

Research Article

Different Pathways Leading to Prosocial Behavior in Preschoolers: The Role of Parenting Style, Child Temperament, and Self-Regulation

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Prosocial behavior, which encompasses actions intended to benefit others, develops rapidly during the preschool years and is shaped by both environmental and individual factors. We aimed to explore the possible relationships between parenting styles, children's cognitive and emotional self-regulation, and their temperament in relation to prosocial behavior in preschoolers. A cross-sectional study was conducted involving 524 parents ($M = 35.57$ years; 488 females) who completed the survey about their children ($M = 56.15$ months; 263 females). The survey included measures of parenting style (Parenting Styles and Dimensions Questionnaire (PSDQ)), child's self-regulation (Child Self-Regulation and Behavior Questionnaire (CSBQ)), temperament (Emotionality, Activity, Sociability Temperament Questionnaire (EAS)), and prosocial behavior (Strengths and Difficulties Questionnaire (SDQ)). According to the structural equation model, authoritarian parenting and sociability were connected to prosocial behavior. Regarding indirect pathways, authoritarian, authoritative, and permissive parenting styles; emotionality; and activity temperamental factors were associated with prosocial behavior through cognitive and emotional self-regulation. Our results indicate that parenting characterized by warmth, consistency, and reasoning, along with the absence of excessive criticism, rigidity, and inconsistency, is associated with self-regulation and prosocial behavior. Temperament is presumably linked to prosocial behavior through a high approach tendency toward social situations and low emotionality. Self-regulation may support prosocial behavior by enabling the adaptive management of emotions and attention in different situations. This integrative model may contribute to a more comprehensive understanding of prosocial behavior in context.

Keywords: parenting style; prosocial behavior; self-regulation; temperament

1. Introduction

Investigating the origins and development of prosocial behaviors (actions apparently benefiting another agent without providing a direct payoff for the actor) is a central issue in developmental psychology research [1]. Although many studies are looking at the direct effects of the factors that shape prosocial behavior [2–4], less is known about how they interact, considering the mediating factors and mechanisms [5]. The present research is aimed at exploring these

effects on prosocial behavior through parenting style, child temperament, and self-regulation skills.

Preschoolers are generally engaged in three types of prosocial behavior [1]. (1) Instrumental helping describes the tendency to help others achieve an action goal. (2) Sharing involves the allocation of one's own resources to others. (3) Comforting is characterized by reactions to others' distress that aim at relieving negative emotions [6]. It is still an open question whether these behaviors are related or not, but Paulus [1] proposes a multidimensional approach to the

study of prosocial behavior; in the early years, prosocial behavior may be subserved by a variety of different actions, mechanisms, and motivations, and later in development, they become more integrated and more coherent.

According to Dunfield and Kuhlmeier [7], to engage in prosocial behaviors, children need to undergo a three-step process. (1) They must be able to recognize behavioral or situational cues from the social environment that suggest another person is experiencing a negative state. (2) They must identify the appropriate intervention to help the other reduce this negative state. (3) They must be motivated to engage in prosocial behavior in the other's favor. Identifying and understanding individual and environmental factors contributing to the steps of this process are important because they are related to later developmental outcomes, such as school performance, peer acceptance, psychological adjustment, and aggression [5, 8, 9]. But which are the key factors contributing to the development of prosocial behavior? Do they operate in separate ways or together?

Parenting behaviors can promote prosocial behavior in children by modeling parental warmth and discipline and internalizing prosocial values through parental control [8]. Authoritative parenting supports prosocial development by modeling other-oriented behavior, encouraging children to be more considerate and caring, and eliciting affection and connectedness that make children more receptive to efforts to foster concern for others [10]. Authoritarian parenting, on the other hand, could hinder children's prosocial behavior by demonstrating a disregard for others' needs or fostering hostility, leading to the rejection of parental attempts at socialization. Permissive parents are responsive, but they are also undemanding; they do not provide clear rules and are not consistent in following these rules. In general, authoritarian and permissive parents are less likely to cultivate prosocial development; however, mixed findings are evident concerning the roles of these parenting styles [4]. As parenting styles may contribute to the development of prosocial behavior in different ways, we also need to consider potential mediating mechanisms [8, 11].

