Motivation and Emotion
https://doi.org/10.1007/s11031-024-10071-4

ORIGINAL PAPER

The role of parenting style for the development of the implicit power motive in children

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Accepted: 5 April 2024

Abstract
Findings show that both parents' reported parenting and children's perception of parenting play a role in predicting a vast number of developmental outcomes. Available research on the development of implicit motives in children, for example, shows a link to early parenting strategies. However, research on effects of parenting on the development of implicit motives is sparse. In the present study, we examined the role of authoritarian and positive parenting (parents' reports) for the development of the implicit power motive (*n*Power) in children, along with the moderating role of perceived parental psychological control and warmth/support (children's report). We hypothesized that authoritarian parenting shows a negative longitudinal association with *n*Power in children, particularly when children also perceive the parenting as psychologically controlling. In contrast, we assumed a positive longitudinal association of positive parenting with *n*Power in children, particularly when children also perceive the parenting as warm/supportive. Data of 66 German children (25 girls) and parents were assessed at two measurement points. Children were 6/7 years old at t1. Analyses partially support our hypotheses. The higher parental reports of authoritarian parenting were, the lower was children's *n*Power 3.5 years later. This association was only significant among children perceiving high or medium levels (vs. low) of parental psychological control. We found neither significant effects of parents' nor children's reports of positive/warm parenting nor a significant interaction of the two. Findings are discussed with respect to existing models of the development and stability of implicit motives and the role of parenting for implicit motive development.

Keywords Implicit power motive · Parenting · Childhood · Picture story exercise

When it comes to what drives human behavior, implicit motives have been an important factor in research for a long time and are experiencing a revival in recent years (e.g., Schultheiss & Köllner, 2021). Among other characteristics, their affective character is important when examing their orienting and directing function on behavior across the lifespan (McClelland et al., 1989; Schultheiss & Köllner, 2014). Developmental antecedences of implicit motives, however, remain largely uncharted since McClelland and Pilon's pioneering study (1983), in which the role of certain child-rearing practices for implicit motive development were longitudinally studied. In the present study, we aim to contribute to a better understanding of the development of implicit motives by focusing on the motive domain of power. In detail, we investigated effects of parenting styles reported by parents and children on the strength of the implicit power motive in children over the course of approximately 3.5 years.

Theoretical background

Implicit motives

Traditionally, most motivational research focusses on the so-called "Big Three" (e.g., McClelland, 1985): the achievement motive, that is, striving for a standard of excellence (McClelland et al., 1953), the affiliation-intimacy motive, that is, preoccupation with (re-)establishing and maintaining interpersonal relationships (Heyns et al., 1958), and the power motive, that is, desire for having an impact

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Published online: 15 May 2024

or influencing others (McClelland, 1975; Winter, 1973). Implicit motives are assumed to develop rather early in the preverbal stages of ontogenesis and are represented in an unconscious manner, thus, they are not accessible to self-reflection and self-report (e.g., McClelland et al., 1989). Implicit motives are closely linked to affects and, more precisely, can be understood as rather stable dispositions to experience certain classes of incentives as rewarding or disincentives as frustrating, respectively (Schultheiss & Köllner, 2014).

Parenting style and development of implicit motives

To this day, systematic and longitudinal research on the development of implicit motives is lacking, but there are hints at the role of certain parenting characteristics. The combination of certain parenting characteristics, as well as parenting behaviors or attitudes, can be subsumed under parenting styles (Durbin et al., 1993; Reichle & Franiek, 2009). An authoritarian parenting style, for instance, is characterized by a restrictive adult-oriented control and a lack of warmth and support, as well as rigorous punishments (e.g., Chang et al., 2003). A positive parenting style, on the other hand, is often described as a warm, supportive and child-centered parenting approach that ensures the child feels accepted and understood (e.g., Reichle & Franiek, 2009). It has to be noted, however, that the absence of an authoritarian parenting style cannot per se be equated with a positive parenting style (Reichle & Franiek, 2009). Likewise, positive parenting does not per se reflect an authoritative parenting style, as its conceptualization does not include the implementation of rules but focuses on the warmth component.

While it is argued that parenting styles remain largely stable across stages of children's development (e.g., Patterson, 1998), there are clear differences in parenting styles between parents (e.g., Durbin et al., 1993). Findings show that parenting styles are associated with numerous behavioral outcomes in children. For example, children's early experiences of psychological control relate to negative outcomes such as adult delinquent and antisocial behavior (for an overview of detrimental effects of parental psychological control on children, see for example Barber & Harmon, 2002).

Despite the postulate of the early shaping of implicit motives, research examining effects of childhood experiences on motive development is almost nonexistent. To our knowledge, there are only very few studies examining effects of early childhood experiences on strength of implicit motives and most of them focus on implicit achievement motivation. McClelland and Pilon (1983) found an association of certain parenting techniques with the implicit achievement and power motive in adult participants about 26–27 years later. Concerning the domain of power, the authors found the following link: Those participants with a high implicit power motive (*n*Power) in their adult life had parents that dealt leniently with children's aggressive and sexual behavior at the time of the initial interview. Even though the authors did not specify a particular parenting style, it seems plausible that those parents were not only tolerant concerning these specific behaviors, but overall displayed a parenting style lacking overly strict and authoritarian characteristics. Examples for characteristics of authoritarian parenting include particular assertive strategies, that is, rigid rules, frequent commands, high parental authority, overriding or disregarding children's needs and interests, and high control (e.g., Reichle & Franiek, 2009). Rosen and D'Andrade (1959) studied parenting practices as predictors of the implicit achievement motive. For example, they found that boys high in implicit achievement motivation had parents that were more likely to set standards of excellence for them and tended to react affectively stronger to their sons' performance. In a similar notion, Rosen (1962) found that the overall relatively low levels of implicit achievement motivation in Brazilian boys could partly be attributed to a family environment that punishes (or at least does not reward) children's striving for independence and autonomy.

