi.org/10.1111/1469-8986.3820222>.
- Patrician, P. A. (2004). Single-item graphic representational scales. *Nursing Research*, 53(5), 347–352. <https://doi.org/10.1097/00006199-200409000-00011>.
- Pothmann, R. (1988). Klinische Schmerzmessung [Clinical measurement of pain]. In R. Pothmann & W. Baier (Eds.), *Chronische Schmerzen im Kindesalter [Chronic pain during childhood]: Diagnose und Therapie; 60 Tabellen* (p. 31). Stuttgart: Hippokrates-Verlag.
- Pothmann, R., & Goepel, R. (1984). Comparison of the visual analog scale (VAS) and a smiley analog scale(SAS) for the evaluation of pain in children. *Pain*, 18, 25. [https://doi.org/10.1016/0304-3959\(84\)90170-2](https://doi.org/10.1016/0304-3959(84)90170-2).
- Raihala, C. E., & Kranz, D. (2018). Choose it or lose it: The implicit power motive in children and their resource control behavior. *Motivation Science*. <https://doi.org/10.1037/mot0000093>. Advance online publication.
- Reijntjes, A., Stegge, H., Terwogt, M. M., Kamphuis, J. H., & Telch, M. J. (2006). Children's coping with in vivo peer rejection: An

- experimental investigation. *Journal of Abnormal Child Psychology*, 34(6), 877–889. <https://doi.org/10.1007/s10802-006-9061-8>.
- Richter, T. (2007). Wie analysiert man Interaktionen von metrischen und kategorialen Prädiktoren? Nicht mit Median-Splits! [How should interactions between metric and categorical predictors be analyzed? Not with median splits!]. *Zeitschrift Für Medienpsychologie*, 19(3), 116–125. <https://doi.org/10.1026/1617-6383.19.3.116>.
- Ryff, C. D., & Singer, B. H. (2003). The role of emotion on pathways to positive health. In R. J. Davidson, K. R. Scherer & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 1083–1104). New York: Oxford University Press.
- Schug, M. G., Shusterman, A., Barth, H., & Patalano, A. L. (2013). Minimal-group membership influences children's responses to novel experience with group members. *Developmental Science*, 16(1), 47–55. <https://doi.org/10.1111/j.1467-7687.2012.01193.x>.
- Schultheiss, O. C. (2008). Implicit motives. In O. P. John, R. W. Robins & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd edn., pp. 603–633). New York: Guilford Press.
- Schultheiss, O. C., & Brunstein, J. C. (1999). Goal imagery: Bridging the gap between implicit motives and explicit goals. *Journal of Personality*, 67(1), 1–38. <https://doi.org/10.1111/1467-6494.00046>.
- Schultheiss, O. C., & Brunstein, J. C. (2002). Inhibited power motivation and persuasive communication: A lens model analysis. *Journal of Personality*, 70(4), 553–582. <https://doi.org/10.1111/1467-6494.05014>.
- Schultheiss, O. C., & Hale, J. A. (2007). Implicit motives modulate attentional orienting to facial expressions of emotion. *Motivation and Emotion*, 31(1), 13–24. <https://doi.org/10.1007/s11031-006-9042-9>.
- Schultheiss, O. C., & Pang, J. S. (2007). Measuring implicit motives. In R. W. Robins, R. C. Fraley & R. F. Krueger (Eds.), *Handbook of research methods in personality psychology* (pp. 322–344). New York: Guilford Press.
- Schultheiss, O. C., Wirth, M. M., Torges, C. M., Pang, J. S., Villacorta, M. A., & Welsh, K. M. (2005). Effects of implicit power motivation on men's and women's implicit learning and testosterone changes after social victory or defeat. *Journal of Personality and Social Psychology*, 88(1), 174–188. <https://doi.org/10.1037/0022-3514.88.1.174>.
- Sharrer, V. W., & Ryan-Wenger, N. M. (1995). A longitudinal study of age and gender differences of stressors and coping strategies in school-aged children. *Journal of Pediatric Health Care*, 9(3), 123–130. [https://doi.org/10.1016/S0891-5245\(05\)80020-3](https://doi.org/10.1016/S0891-5245(05)80020-3).
- Slaughter, V., Peterson, C. C., & Moore, C. (2013). I can talk you into it: Theory of mind and persuasion behavior in young children. *Developmental Psychology*, 49(2), 227–231. <https://doi.org/10.1037/a0028280>.
- Smith, C. P., Feld, S. C., & Franz, C. E. (1992). Methodological considerations: Steps in research employing content analysis systems. In C. P. Smith (Ed.), *Motivation and personality: Handbook of thematic content analysis* (pp. 515–536). Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511527937.038>.
- Smith, M., Hubbard, J. A., & Laurenceau, J.-P. (2011). Profiles of anger control in second-grade children: Examination of self-report, observational, and physiological components. *Journal of Experimental Child Psychology*, 110(2), 213–226. <https://doi.org/10.1016/j.jecp.2011.02.006>.
- Sun, G.-W., Shook, T. L., & Kay, G. L. (1996). Inappropriate use of bivariable analysis to screen risk factors for use in multivariable analysis. *Journal of Clinical Epidemiology*, 49(8), 907–916. [https://doi.org/10.1016/0895-4356\(96\)00025-X](https://doi.org/10.1016/0895-4356(96)00025-X).
- Veroff, J. (1969). Social comparison and the development of achievement motivation. In C. P. Smith (Ed.), *Achievement-related motives in children* (pp. 46–101). New York: Russell Sage Foundation.
- Weiss, D. M., & Sachs, J. (1991). Persuasive strategies used by preschool children. *Discourse Processes*, 14(1), 55–72. <https://doi.org/10.1080/01638539109544774>.
- Winter, D. G. (1973). *The power motive*. New York: Free Press.
- Winter, D. G. (1988). The power motive in women—and men. *Journal of Personality and Social Psychology*, 54(3), 510–519. <https://doi.org/10.1037/0022-3514.54.3.510>.
- Winter, D. G. (1994). *Manual for scoring motive imagery in running text (and related materials)*. Ann Arbor: University of Michigan.
- Winterbottom, M. (1958). The relation of need for achievement to learning experience in independence and mastery. In J. W. Atkinson (Ed.), *Motives in fantasy, action, and society: A method of assessment and study* (pp. 453–478). Princeton: van Nostrand.