Parenting can have indirect effects on prosocial development through children's self-regulation. Parental warmth and involvement, positive discipline, reasoning, and explanations play an important role in the development of self-regulatory skills associated with the enactment of prosocial behaviors [8]. Although self-regulation is an umbrella term including several interrelated mechanisms, in this study, we focus on cognitive and emotional regulation as early foundational aspects of self-regulation [12, 13]. Cognitive regulation involves the ability to maintain attention for prolonged periods and switch focus when necessary [14]. Emotional regulation refers to the ability to manage and adjust emotional states to support adaptive functioning [15]. Children with stronger self-regulatory skills are likely to respond more prosocially to others. For instance, a past study [16] showed that 4-year-old children with higher attention regulation and lower emotional reactivity (indicating better emotional regulation) were rated by their teachers as more prosocial than children with low attention regulation and high emotional reactivity. This indicates that enhancing

emotional and attentional regulation in young children might be a way to foster greater prosocial behavior.

Parental sensitivity and responsiveness to the child's needs also support self-regulation in several ways. In the preschool years, sensitive and responsive care implies prompt, accurate, and consistent reactions to the child's behavior. In this process, the parent ensures the child's autonomy but provides help when the child needs it. This behavior is beneficial for the child's development of self-regulation because it allows the child to try to solve different situations in a safe environment [17]. In fact, previous studies [18, 19] found that self-regulation and responsive and authoritative parenting at Age 3 predicted children's effortful control at age four and children's expressed sympathy for others at Ages 6 and 7. Furthermore, according to Mathis and Bierman's [20] findings, lower levels of critical and directive parenting correlated with emotional and attentional regulation in children, while parental warmth and sensitivity showed no significant relationship. Taken together, it is still an open question whether high levels of warmth or the absence of critical parenting are most important for children's self-regulatory behavior [13]. Children of permissive parents exhibit poor emotional regulation, socially unacceptable behaviors, low persistence when faced with challenges, and resistance when their demands are limited [21, 22]. Parenting can therefore contribute to the development of prosocial behavior both directly and indirectly, for example, through cognitive and emotional aspects of self-regulation.

A large body of past research has emphasized the role of temperament in explaining differences in preschoolers' prosocial behavior (e.g., [8, 23, 24]). Temperament consists of inherent tendencies within the individual that form the basis for the expression of activity, reactivity, emotionality, and sociability [25, 26]. Children with moderate levels of emotionality and higher levels of behavioral control exhibit more prosocial behaviors. Conversely, undercontrolled or inhibited children are less prosocial [27]. Nevertheless, the relationship between temperament and self-regulation and its impact on prosocial behavior may be problematic to map due to difficulties in conceptualizing the components of self-regulation and temperament. A recent meta-analysis [28] of 37 studies that examined the associations between self-regulation and morality in preschool and elementary school children included some temperament traits, executive functions, and emotion regulation mechanisms in the category of "self-regulation." This may therefore make it difficult to distinguish between the different constructs. Difficulties may be compounded by the complex transactional relationship between temperament and self-regulation. For example, a more emotionally reactive child may need higher levels of self-regulation to function optimally [27]. Furthermore, it has been shown that children who are calm or easily reassured and persistent are more likely to exhibit socially competent behavior [27]. Past studies (e.g., [29, 30]) investigating the link between temperament and social skills tended to focus more on maladaptive behaviors (e.g., externalizing and internalizing behaviors), with just a few studies focusing on positive developmental outcomes [31]. Finally, past research mainly focused on the relationship between temperament and emotion

regulation in predicting different social behaviors, such as prosocial behavior, adjustment, and peer acceptance [32], and paid little attention to the cognitive aspect in the context of prosocial behavior. These difficulties are further compounded by the fact that there are only a limited number of studies that have been conducted in the preschool population.

Thus, in the present study, we aimed to test the relationship between parenting style, child temperament, self-regulation, and prosocial behavior in preschool children, with a focus on positive developmental outcomes. We propose a theoretical model (see Figure 1) that describes this complex relationship. Parenting style and child temperament are the first levels of predictors because they are temporally stable, trait-like factors that serve as a background for prosocial development. We hypothesized that cognitive and emotional self-regulation would mediate the relationship between these and prosocial behavior. Exploring these factors and their mechanisms of interaction may help to better understand prosocial development in context and highlight positive aspects of development as our outcome focuses on social adjustment rather than maladjustment.