In recent years, there has been a growing interest in the stability of implicit motives across the life span (see Denzinger & Brandstätter, 2018). The authors report relatively inconsistent correlations of age and implicit motive scores across various cross-sectional studies with adults. Studies with more than one measurement point usually look at retest reliabilities of implicit motive measures but only span over a relatively short period of time. However, Denzinger and Brandstätter (2018) highlight the importance of many different learning experiences and environmental influences over the life-span for the plasticity of implicit motives. Hence, it seems crucial to implement multiple measurement points over a longer period of time, that is, an individual's life-span, to identify possible (longitudinal) influences on the strength of a given implicit motive. It is postulated that implicit motives have both a dispositional, trait-like character, that is, stability over time and across situations, and at the same time are prone to situation-specific cues (McClelland, 1985; Schultheiss & Köllner, 2014). This is in line with the notion that implicit motives develop through the repeated linkage of incentives or rewards, e.g., positive affect, and certain behaviors or situational cues, e.g., exerting influence (McClelland & Pilon, 1983; Schultheiss & Köllner, 2014; see also Denzinger & Brandstätter, 2018, for an overview). On the other hand, the repeated punishment of behavior, especially in a non-responsive and non-child-oriented way,

should lead to frustration and eventually to a decrease in behavior. In line with the notion of (dis-)incentive fueled conditioning, we hypothesize that parenting style plays an important role when it comes to the development of *n*Power in children. Arguably, a parenting style minimizing children's autonomy and independence might generally inhibit the development of implicit motives irrespective of motive domain; however, authoritarian parenting might be of particular importance when it comes to *n*Power, since it is the only motive characterized by the need to have an impact on other people's emotions and behavior. The repeated frustration of the child's need for impact is a focal factor in both authoritarian or controlling parenting and *n*Power: children repeatedly experience that any attempts at influencing (both consciously and unconsciously) their parents fail, as parents do not tolerate any negotiations. Thus, situational cues for successfully realizing *n*Power are lacking. Over time, any attempts to have an impact or to be included in discussions or decisions may become associated with negative affect or the absence of positive affect. Given the (persisting) lack of situational cues for successfully realizing *n*Power, a low motive disposition emerges, as the child should eventually orient their behavior away from these attempts.

On the other hand, positive parenting typically lacks strict enforcement of rules and is characterized by a responsive way of dealing with children's basic needs (Reichle & Franiek, 2009; even sexual and aggressive behavior, see McClelland & Pilon, 1983). Hence, children's needs will be satisfied, leading to the experience of positive affect and over time, possibly to a consolidation of the association of incentive (i.e., power-themed behavior) and reward (i.e., positive affect). Children of parents characterized by low authoritarian or controlling parental strategies should experience many situational cues for realizing *n*Power as rules are negotiable and influence on parents is feasible. Hence, power-related needs (i.e., exerting influence, having an impact) can be met when children grow up in an environment characterized by positive parenting. Consequently, power-related behavior is repeatedly associated with positive affect/rewards, that is, reinforcing the orientation towards power-related behavior as an important aspect of *n*Power (McClelland, 1985). Drawing from research regarding operant conditioning, a reinforcement of certain behaviors by repeated (affective) rewards should lead to a consolidation of behavior and, in the case of implicit motives, a consolidation of affectively charged needs (McClelland, 1985; Schultheiss & Köllner, 2014).

Parenting styles: parent- vs. child-report

For many years, research has focused on parents' reports of their parenting or relied on observation of parental behavior. When examining effects of parenting, however, it seems obvious that the recipients' perception also matters. The perception of parenting as well as its interpretation often differ between parents and children or adolescents. Typically, only a modest correlation between both measurements is observed (e.g., Dimler et al., 2017; Taber, 2010). More specifically, parents tend to report less negative and more positive parenting behavior than their children (Guastaferro et al., 2021).

Moreover, findings indicate that recipients' and parents' perception of parenting uniquely contribute to explain differences in adolescents' problem behavior (e.g., Mackenbach et al., 2014). Dimler and colleagues (2017) report that not only different perceptions of parenting style, but also the direction of discrepancy matters, that is, the effects on adolescent behavior were particularly pronounced if adolescents rated their parents' behavior as less warm and more negative than parents did.

The present research

Building on aforementioned findings on the development of implicit motives, we expect a link between authoritarian parenting and the implicit power motive in children. Precisely, we assume that a strict parenting style overruling children's needs for autonomy and independence (reported by parents) at the first measurement point when children were aged between 6 and 7 years is associated with a less pronounced *n*Power in children approximately 3.5 years later. In other words, a higher *n*Power in children is supposed to be associated with a parenting style characterized by low (psychological) control and an overall rather flat family hierarchy.

Furthermore, we expect that the effect of authoritarian parenting on children's *n*Power is moderated by children's perception of parenting. Specifically, we hypothesize a significant association of authoritarian parenting with *n*Power in children only if children also perceive their parents to exert high psychological control on them. Psychological control is assumed to have a significant conceptual overlap with authoritarian parenting, as both are characterized by strict rule enforcement, high parental authority, and a lack of responsiveness to children's needs (Reichle & Franiek, 2009; Reitzle et al., 2001).

Regarding positive parenting, we assume a positive association with children's *n*Power approximately 3.5 years later. Precisely, a parenting characterized by a positive and responsive style should foster the development of *n*Power. Again, we expect this association to be moderated by perceived warm/supportive parenting reported by the children. Specifically, we assume a significant association of positive parenting with children's *n*Power only if children also

perceive their parents to be responsive and supportive (to their needs).

Method

Procedure

Our sample was drawn from a pool of participants that had previously taken part in a longitudinal project focusing on implicit motives in childhood and their developmental correlates (see Spengler et al., 2020a, b, also for details on sample recruitment). After completion of the project, 120 parent-child dyads agreed to be contacted for future studies. Among those, 66 agreed to take part in the present study (t2). The first measurement point of the present study (t1, i.e., first measurement point of the original project) took place in late 2016 to early 2017; the second measurement point (t2 of the present study) took place approximately 3 years and 8 months later in fall 2020. The rather large drop-out was mostly due to the ongoing Covid-19 pandemic: a lot of parents expressed their concern to come to the lab as they wanted to keep the number of social contacts as low as possible. Other families were not available due to changes in everyday life (e.g., moving to another region) that did not allow them to accept the invitation.

The conduction of the study was approved by the ethics committee of Trier University. Before each of the data assessments, parents signed an informed consent form. Furthermore, children gave their verbal consent after being informed about the procedure. Participants voluntarily took part in the study and were guaranteed that any information given would be treated confidentially. At the end of t2, parents were asked to indicate their willingness to participate in future data assessments. Participants received monetary compensation (approximately 11 $ for each measurement point) as well as a small gift.