2. Method

2.1. Participants and Procedure. Our research used a quantitative cross-sectional nonexperimental single-group design. We examined relationships between data from questionnaire variables collected at a single point in time in a conventional sample of Hungarian parents. The required sample size for this experiment was determined by computing estimated statistical power (root mean square error of approximation RMSEA = 0.05, $\alpha = 0.05$, power = 0.95, $df = 44$, $p = 8$) using the *semPower* Package for R [33, 34]. The analysis indicated a required total sample size of 374; however, we aimed to collect more data than that to account for incomplete answers and possible exclusions. The inclusion criterion was to have at least one child between the ages of 3 and 7. We excluded children with mental or neurological disorders because treating atypical children as an independent sample would not have been feasible due to the large individual differences. This criterion was necessary because we intended to use a convenience sampling method. A total of 607 Hungarian parents completed our survey. We excluded 41 respondents because their child was out of the age range studied (i.e., their child was less than 3 or more than 7 years old), and another 42 respondents were excluded because of the atypical development of their child. Thus, the total sample we analyzed consisted of 524 parents (mean age = 35.57 years; SD: 4.65; range: 21–49; 36 males, 488 females) who completed the survey about their children (mean age = 56.15 months; SD: 12.53; range: 36–86; 261 males, 263 females). Supporting Information 1: Table S1 shows the main sociodemographic characteristics of the participating parents and children.

We collected the data during the spring of 2023. We recruited participants via various social media sites (e.g., Facebook and Instagram). All respondents filled out the survey online voluntarily and anonymously using Google Forms. No information was requested from participants that could be used to identify them (e.g., email address). Participation was voluntary, and respondents did not get any com-

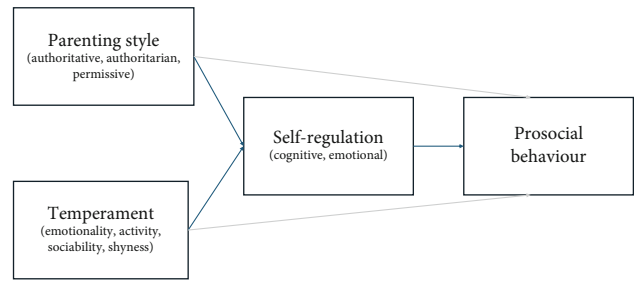


FIGURE 1: The proposed theoretical model of the relationship between parenting style, temperament, self-regulation, and prosocial behavior.

pensation. We obtained informed and written consent from all participants. The study received ethical approval as part of a larger research project on preschoolers' prosocial development from the Hungarian United Ethical Review Committee for Research in Psychology (Ref. No. 2023-138). The research was carried out in accordance with the code of ethics of the World Medical Association (Declaration of Helsinki).

2.2. Measures

2.2.1. Parenting Styles. We used the Parenting Styles and Dimensions Questionnaire (PSDQ; [35]; adapted to Hungarian by [36]) to measure the three main facets of parenting styles: *authoritative* (e.g., "I take my child's wishes into consideration before I ask him/her to do something."), *authoritarian* (e.g., "When my child asks me why he/she has to do something I tell him/her it is because I said so, I am your parent, or because that is what I want."), and *permissive* (e.g., "I appear unsure on how to solve our child's misbehavior."). The questionnaire has 32 items, and each item asks the participant to evaluate the general frequency of the parenting practices on a scale from 1 (*never*) to 5 (*always*). Higher scores reflect a greater likelihood of using that parenting style. In this study, the parents filled out the questionnaire only about themselves and not about their partners. In our study, McDonald's omegas were 0.77 for the *authoritative*, 0.82 for the *authoritarian*, and 0.59 for the *permissive* subscale.

2.2.2. Self-Regulation. We used the Child Self-Regulation and Behavior Questionnaire (CSBQ; [37]; adapted to Hungarian by [38]) to measure self-regulation on three levels (cognitive, emotional, and social). The CSBQ is a 19-item questionnaire with three subscales: *cognitive self-regulation* (e.g., persists with difficult tasks), *emotional self-regulation* (e.g., is calm and easygoing), and *social self-regulation* (e.g., has regular friends). Each item asks the parent to evaluate the general frequency of the child's target behaviors on a scale from 1 (*not true*) to 5 (*certainly true*). Higher scores reflect higher levels of self-regulation. In the present study, McDonald's omegas were 0.75 for the *cognitive*, 0.76 for the *emotional*, and 0.76 for the *social* subscale.

2.2.3. Temperament. We measured children's temperament using the 20-item Emotionality, Activity, Sociability Temperament Questionnaire (EAS; [39]; adapted to Hungarian by [40]), which measures temperament on four subscales:

emotionality (tendency to show distress), *activity* (preferred level of activity), *shyness* (tendency to be inhibited with unfamiliar people or new situations), and *sociability* (tendency to prefer the company of others). Items are rated from 1 (*my child's behavior is never like this*) to 5 (*my child's behavior is always like this*). Higher scores reflect higher levels on each of the temperament dimensions. In the present study, McDonald's omegas were 0.76 for the *emotionality*, 0.72 for the *activity*, 0.79 for the *shyness*, and 0.67 for the *sociability* subscale.