Sample

In total, 66 German children (25 females) and their respective parent provided sufficient data at both measurement points and thus were included in the study sample. At both measurement points, children were mostly accompanied by their mothers ($n_{t1} = 60$; $n_{t2} = 57$).

At the first measurement point, children were between 6 and 7 years of age ($M = 6.74$; $SD = 0.42$). At the second measurement children were aged between 9 and 11 years ($M = 9.95$; $SD = 0.48$). At both measurement points, girls were significantly older than boys. On average, at t1 girls were 0.23 years [F (1, 64) = 5.174, $p = .026$] and at t2 0.27 years [F (1, 64) = 5.123, $p = .027$] older than boys. At the first measurement point, all participants attended primary school; at the second measurement point, 10 children still attended primary school (grade 4), while 56 children attended the first grade of secondary school (grade 5). A post-hoc power analysis using G*Power version 3.1.9.7 yielded a power of $1\text{-}\beta = 0.849$. To obtain a power of $1\text{-}\beta = 0.900$, with an expected $f^2 = 0.256$ (for similar effect sizes reported in research on implicit motives in childhood, see, e.g., Schattke et al., 2011; Spengler et al., 2020a, b; Raihala & Hansen, 2019), 75 participants would have been needed.

Measurements

Trained research assistants supervised all assessment sessions. At both measurement points, the strength of the implicit need for power in children was assessed at first. Next, children provided data on psychological constructs not relevant to the present study (e.g., indices of subjective well-being). Only at t2, children provided data on how they perceive their parents' parenting style.

At both measurement points, the accompanying parent provided data on parenting style and other constructs not relevant to the study at hand (e.g., critical life events). The parents took the questionnaire simultaneously but spatially separated from their children. Assessment of data took approximately one hour for the children and 30 min for their parent at both measurement points.

Implicit power motive

The strength of children's *n*Power was assessed by a Picture Story Exercise (PSE; Schultheiss & Pang, 2007; Smith et al., 1992). However, an adapted version for children was implemented, using picture cues depicting situations closer to the children's everyday life (e.g., two children playing with an empty cardboard box; three children with a soccer ball; for details see Spengler et al., 2020a). This picture set has been previously used in studies as a valid and reliable measure to assess the implicit power and affiliation motive in children. Spengler et al. (2020a), for example, found both a satisfactory stimulus pull for the aforementioned implicit motives as well as a predictive validity comparable to adult PSE measures (i.e., Power Stress). At t1 and t2, respectively, children were asked to verbally produce stories instead of writing them down. This procedure was chosen to rule out effects of children's penmanship and to keep procedures consistent across measurement points.

The recommended standard instruction for PSE (Smith et al., 1992) was implemented in a slightly adapted form: Children were told that they would see six pictures. They were asked to imagine a story for each of the pictures and

were reminded that there were no right or wrong stories. At the second measurement point, they were also told that they might remember a story they had told before and that they could either retell the same story or produce a different one. In contrast to the standard assessment procedure of implicit motives among adults, children were shown the respective picture card for the duration of their story telling. This practice was chosen to support fluency of children's story telling due to children's young age. Only if children hesitated or stopped during their story telling, they were asked supplementary questions similar to the ones used in standard PSE instructions (e.g., "what has led up to this situation?", "what are the people thinking about?", "how do they feel?"). Most (n_{t1}: 66, n_{t2}: 49) children received at least one supplementary question to support proper story-telling. Number of supplementary questions was not correlated with children's *n*Power scores at t1 ($r = -.10$, $p = .420$) or t2 ($r = .020$, $p = 876$), respectively. Children had 3 min to tell their story for each of the picture cards. Since story-production was verbal, this timeframe seemed appropriate and has proven to be sufficient in previous research with children and to approximate story length produced by adults (see, e.g., Spengler et al., 2020a, b). If children finished their story before the time was up, the next picture card was shown. If children had not finished their story after 3 min, they were gently instructed ("And how does the story end?") to wrap up their story. Pictures were presented in the same order for all children at both measurement points to keep possible interferences between picture cues constant (see e.g., Veroff et al., 1960). For instance, expressing a given motive in one story can temporarily reduce the likelihood of its expression in a subsequent story (Atkinson, 1981; see also Schultheiss & Schultheiss, 2014).

The children's PSE stories were coded by two student assistants at t1 and two different student assistants at t2 using Winter's (1994) manual. Both coding dyads were blind to the study's aims and well-trained in coding adult and children PSE stories and reached at least 85% agreement with training material coded by experts (Winter, 1994). Additionally, all six stories of ten participants were double-coded at each measurement point to calculate inter-rater reliability. Two-way random, absolute-agreement, single measure intraclass correlation coefficients (ICCs, see Shrout & Fleiss, 1979) for *n*Power were calculated. At both measurement points, good ICC scores (t1: 0.81; t2: 0.82) were obtained (Koo & Li, 2016). Thus, the remaining stories were coded individually. Coding disagreements were discussed and resolved in regular team meetings.

The story length aggregated for all six stories ranged from 85 to 1686 words ($M = 606.13$; $SD = 404.12$) at t1 and from 197 to 1800 words ($M = 606.55$; $SD = 287.12$) at t2. Since research on implicit motives in childhood is limited and, at least to our knowledge, there are no conventions regarding minimum protocol length for their age group, we did not exclude any children that did not produce a certain amount of words (e.g., an average of 30 words per story).[1] The total number of power motive imageries across all six stories ranged from 0 to 28 ($M = 6.06$; $SD = 5.24$) at t1 and from 0 to 18 ($M = 3.62$; $SD = 3.02$) at t2. The number of motive imageries was significantly correlated with word count at both measurement points (t1: $r = .501$, $p = .002$; t2: $r = .395$, $p < .001$). Therefore, to control for confounding effects of story length on motive scores, we used regression analysis to calculate residualized motive scores.

Parenting style reported by children

Children reported on perceived parenting styles by responding to a selection of items taken from the short version of the Zurich Brief Questionnaire for the Assessment of Parental Behavior (ZKE; Reitzle et al., 2001). The ZKE consists of 27 items which are assigned to three scales, that is warmth/support (e.g., "teaches me things I want to learn"), rules (e.g., "always wants to be asked before I go out"), and psychological control (e.g., "thinks I am ungrateful when I do not obey her/him"). For the study at hand, only the scales warmth/support and psychological control are relevant. The subscale "rules" was excluded as it does not fit into either category of positive (i.e., responsive) or negative (i.e., authoritarian) parenting. Due to time constraints, we did not administer all items of the ZKE to measure warmth/support and psychological control but selected a subset of items that are most characteristic for a given scale (items with highest discriminatory power and factor loadings on the respective scale; Reitzle et al., 2001). Thus, seven items were selected for warmth/support (Cronbach's $\alpha = 0.819$) and three items for psychological control (Cronbach's $\alpha = 0.508$). The mean of respective items was used as an index for warmth/support and psychological control, respectively. Items were rated on a 4-point Likert scale ranging from 1 (*not true*) to 4 (*absolutely true*). When working on the questionnaire, children were asked to think of the parent accompanying them at t2. To ensure children understood the questions properly, a student assistant read all questions aloud and then asked the child to mark their answer with a cross on the questionnaire by their own. Children did not report difficulties understanding any of the items.

Parenting style reported by parents

At both measurement points, parents indicated their parenting style using the German extended version (GE-APQ, Reichle & Franiek, 2009) of the Alabama Parenting Questionnaire (APQ, Frick, 1991). The GE-APQ consists of

40 items measuring the following parenting dimensions: authoritarian parenting (six items; e.g., "when your child wants you to make an exception, you insist on your rules to make it clear who is in charge in your family."), positive parenting (six items; e.g., "you praise your child for behaving well."), responsible parenting (e.g., "you discuss activities with your child that he/she could do in his/her free time."), inconsistent parenting (e.g., "how strict the punishment for your child will be depends on your current mood."), involvement (e.g. "you help your child with homework."), corporal punishment (e.g., "you give your child a smack when he/she did something wrong."), and poor monitoring/supervision (e.g., "your child is out and you do not know exactly where he/she is."). Parents indicated on a scale from 0 (*never*) to 4 (*always*) how often parenting techniques described by each item occur in their family, that is, how often they or their partner use these techniques. For the present study, only the scales authoritarian parenting and positive parenting are relevant and yielded good reliabilities (t1: Cronbach's $\alpha = 0.793$ and $\alpha = 0.721$, t2: Cronbach's $\alpha = 0.806$ and $\alpha = 0.743$, respectively).

As outlined above, children's perception of parents' parenting was assessed via a subset of items of the ZKE due to time constraints. Thus, different measurements were used to assess parenting among parents and children, respectively. However, authoritarian and psychologically controlling parenting are both characterized by high parental control, low responsivity and strict rule enforcement. Hence, a significant conceptual overlap between both parenting dimensions can be concluded (see for example Reichle & Franiek, 2009; Reitzle et al., 2001). Likewise, positive parenting (GE-APQ, Reichle & Franiek, 2009) and warmth/support (ZKE, Reitzle et al., 2001) are both characterized by child-centered and responsive features.

Transparency and openness

We report on how we determined our sample size, all data exclusions, and all measures in the present study, and we follow JARS (Kazak, 2018). All data, analysis code and research materials are publicly available at the Open Science Framework and can be accessed at https://osf.io/muxtq/?view_only=8478b5cf50384e51a45da53ec0ac780e. Due to copyright infringement, children's PSE pictures cannot be made publicly available but can be obtained upon reasonable request from the first author. All analyses were executed using IBM SPSS Statistics version 28.0.1.0. The PROCESS macro version 4.0 (Hayes, 2018) was used to test the moderation hypothesis. The study's design and its analyses were not pre-registered.

Results

First, we will outline results of preliminary analyses. Next, general descriptive statistics and correlations of the relevant variables as well as correlations with possible covariates will be presented. In the following section, main inferential analyses will be presented examining the hypothesized moderating effects of (a) perceived psychological control (parenting style reported by children) on the relationship of authoritarian parenting (parent report, t1) and children's *n*Power (t2) and (b) perceived warm/supportive parenting (children report) on the relationship of positive parenting (parent report, t1) and children's *n*Power (t2).

Preliminary analyses

To test the possibility of a systematic dropout, we ran ANOVAS to compare participants at t1 who also took part in t2 and those who did not. Analyses indicate no significant mean differences in positive [$F(1, 118) = 1.577$, $p = .212$, $\eta^2 = 0.013$] or authoritarian [$F(1, 118) = 2.613$, $p = .109$, $\eta^2 = 0.022$] parenting style or *n*Power [$F(1, 118) = 0.202$, $p = 654$, $\eta^2 = 0.002$], respectively. However, the relation of boys to girls was slightly lower in the drop-out sample [$F(1, 118) = 5.608$, $p = .020$, $\eta^2 = 0.045$; boys : girls drop outs = 32 : 22; boys: girls at t2 = 41 : 25].

To investigate associations between hypotheses-relevant constructs and to identify possible covariates of our main analyses, we ran two-tailed t-tests for dependent samples and found a significant mean difference of 0.128 [$T(65) = -2.094$, $p = .040$, $d = 0.498$] between authoritarian parenting at t1 ($M = 2.255$, $SD = 0.612$) and t2 ($M = 2.127$, $SD = 0.681$). Likewise, we found a significant mean difference of 0.084 [$T(65) = 2.047$, $p = .045$, $d = 0.332$] between positive parenting at t1 ($M = 3.644$, $SD = 0.393$) and t2 ($M = 3.561$, $SD = 0.403$).

To investigate whether combining reports of mother's and father's parenting style for our main moderation analyses was legitimate, we ran respective one way ANOVAs. We did not find significant differences between fathers ($M = 2.167$, $SD = 0.691$) and mothers ($M = 2.264$, $SD = 0.609$) concerning the level of authoritarian parenting at t1 [$F(1,64) = 0.138$, $p = .712$, $\eta^2 = 0.002$]. Likewise, we did not find differences between fathers ($M = 2.037$, $SD = 0.551$) and mothers ($M = 2.142$, $SD = 0.703$) at t2 [$F(1,64) = 0.181$, $p = .672$, $\eta^2 = 0.003$] nor differences in perceived psychological control reported by the children for fathers ($M = 1.444$, $SD = 0.289$) and mothers [$M = 1.468$, $SD = 0.440$; $F(1,64) = 0.024$, $p = .878$, $\eta^2 = 0.000$]. Likewise, there were neither significant differences between fathers ($M = 3.556$, $SD = 0.486$) and mothers ($M = 3.561$, $SD = 0.393$) concerning the level of positive parenting at

t2 [$F(1, 64) = 0.002$, $p = .968$, $\eta^2 = 0.000$] nor differences in perceived warmth/support reported by the children for fathers ($M = 3.571$, $SD = 0.371$) and mothers [$M = 3.694$, $SD = 0.401$, $F(1, 64) = 0.743$, $p = .392$, $\eta^2 = 0.011$]. There were, however, significant mean differences between mothers ($M = 3.684$, $SD = 0.362$) and fathers ($M = 3.250$, $SD = 0.514$) at t1 [$F(1, 64) = 7.264$, $p = .009$, $\eta^2 = 0.102$] regarding positive parenting. However, given that only very few fathers accompanied their child at t1, parents' relation to the child was not included as a covariate in either of the main analyses.