2.2.4. Prosocial Behavior. To measure prosocial behavior, we used the *prosocial behavior* subscale of the Strengths and Difficulties Questionnaire (SDQ; [41]; adapted to Hungarian by [42]). The scale taps five items related to kindness and consideration for others, sharing, helping with chores, and in situations where other children are hurt or sick. The instrument requires parents to respond to items as either 0 (*not true*), 1 (*somewhat true*), or 2 (*certainly true*). Higher scores indicate improved or better prosocial skills. In this study, McDonald's omega on the scale was 0.68.

Supporting Information 2: Table S2 shows the descriptive statistics of the investigated variables.

2.3. Data Analysis. The final sample of 524 parents fully completed the survey (there were no missing responses), so all data were included in the analysis. We performed the statistical analyses using the JAMOVI Version 2.4 [43] and the JASP Version 0.16.1 [44] statistical programs. All variables were normally distributed as the absolute values of skewness and kurtosis were less than 2 [45].

First, we sought to explore the possible relationships between *parenting styles*, *self-regulation skills*, *temperament factors*, and *prosocial behavior* with Pearson's correlation. For the results, see Supporting Information 3: Table S3.

Then, we carried out three separate generalized linear models (GLMs) to explore the relationship between the variables that comprise our theoretical model. In our final model, we included variables based on their significance in the GLMs for structural equation modeling (SEM). In Model 1, the dependent variable was *prosocial behavior*, while *authoritarian*, *authoritative*, and *permissive parenting styles*; *cognitive self-regulation*, *emotional self-regulation*, and *social self-regulation*; and *emotionality*, *activity*, *sociability*, and *shyness* were entered as independent predictors. Subsequently, we performed two GLMs to test the parenting style and temperament variables' predictive value on self-regulation skills (Models 2 and 3, respectively). *Cognitive* and *emotional self-regulation* scores were entered as outcome variables (again, in two separate models), and parenting style and temperament (same as previously) were included as independent predictors. We did not perform a GLM with *social self-regulation* because it had no significant predictive power in the first GLM model predicting prosocial behavior.

Then, we performed SEM to assess fit measures for our proposed model (see Figure 2), which we based on the results of the previous GLM analyses. We allowed covariance between the two self-regulation factors based on theo-

retical considerations [12, 13] because they were correlated. All variables were entered as measured variables.

To ensure that the distribution of variables does not bias the results, we standardized the variables before entering them into the model and used a robust estimator in the analysis. To assess model fit, we used the comparative fit index (CFI), the Tucker–Lewis index (TLI), the RMSEA, and the standardized root mean squared residual index (SRMR). The cutoffs for good model fit were CFI and TLI values of 0.95 or greater and RMSEA and SRMR values of 0.08 or lower [46–48]. Statistical results will be presented in tables instead of in the text to make the description of the results easier to follow and more understandable.

3. Results

3.1. General Linear Models. The first GLM regarding *prosocial behavior* was significant ($\text{adj.}R^2 = 0.287$). See Table 1 for the detailed statistical results and individual variable effects. *Authoritative parenting style*, *cognitive self-regulation*, *emotional self-regulation*, and *sociability temperament factor* were associated with *prosocial behavior*; *authoritarian parenting style*, *permissive parenting style*, *sociability self-regulation*, *emotionality*, *activity*, and *shyness* had no significant association with *prosocial behavior*.

Regarding *cognitive self-regulation*, the GLM was also significant ($\text{adj.}R^2 = 0.222$). See Table 2 for the detailed statistical results and individual variable effects. *Authoritative parenting style*, *permissive parenting style*, *emotionality*, and *activity* were associated with *cognitive self-regulation*. *Authoritarian parenting style*, *sociability*, and *shyness* showed no significant association with *cognitive self-regulation*.

In the case of *emotional self-regulation*, the GLM was also significant ($\text{adj.}R^2 = 0.444$). See Table 2 for the detailed statistical results and individual variable effects. *Authoritarian parenting style*, *permissive parenting style*, *emotionality*, and *activity* were associated with *emotional self-regulation*. *Authoritative parenting style*, *sociability*, and *shyness* had no significant association with *emotional self-regulation*.