To investigate whether children's gender plays a role in the parenting style reported by parents or children and would therefore classify as a covariate in the moderation analyses, we ran respective one way ANOVAs. At t1, we did not find a significant difference between boys ($M = 2.283$, $SD = 0.618$) and girls ($M = 2.212$, $SD = 0.610$) regarding parent report of authoritarian parenting [$F(1, 64) = 0.214$, $p = .645$, $\eta^2 = 0.003$]. Likewise, there was no significant differences between boys ($M = 2.221$, $SD = 0.645$) and girls ($M = 1.973$, $SD = 0.716$) regarding parent report of authoritarian parenting at t2 [$F(1, 64) = 2.089$, $p = .153$, $\eta^2 = 0.032$]. However, there was a significant effect of children's gender on perceived psychological control [$F(1,64) = 13.686$, $p < .001$, $\eta^2 = 0.176$]: boys ($M = 1.602$, $SD = 0.456$) reported significantly more psychological control than girls ($M = 1.240$, $SD = 0.226$). Hence, children's gender was included as a covariate in the first moderation analysis. Regarding parents' reports of positive parenting, we did not find significant differences between boys ($M = 3.628$, $SD = 0.410$) and girls ($M = 3.671$, $SD = 0.371$) at t1 [$F(1,64) = 0.180$, $p = .673$, $\eta^2 = 0.003$] or t2 [$F(1,64) = 0.040$ $p = .843$, $\eta^2 = 0.001$; boys: $M = 3.553$, $SD = 0.412$; girls: $M = 3.573$, $SD = 0.394$]. Moreover, we did not find significant differences between boys ($M = 3.645$, $SD = 0.463$) and girls ($M = 3.731$, $SD = 0.252$) regarding perceived warmth/support [$F(1,64) = 0.742$, $p = .392$, $\eta^2 = 0.011$).

Correlations

In Table 1, descriptive statistics as well as correlations among variables and with sociodemographic variables are shown. Surprisingly, the correlation between indices of *n*Power at t1 and t2 are close to zero. Furthermore, analyses do not indicate a significant association between parents' and children's reports of (perceived) parenting at both measurement times. However, parental reports of both authoritarian and positive parenting at t1 were highly correlated with corresponding parenting scores at t2 (see preliminary analyses for details).

Main analyses

We hypothesized a negative association of authoritarian parenting (t1, parent report) and children's *n*Power (t2). This association is furthermore hypothesized to be moderated by children's perception of parental psychological control.

For both moderation analyses, the template for simple moderation analyses (model 1) was used with parenting (parent report) at t1 as the predictor, children's *n*Power at t2 as the dependent variable and children's perceived parenting at t2 as the moderator. All variables were transformed into standardized *Z*-scores. The number of bootstrap samples was set to 10,000. Results are presented in Table 2.

The first moderation model explains a significant amount of variance in children's *n*Power (t2). The main effect of authoritarian parenting at t1 reported by the parents on children's *n*Power at t2 was significant ($B = -0.278$, $p = .018$). There is no significant association of children's reports of psychological control at t2 and their *n*Power at t2 ($B = 0.189$,

Table 1 Descriptive statistics and correlations among measures

	1	2	3	4	5	6	7	8	9	10	M (SD)
1 *n*Power (t1)	---										0 (4.61)
2 *n*Power (t2)	0.023	---									0 (2.78)
3 Psychological Control (t2)	−0.096	0.150	---								1.46 (0.42)
4 Authoritarian Parenting (t1)	−0.030	−0.267*	0.090	---							2.26 (0.61)
5 Authoritarian Parenting (t2)	0.071	−0.281*	0.142	0.709***	---						2.13 (0.68)
6 Warmth/Support (t2)	−0.184	−0.042	−0.383*	0.205	−0.009	---					
7 Positive Parenting (t1)	0.116	−0.046	0.057	0.269*	0.091	0.205	---	.			
8 Positive Parenting (t2)	0.217	−0.025	−0.068	0.312*	0.202	0.117	0.653*	---			
9 Age (t2)	0.212	−0.165	−0.148	0.018	−0.013	0.061	−0.053	−0.065	---		9.95 (0.48)
10 Gender[a]	0.03	−0.05	−0.420***	−0.058	−0.178	0.107	0.053	0.025	0.272*	---	---

Note. $N = 66$. Variables 4, 5, 7 and 8 are parents' reports; all other variables are children's reports

[a] gender coding: 1 = boy. 2 = girl

*$p < .05$. ***$p < .001$

Table 2 Effects of parenting (parents' and children's report) on children's n Power

outcome	*B* (*S.E.*)	*t*-value (*p*)	*F*-value (*p*)	R^2	BF_{10}
*n*Power (t2)			4.901 (.004)	0.192	8.948
			df = 3, 62		
Authoritarian Parenting (t1)	-0.278 (.115)	-2.423 (.018)			1.968
Psychological Control (t2)	0.189 (.115)	1.644 (.105)			0.47
Auth. Parenting * Psych. Control	-0.350 (.134)	-2.622 (.011)			3.303
			0.436	0.021	0.067
			-0.728		
			df = 3, 62		
Positive Parenting (t1)	0.014 (.138)	0.103 (.918)			0.267
Warmth/Support (t2)	-0.037 (.128)	-0.289 (.774)			0.264
Positive Parenting * Warmth/Support	0.144 (.137)	1.052 (.297)			0.43

Note. $N = 66$

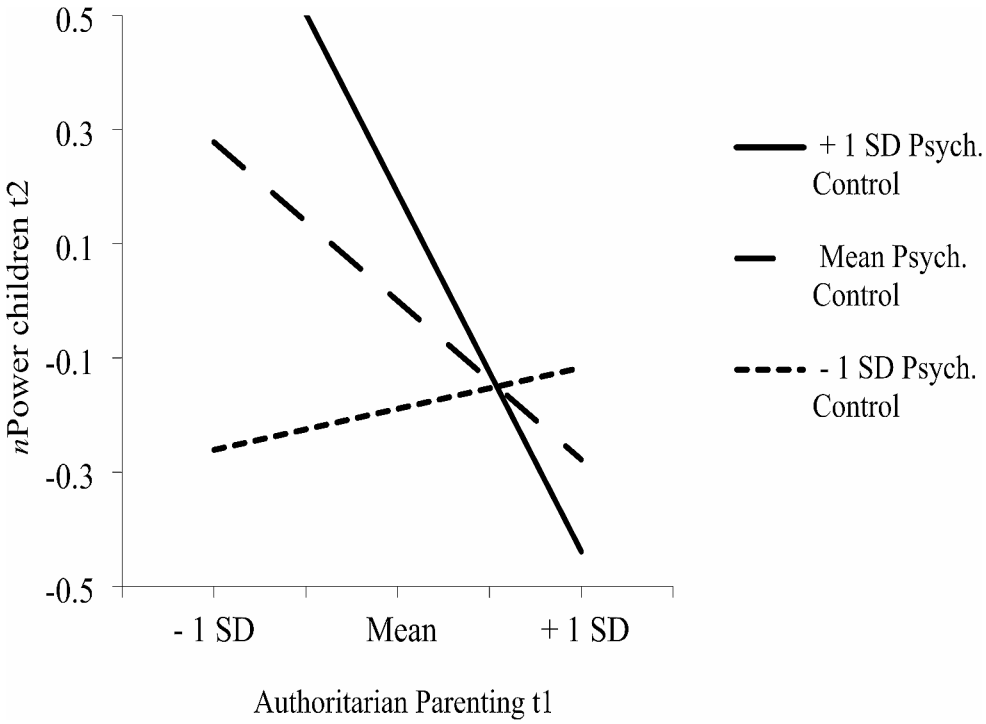

Fig. 1 Interaction of authoritarian parenting (parent report) and perceived psychological control (children's report) on children's n Power

$p = .105$). However, the interaction term of authoritarian parenting (t1) and perceived psychological control (t2) reached statistical significance [F_{change} (1, 62) = 6.878, $R^2_{change} = 0.090$, $p = .011$].

Conditional effects at three values of the moderator, that is, at the mean, at one below and at one standard deviation above the mean, were calculated. A significant association of authoritarian parenting (parent report, t1) and children's *n*Power at t2 could be identified at high levels of the moderator (B= -0.628, $SE = 0.175$, t= -3.600, $p = .001$, 95% CI [-0.977, -0.279) and at medium levels of the moderator (B= -0.278, $SE = 0.115$, t= -2.423, $p = .018$, 95% CI [-0.507, -0.049). In contrast, at low levels of perceived psychological control no statistically significant effects could be identified ($B = 0.073$, $SE = 0.178$, $t = 0.409$, $p = .684$, 95% CI [-0.282, 0.428]). The moderation effect is visualized in Fig. 1, that is, only at high and medium levels of perceived psychological control, there is a significant negative association of authoritarian parenting (parent report, t1) and children's *n*Power at t2.

For our second model, we hypothesized a positive association of positive parenting (parent report, t1) and children's *n*Power at t2. This association is furthermore hypothesized to be moderated by children's perception of parental warmth/support. The second moderation model does not explain a significant amount of variance in children's *n*Power (t2). Neither the main effect of positive parenting at t1 reported by the parents nor the main effect of perceived warmth/support reported by the children at t2 reached statistical significance. Furthermore, the interaction term of positive

parenting (t1) and warmth/support (t2) did not reach statistical significance ($F_{change} = 1.165$, $R^2_{change} = 0.019$, $p = .285$).

To control for potentially confounding effects and to further scrutinize our findings, we reran our moderation analyses including parents' parenting reports at t2, children's t1 *n*Power scores and children's gender (only in the model including psychological control). There were no significant differences in the patterns of results. Thus, we report results without covariates to adhere to the principle of parsimony.

Discussion

In the present study, we investigated longitudinal effects of parenting on the development of *n*Power in children. Specifically, we were interested in the role of authoritarian parenting, which seems to be the most tangent to *n*Power. Moreover, we investigated the role of positive parenting on development of *n*Power. Furthermore, we assumed that children's reports on the respective perceived parenting style (i.e., psychological control and warmth/support) moderates the link between parenting style (parental report) and *n*Power approximately 3.5 years.

Results partially support our hypotheses. Our first hypothesis, that is, a negative association of authoritarian parenting at the first measurement point with children's *n*Power approximately 3.5 years later, is supported by our data. In detail, higher levels of parents' authoritarian parenting were associated with lower levels of children's *n*Power. Moreover, as hypothesized, children's perceptions of perceived psychological control moderated this association. Only for children that perceived high or medium levels of controlling parenting, a significant negative association of authoritarian parenting and *n*Power was present. In contrast, we did not find a significant association of authoritarian parenting and *n*Power when children perceived low levels of psychological control. Regarding positive parenting, results do not support our hypothesis, that is, there is neither a positive association of positive parenting at the first measurement point and children's *n*Power approximately 3.5 years later nor a significant moderation effect of children's report of warm/ supportive parenting on this link.

Generally, our findings are in line with McClelland and Pilon's pioneering study (1983). Even though parenting style was operationalized in a different way, in both studies, child-rearing characterized by lower control was longitudinally associated with a higher *n*Power in children. In contrast to McClelland and Pilon (1983), we did not solely focus on parental control concerning sexual and aggressive behavior, but relied on a broader measure of authoritarian parenting, that is, parents' strictness and control over their children in a general sense. Furthermore, we examined a positive parenting style as an influence on the development of *n*Power that is characterized by need-responsiveness and child-orientation.