3.2. SEM Model. The SEM analysis yielded a good model fit ($\chi^2(6) = 1.99$, $p = 0.921$, CFI = 1.000, TLI = 1.012, RMSEA = 0.000 [90% confidence interval (CI): 0.000–0.020], SRMR = 0.007). *Cognitive self-regulation* ($R^2 = 0.227$) was positively associated with *authoritative parenting style* and *activity* and negatively associated with *permissive parenting style* and *emotionality*. *Authoritarian parenting style* was not associated with *cognitive self-regulation*. *Emotional self-regulation* ($R^2 = 0.456$) was negatively associated with *authoritarian parenting style*, *permissive parenting style*, *emotionality*, and *activity*. *Authoritative parenting style* was not associated with *emotional self-regulation*. *Prosocial behavior* ($R^2 = 0.294$) was positively associated with *authoritative parenting style*, *cognitive self-regulation*, *emotional self-regulation*, and *sociability*.

Regarding the indirect pathways, we found that the *authoritative parenting style* was associated with *prosocial behavior* through *cognitive self-regulation*. *Authoritarian parenting style* was associated with *prosocial behavior*

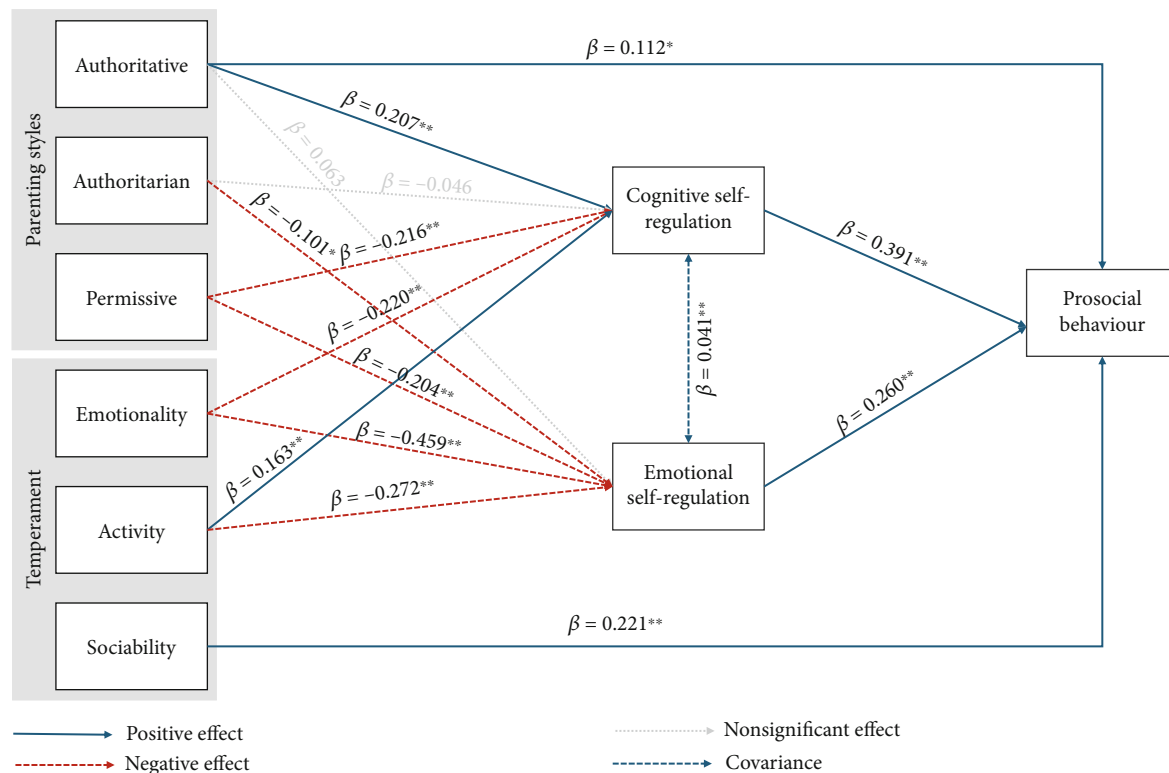


FIGURE 2: Our proposed model of the relationship between parenting styles, temperament factors, self-regulation skills, and prosocial behavior. Note: All pathways and variables included in the analysis are displayed. The reported estimates are standardized estimates (β). Parenting styles are marked with a dashed square, and temperament factors are marked with a dotted square. Positive effects are marked with solid blue lines, negative effects are marked with dashed red lines, and nonsignificant effects are marked with dotted grey lines. * $p < 0.05$; ** $p < 0.001$.

through *emotional self-regulation*. *Permissive parenting style* was associated with *prosocial behavior* through *cognitive self-regulation* and *emotional self-regulation*. *Emotionality* was associated with *prosocial behavior* through *cognitive self-regulation* and *emotional self-regulation*. *Activity* was associated with *prosocial behavior* through *cognitive self-regulation* and *emotional self-regulation*. The covariance between *cognitive self-regulation* and *emotional self-regulation* was significant. For the exact β values, see Figure 2, and for all statistical values, including the point estimates, standard errors (SEs), β values, z values, and p values for both direct and indirect pathways, see Supporting Information 4: Table S4.