Parents' vs. children's report of parenting

Additionally, we broadened the scope of the findings by including children's perception of parental control as well as the dimension of positive, that is, responsive, parenting. In line with findings regarding parents' reports on and children's perception of parenting, we did not find a significant correlation of both measures in the domain of authoritarian/controlling parenting or the domain of positive parenting (e.g., Dimler et al., 2017; Taber, 2010). Recent research states that effects of parenting on adolescent (problem) behavior were stronger if adolescents rated their parents' behavior as more negative than parents themselves did (Dimler et al., 2017). Following this notion, even though this was not the central point of our moderation hypotheses, we found the highest *n*Power scores at t2 in children with high perceived psychological control and low parental reports of authoritarian parenting. Although *n*Power can evidently not be equated with deviant or problematic behavior per se, effects of negative parenting, often including controlling or authoritarian behavior, seem to be particularly pronounced when parents' reports and children's perception do not match, that is, when parents perceive their parenting to be less negative than their children do (Dimler et al., 2017). It also seems plausible that children high in *n*Power perceive more psychological control in parenting than children low in *n*Power, that is, that they are more sensitive to assertive/authoritarian cues. Findings regarding *n*Power in adults show that individuals high in *n*Power are characterized by an enhanced sensitivity to social cues of dominance compared to those low in *n*Power (Donhauser et al., 2015).

Stability and development of implicit motives

Compared to McClelland and Pilon's (1983) study, the present study covers a much shorter period of time. Thus, more research is needed to closer investigate the distinct mechanisms underlying the development of implicit motives, both during and beyond childhood and early adolescence. However, our findings might be a first hint that the effects of parenting could manifest even over a relatively short time span.

In literature, it is postulated that implicit motives are primarily shaped in preverbal stages of ontogenesis (McClelland et al., 1989). However, there was no significant cross-sectional association of authoritarian or positive parenting style and *n*Power in children at t1. In contrast, we found a significant cross-sectional association of authoritarian parenting and children's *n*Power at t2, in addition

to the longitudinal effects of parenting at t1. Albeit unexpected, this finding suggests that (authoritarian) parenting, at least in our sample, might not have immediate effects on *n*Power in younger children, but that the effects of parenting take some time to unfold their effect on (older) children's *n*Power. This appears to be inconsistent with assumptions on the preverbal development of implicit motives, at least in the domain of power (McClelland & Pilon, 1983). Additionally, children's *n*Power was not stable over the course of 3.5 years in our sample. This finding contradicts arguments on the trait-like stability of implicit motives (e.g., McClelland et al., 1989, Schultheiss et al., 2008) and again, challenges the notion that development of implicit motives is limited to the preverbal stages of ontogenesis (McClelland & Pilon, 1983). More recent findings point to a less pronounced stability of implicit motives (e.g., Denzinger & Brandstätter, 2018; Busch & Hofer, 2012). As children transition from early to late childhood, more and more opportunities, that is, situational cues or incentives, for realizing the implicit power motive arise. Since it is postulated that implicit motives are elicited by situational cues or incentives, respectively, these short-term arousals might foster long-term change in implicit motives' strength (e.g., Schultheiss & Schultheiss, 2014). Types or styles of parenting, both verbally and non-verbally transmitted, affect children's exposure to incentives and thereby, also (indirectly) affect children's future behavior. Thus, parents' reactions to children's behavior might play a crucial role in shaping implicit motives even through late childhood and adolescence.

Parenting shifts throughout children's development

Especially from early to late childhood, there might be a shift in parenting style, because parents also react to children's behavior, resulting in a bidirectional dynamic course of interaction (e.g., Patterson, 1982). In our sample, both authoritarian and positive parenting significantly decreased during the observed time span (albeit the high positive correlation between the measures has to be noted, see also Reichle & Franiek, 2009, for similar results). Due to the nature of implicit motive scores, we cannot make mean level comparisons between both measurement points, hence, we cannot rule out the possibility that a change in children's power-motivated behavior might have had an effect on the shift in parenting style. Interestingly, albeit not statistically significant, we found a positive correlation of positive parenting at t1 and *n*Power at t2, however, almost a zero correlation of positive parenting at t2 and *n*Power. As positive parenting is characterized by a responsive and child-centered style (e.g., Reichle & Franiek, 2009), one might argue that this parenting style is particularly influential for *n*Power in the early stages of motive development. More precisely, in the preverbal or early verbal stages, a positive parenting style might be associated with the development of *n*Power, as children's needs are dealt with in a responsive way and antecedents of power-motivated behavior could be enforced (McClelland & Pilon, 1983; McClelland et al., 1989). Later on, there might be a shift in children's power-motivated behavior as the child becomes increasingly aware of its possible impact on others through bargaining and more distinguished persuasive strategies (e.g., Veroff & Veroff, 1971). The role of authoritarian parenting might increase, as authoritarian (vs. non-authoritarian) parents try to suppress and punish power-motivated behavior that increasingly challenges their rules. Furthermore, the importance of rules might also shift through childhood, as options for actively organizing their leisure time increase for children, for instance, spending more time with friends or taking on different hobbies (Ryan et al., 1995). Another important developmental task in the transition from early to late childhood is achieving personal independence (Havighurst, 1953). Common examples include testing authority figures (e.g., parents or teachers) as well as identifying and following interests and goals that might differ from their parents'. Furthermore, children learn to progressively understand and self- regulate their emotions, therefore decreasingly relying on parents. Hence, parents are faced with children's increasing need for autonomy regarding more and more life domains, which might, in turn, encourage authoritarian parents to increase psychological control in order to assert their authority. Moreover, during the transition to early adolescence, children increasingly express their own ideas and thoughts, possibly posing a threat to authoritarian parents' framework of controlling children's interests and choices that might differ from theirs (e.g., Wray-Lake et al., 2010).

Another difference worth mentioning between the study at hand and McClelland and Pilon's study (1983) is the time of data collection. While McClelland and Pilon (1983) obtained parents' child-rearing practices in the late 1950s, data on parenting in the study at hand was obtained between 2016 und 2020. General norms or mean levels of parenting might have changed over the past decades, yet, effects of authoritarian and controlling parenting seem to persist, enhancing the generalizability of findings. In contrast to McClelland and Pilon (1983), we did not rely on retrospective measures of parenting. Furthermore, their rather small sample size as well as the single-study design should be noted.