4. Discussion

Prosocial behaviors emerge in the early years of life and several individual (e.g., temperament and self-regulation) and environmental (e.g., parenting style) factors can contribute to the development of these behaviors. During this period, children's social environment becomes extended beyond the family to include teachers and peers, which further challenges children's emerging prosocial skills. However, the number of previous studies addressing this relationship in preschool children is limited. In addition, the generalizability of findings from previous research on the relationship between temperament and self-regulation and its impact on prosocial behavior may be problematic due to difficulties in conceptualizing the components of self-regulation and

temperament [28] and due to the fact that previous studies have mostly focused on maladaptive behaviors [29, 30], and little attention has been paid to the cognitive aspect in the context of prosocial behavior [32]. Thus, we sought to address these issues in the present study. In sum, we found that cognitive and emotional self-regulation skills mediated between parenting style and temperament factors and prosocial behavior, which is consistent with previous theoretical considerations. The results of our research suggest that prosocial behavior in early childhood could be linked to temperamental factors and parenting styles through various possible pathways.

A more *authoritative parenting style* was directly associated with higher levels of prosocial behavior. Our result is consistent with the claim that this parenting style is strongly associated with positive developmental outcomes [4], including prosocial behavior [49]. This parenting style is characterized by a warm parent-child relationship, clear expectations, reasoning, and open, two-way communication. Children of authoritative parents show greater autonomy and self-control, are more courageous in new situations, and show openness in their social relationships [21, 50]. Authoritative parenting style was also associated with prosocial behavior through cognitive self-regulation. Several recent studies (e.g., [49, 51]) suggest that authoritative parenting is indirectly associated with prosocial behavior, but they mainly emphasize the role of empathy and emotional regulation as mediating factors. Our findings suggest that parental reasoning, explanations of situations and

TABLE 1: Results of the GLM analysis of Model 1. The associations of parenting styles, self-regulation, temperament, and prosocial behavior variables.

Predictors	Prosocial behavior		
	β	95% CI	
		Lower	Upper
PSDQ (authoritative)	0.099*	0.016	0.182
PSDQ (authoritarian)	-0.0048	-0.092	0.083
PSDQ (permissive)	-0.038	-0.122	0.046
CSBQ (cognitive self-regulation)	0.297**	0.212	0.383
CSBQ (emotional self-regulation)	0.234**	0.133	0.334
CSBQ (social self-regulation)	0.076	-0.048	0.199
EAS (emotionality)	0.021	-0.070	0.112
EAS (activity)	-0.045	-0.133	0.043
EAS (sociability)	0.199**	0.114	0.285
EAS (shyness)	-0.038	-0.162	0.085
Adjusted R^2	0.287		
$F(10,513)$	22.0**		

Note: The presented values are adjusted R^2 and F for the model standardized estimates (β) and the 95% confidence interval for the predictors. Abbreviations: EAS, Emotionality, Activity, Sociability Temperament Questionnaire; CSBQ, Child Self-Regulation and Behavior Questionnaire; PSDQ, Parenting Styles and Dimensions Questionnaire.

* $p < 0.05$.

** $p < 0.001$.

consequences, and parental consistency may support the development of those cognitive processes that allow children to recognize and interpret social situations more quickly through cognitive evaluation, which may contribute to the emergence of prosocial behavior [17]. Kang and Guo [49] found that certain emotion regulation strategies positively mediated the relationship between authoritative parenting and prosocial behavior. In contrast, our results did not show a significant relationship between authoritative parenting and prosocial behavior through emotional self-regulation. We suggest that this contradiction may be resolved by the fact that Kang and Guo's study examined cognitive emotion regulation strategies. These variables are more similar to our concept of cognitive self-regulation, which is found to be a mediating factor between authoritative parenting and prosocial behavior. However, our study's emotional self-regulation variable includes more behavioral outcomes of successful or less successful emotion regulation in preschool children, such as emotional stability versus impulsivity. Given the direction of effects, our findings suggest that children with strong cognitive self-regulation skills and higher prosocial tendencies may elicit an optimal or lower level of parental control, warmth, and encouragement [52, 53].

We suggested that there is a link between the extreme levels of control present in both permissive and authoritarian parenting styles and the development of cognitive and emotional self-regulation. *Authoritarian parents* are very strict and demand absolute obedience. Communication is more commanding, and the parent punishes when the child breaks the rules. Authoritarian parenting is linked to children's aggression, anxiety, and low self-esteem. Our results

did not show a significant association between authoritarian parenting and prosocial behavior through cognitive self-regulation. In general, there are no clear research findings on the relationship between authoritarian parenting style and cognitive regulation, and less attention has been paid to this parenting style [54]. For example, the meta-analysis by Valcan, Davis, and Pino-Pasternak [55] found that negative parental behaviors that feature in authoritarian style (e.g., control, intrusiveness, and detachment) had a significant negative association with the cool aspect of children's executive function. However, the review by Fay-Stammach, Hawes, and Meredith [56] pointed out that few studies have examined the association between the parental control/discipline featured in authoritarian parenting and self-regulation, and the results were mixed, with negative and null relationships. Authoritarian parenting style also involves less sensitivity and attention to the child, which increases the likelihood of emotional rejection [57]. Emotional rejection combined with strict control may hinder the development of adaptive emotion regulation and lead to anxious or oppositional, impulsive behavior.

Further, a *permissive parenting style* is overly supportive of the child's aspirations, allowing a great deal of freedom, demonstrating a lack of control, and setting fewer rules. These parents are emotionally variable; some are warm and have an accepting relationship with their child, while others are cold, distant, and disinterested in their child [21, 50]. The permissive parenting style was indirectly and negatively linked with prosocial behavior, which is mediated by both cognitive and emotional self-regulation. This parenting style lacks the cognitive (reasoning, consistency, setting, and maintaining boundaries) and emotional (opportunity to experience a wide range of emotions and retention of negative emotions) components that support the development of regulatory skills. During the preschool years, this leads to immaturity, poor self-control, and lack of independence [54]. Williams and Berthelsen [13] pointed out that, in the case of permissive parenting, it is difficult to decide whether emotional warmth or lack of control contributes more to the development of self-regulation. Our findings suggest the latter. Here again, we should highlight that child-to-parent effects lie behind the findings. Different studies showed that children with emotional and cognitive self-regulation difficulties might trigger extreme levels of control from their parents [58, 59].

Regarding the temperament factors, we found that *emotionality* was negatively associated with prosocial behavior through cognitive and emotional regulation. This temperament factor is about how easily and how intensely an individual's arousal level rises in negative emotional situations [39]. If a child is characterized by high emotionality, in interpersonal situations that trigger negative emotions, the child may be overwhelmed by these negative feelings and will be busy coping and avoiding them rather than helping the other in need. In addition, *activity* was positively associated with prosocial behavior through cognitive regulation and negatively through emotional regulation. Several studies have found a link between higher physical activity and better cognitive performance and regulation (for the review, see [60]). They highlight the stimulatory effect of activity on

TABLE 2: Results of the GLM analysis of Models 2 and 3. The associations of parenting style, temperament, cognitive self-regulation, and emotional self-regulation variables.

Predictors	Cognitive self-regulation			Emotional self-regulation		
	β	Lower	Upper	β	Lower	Upper
PSDQ (authoritative)	0.177**	0.151	0.429	0.0612	-0.01886	0.2361
PSDQ (authoritarian)	-0.048	-0.229	0.071	-0.091*	-0.30150	-0.0262
PSDQ (permissive)	-0.204**	-0.291	-0.121	-0.204**	-0.30020	-0.1445
EAS (emotionality)	-0.213**	-0.222	-0.098	-0.472**	-0.44192	-0.3290
EAS (activity)	0.174**	0.073	0.219	-0.221**	-0.26819	-0.1350
EAS (sociability)	-0.059	-0.132	0.025	-0.021	-0.09283	0.0514
EAS (shyness)	-0.071	-0.109	0.012	0.070	-0.00427	0.1075
Adjusted R^2	0.222			0.444		
$F(10,513)$	22.3**			60.74**		

Note: The presented values are adjusted R^2 and F for the model standardized estimates (β) and the 95% confidence interval for the predictors. Abbreviations: EAS, Emotionality, Activity, Sociability Temperament Questionnaire; PSDQ, Parenting Styles and Dimensions Questionnaire.