Limitations and outlook

We hope to add to the understanding of the development of implicit motives with our study. We believe studying developmental correlates of implicit motives in childhood is an

important research topic given the possible incremental and predictive nature of implicit motives for various outcomes across the lifespan, for instance, career paths (McClelland & Franz, 1992) or preferences in social interactions (e.g., Stoeckart et al., 2018). Yet, some limitations of the current study ought to be addressed. Firstly, we only obtained children's perception of parenting style at t2, but not at t1. We decided to refrain from assessing children's reports at t1 due to their young age. Findings point to a relatively low validity of children's report of parenting styles in elementary school aged children (Shelton et al., 1996). Also, Frick et al. (1999) report an increase in predictive validity as a function of children's age. Still, the longitudinal effect of parenting on *n*Power needs to be replicated taking both parents' and children's reports at both measurement points into account.

Moreover, we did not use the same measure for children's and parents' reports of parenting styles. As we were concerned about test length, we decided to use a subset of items taken from the ZKE as a reliable, valid and particularly economic instrument among children (Reitzle et al., 2001). Furthermore, the dimensions authoritarian parenting and psychological control are both characterized by high control/pressure and low responsiveness (Reitzle et al., 2001; Reichle & Franiek, 2009). In the same notion, both positive parenting (GE-APQ-dimension, Reichle & Franiek, 2009) and perceived warmth/support (ZKE-dimension, Reitzle et al., 2001) are characterized by high responsiveness and a child-centered parental approach. Unfortunately, the psychological control scale did not yield a high reliability in our sample. This might be due to the shortness of the three-item scale used in this study. Applying the Spearman-Brown-Formula for test extension and using the empirical reliability obtained in our study, we would obtain a hypothetical reliability of $\alpha = 0.756$ when triplicating the number of items in the scale. This corresponds to the subscale's number of items in the longer ZKE version, as well as the reliability obtained by Reitzle and colleagues (2001).

In our study, measures of parenting styles were mostly obtained from mothers who primarily accompanied their children. More recent research emphasizes the importance of taking both mothers' and fathers' parenting style into account, as there are often significant differences between their parenting styles. In general, fathers usually display a more authoritarian parenting style than mothers who in turn usually show a more authoritative style (for a recent review, see Yaffe, 2023). In our sample, we did not find significant differences in parental (authoritarian) control between mothers and fathers, neither in parents' nor in children's report. Regarding positive parenting, we only found significant mean differences in parental reports at t1, that is, mothers reported higher scores than fathers. However, as stated earlier, most data were assessed from mothers. Although instructions for the GE-APQ refer to parental styles prevalent in the family (as opposed to a specific parent's style), future research should include fathers' parenting reports to examine different effects of fathers' and mothers' parenting on motive development.

Moreover, recent research highlights the importance of considering biological factors when studying the development of implicit motives (e.g., Köllner et al., 2019; Schultheiss & Köllner, 2021). Unfortunately, we did not measure biological markers of *n*Power (e.g., 2D:4D scans; see also Schultheiss & Zimni, 2015). Future research ought to take both biological markers and (socio-) environmental factors, like parenting style, and especially their interaction into account when examining the longitudinal development of *n*Power.

Furthermore, our findings are limited to a Western individualistic sociocultural context. Cross-cultural research points to the generalizability of many findings in the domain of implicit motives and their correlates (see, Hofer & Chasiotis, 2022, for an overview) as well as the domain of parenting style (Lehmann et al., 2021). Therefore, future studies ought to take into consideration that the association of certain parental styles and the development of implicit motives might differ as a function of cultural context.

Finally, we did not test for effects of response styles (e.g., social desirability) on data assessed by parents and children. Findings regarding the GE-APQ and social desirability postulate effects only on responses in the domains of extremely positive (i.e., positive parenting) or extremely negative (i.e., corporal punishment) parenting (Reichle & Franiek, 2009). One possibility to work around this issue is the use of observational data regarding parenting style. Research regarding the APQ has demonstrated positive associations of observational data and self-report measures regarding parenting style (Hawes & Dadds, 2006). Yet, there are reports on a decrease in the (ecological) validity of behavioral observation of parenting style as children grow older (Keller, 1986). Taken together, findings suggest that assessing parenting style in a sample of school-aged children via self-report is a reliable and economic measure. We assume that effects of social desirability on our significant moderation results are negligible, however, we cannot rule out the possibility that social desirability led to an exaggeration of positive characteristics.

Summing up, our study adds recent evidence to the literature concerning the development and stability of the implicit power motive in childhood by highlighting the role of parenting. Of course, given the tentative character of our findings, future research based on pre-registered hypotheses is needed to replicate these findings and to examine the development of implicit motives in more detail, starting even earlier in childhood and continuing into adulthood to

gain more insight into the stability of implicit motives and identify possible developmental windows.

Acknowledgements Part of this research was supported by a grant of the German Research Foundation awarded to the last author (DFG, HO 2435/10-1).

Author contributions Ellen Kerpen: Conceptualization, data curation, formal analysis, investigation, project administration, writing (original draft); Holger Busch: Funding acquisition, writing (review and editing); Benedikt Schulte im Busch: Data curation, investigation, project administration; Jan Hofer: Conceptualization, funding acquisition, project administration, supervision, writing (review and editing).

Funding Part of this research was supported by a grant of the German Research Foundation awarded to the last author (DFG, HO 2435/10-1).
Open Access funding enabled and organized by Projekt DEAL.

Data availability Due to copyright infringement, children's PSE pictures cannot be made publicly available but can be obtained from the first author upon reasonable request. The data and all other research materials that the analyses are based upon are available at https://osf.io/muxtq/?view_only=8478b5cf50384e51a45da53ec0ac780e.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Compliance of ethical standard The Research Ethics Committee of the Trier University approved the study. The study was conducted in accordance with the Declaration of Helsinki.

Informed consent Parents were asked for permission and prior to data assessments signed an informed consent form. Verbal informed consent was obtained from children prior to data assessments. Both parents and children voluntarily participated in the study and were guaranteed that any information given would be treated confidentially.

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Footnotes 1 Yet 85 words at t1 appeared to be rather moderate. Thus, we performed the main analyses with and without the respective child. There was no indication of any differences in the pattern of results. Hence, we report results including all 66 participants. 2 Details on regression analyses including covariates can be accessed here: https://osf.io/muxtq/?view_only=8478b5cf50384e51a45da53ec0ac780e

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