* $p < 0.05$.
** $p < 0.001$.

cognitive performance (e.g., working memory) and regulation (e.g., attention regulation and inhibition). This supports the positive association we found between activity and cognitive regulation. Regarding the relationship between activity and emotion regulation, the negative effect might be explained by the fact that increased activity may be a behavioral manifestation of arousal regulation, which can lead to restless, impulsive behavioral traits typical of emotionally under-regulated children. Temperamentally active children use some form of activity in regulation to overcome frustration and negative emotions. In their research, Schoppmann, Schneider, and See-hagen [61] found that children with more active temperaments engage in more active play activities in a frustration-provoking situation than their less active temperament peers. Thus, it may be that activity supports the cognitive side, while it is negatively related to emotion regulation. *Sociability* (the tendency for the individual to seek the company of others) was directly and positively associated with prosocial behavior. This is in line with past results claiming that children who are open to and comfortable participating in social situations are more likely to exhibit prosocial behavior [62].

4.1. Limitations and Future Directions. Several limitations of the present study should be noted. The first is the homogeneity of the sample and thus the generalizability of the results. The sample was collected through convenience sampling via social media platforms. Although it is difficult to reach families from lower socioeconomic status and different ethnic minorities in Hungary, a more targeted sample could be used in the future to broaden the range of participants. Secondly, as it is a cross-sectional survey research, the results should be interpreted with caution regarding causality. Future studies could employ longitudinal designs to more rigorously establish causal relationships among these variables. Another limitation is that the reliance on parent-reported data in our study could lead to potential subjectivity about children's behavior [63]. This may have led to a

decrease in the external and ecological validity of our measurements; however, several studies have investigated the level of agreement between different evaluators, with findings indicating a correlation between maternal assessments and those of teachers and fathers regarding both positive and negative social behaviors [64–67]. Also, the reliability of the measurement tools was found to be adequate; therefore, we assume that valid conclusions could be drawn from our results. To increase the objectivity and authenticity of future findings, it would be valuable to include experimental and observational measures and teacher reports of preschoolers' psychological states and performance during various stages of development. Additionally, our concurrent design limited our ability to examine influential factors on prosocial development. Parent-child dynamics are likely bidirectional. As our results show, parental characteristics can be associated with children's self-regulation and prosocial behavior, but self-regulation and prosocial behavior may influence the parenting and disciplinary strategies that parents use. Future research could address these limitations by considering transactional relationships over time.

5. Conclusions

Many factors may be associated with the development of prosocial behavior. This study focuses primarily on examining the relationship between parenting style, child temperament self-regulation skills, and prosocial behavior. Exploring these factors and their mechanisms of interaction may help to better understand prosocial development in context and highlight positive aspects of developmental outcomes, but it cannot completely rule out the effects of other influencing factors, such as attachment, empathy, theory of mind, and peer relationships [2, 3, 32, 68]. Therefore, an integrative approach may be important, which can collectively investigate these psychological mechanisms, outlining different pathways in the development of prosocial behavior.

Data Availability Statement

The data that support the findings of this study are available from the OSF page of the study (https://osf.io/hxnrz/?view_only=6290574b509841dfa437bccdb2a795a).

Conflicts of Interest

The authors declare no conflicts of interest.

Author Contributions

R.O.: conceptualization, formal analysis, investigation, resources, data curation, writing—original draft preparation, writing—review and editing, and funding acquisition. M.P.: conceptualization, formal analysis, investigation, writing—review and editing, and supervision. A.N.Z.: data curation, writing—review and editing, and supervision. B.L.K.: data curation and writing—review and editing. All authors have read and agreed to the published version of the manuscript.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supporting Information 1. Table S1: demographic characteristics of the sample by education, marital status, subjective income, and number of children.

Supporting Information 2. Table S2: descriptive statistics of the investigated variables. In the following table, we provided the descriptive statistics of the investigated variables, such as the parenting styles (authoritarian, authoritative, and permissive), self-regulation skills (cognitive self-regulation, emotional self-regulation, and sociability), temperament (emotionality, activity, sociability, and shyness), and prosocial behavior.

Supporting Information 3. Table S3: correlation matrix. In the following table, we provided the result of the Pearson correlations between the investigated variables, such as the parenting styles (authoritarian, authoritative, and permissive), self-regulation skills (cognitive self-regulation, emotional self-regulation, and sociability), temperament (emotionality,

activity, sociability, and shyness), and prosocial behavior. We presented Pearson's r and the p value for each variable.

Supporting Information 4. Table S4: SEM—direct and indirect pathways in the SEM analyses.

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