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Teacher-child dependency in preschool: links with teacher-child closeness, conflict and children's effortful control

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ABSTRACT

Dependency is a scarcely investigated dimension of teacher-child (T-C) relationships that can reflect a lack of security and obstruct children's autonomous exploration in the school context. We examined the within- and cross-time associations between T-C dependency, closeness, and conflict, and children's effortful control, an ability related to children's self-regulation. Data were collected during the preschool period at two time-points (T1 and T2) 1-year apart. Participants were 199 children (44% girls, *M* age = 47.47) attending 46 middle-class preschool classrooms. Results from path analyses indicated that, though marginally significant, there was a positive association between T-C dependency and conflict at T1. At T2, dependency was positively related to both conflict and closeness. Dependency at T1 positively predicted children's effortful control at T2. This study clarifies the interconnection between T-C dependency, closeness and conflict, and the unique contribution of dependency on children's effortful control. Findings are discussed considering the socio-cultural meaning of dependency.

KEYWORDS

Teacher-child dependency;
teacher-child closeness;
teacher-child conflict;
effortful control

Relational dynamics within the school context and how they influence children's well-being and development are a major current focus in educational research. In this domain, teacher-child (T-C) relationship quality is a core aspect of children's school adjustment (Lei et al., 2016; Vandenbroucke et al., 2017). The importance of T-C relationships is particularly evident during the preschool ages, when children rely heavily on adults to model their behavior (Lei et al., 2016). Nevertheless, our current understanding of T-C relationships during these ages is limited in some aspects. The available literature gives special emphasis to the affective quality of T-C relationships, in specific the levels of closeness and conflict, while other dimensions of this dyadic relationship, such as dependency, autonomy support, and behavior management, remain less explored (Vandenbroucke et al., 2017). As a consequence, research topics such as the interconnections between different dimensions of T-C relationships and their unique contributions to children's socioemotional adjustment have not received enough attention. The current study focuses on T-C dependency in preschoolers, examining how this dimension of T-C relationships relates to closeness and conflict. Furthermore, this study investigates

the links between these three dimensions of the T-C relationship and children's effortful control, an ability related to children's emotional and behavioral self-regulation. Our goal was to understand the unique contribution of T-C dependency to this pivotal ability to children's socioemotional adjustment, while considering the interconnections between dependency, closeness, and conflict.

An attachment perspective on T-C relationship

Research on T-C relationships is largely influenced by attachment theory (Ainsworth, 1972, 1989). An attachment bond can be defined as a relatively long-enduring tie with a non-interchangeable partner that can provide the experience of security and the necessary confidence to engage in exploring activities (Ainsworth, 1989). Although the T-C relationship hardly fits within a strict definition of attachment bond, some aspects of this definition are used to frame the relationship between a child and his or her teacher (Verschueren & Koomen, 2012). The teacher has been considered an *ad hoc* attachment figure that, in specific circumstances, can assume the role of safe haven and secure base (Verschueren & Koomen, 2012). Several studies support this idea, indicating that children frequently use their teachers as a secure base from which to explore the school environment (Ahnert et al., 2006; Koomen & Hoeksma, 2003). A meta-analysis conducted by Ahnert et al. (2006) shows that children can adopt a wide array of attachment-related behaviors towards their teachers, suggesting that secure base behavior can be observed in T-C relationships.

An attachment perspective on T-C relationships has stressed the significance of three dimensions of T-C relationships: closeness, conflict and dependency (Pianta, 1992; Sabol & Pianta, 2012). These have usually been measured using the Student-Teacher Relationship Scale (STRS, Pianta, 2001). High levels of closeness in the T-C relationship suggest that the child is able to use the teacher as a safe haven, maintaining open communication, warm and harmonious interactions. On the contrary, high levels of conflict can denote resistance and disharmony that usually characterize insecure attachment relationships (Pianta, 1992, 1999). The dimension of T-C dependency focuses on the extent to which the child shows overreliance on the teacher for help and proximity, indicating a lack of secure base use of the teacher (Verschueren & Koomen, 2012). Children showing high dependency on their teacher rarely explore their environment independently, thus missing crucial learning experiences that can promote their self-regulation (Vandenbroucke et al., 2017). Consequently, when assessing the role of attachment-based dimensions of T-C relationships for children's self-regulation, it is key to consider dependency in addition to closeness and conflict.

Despite the arguments for considering dependency as a key-component of the T-C relationship, this dimension was often disregarded by studies using the STRS due to reliability issues and model misfit (Hamre & Pianta, 2001; Lei et al., 2016). Still, there have been some efforts to improve the psychometric qualities of this dimension, namely through the inclusion of additional items tapping children's overreliance on and possessiveness towards the teacher (Koomen et al., 2012). Moreover, several studies using Confirmatory Factor Analysis (CFA) have confirmed the 3-factor structure, with closeness, conflict, and dependency, for the STRS (Faire et al., 2013; Koomen et al., 2012; Solheim et al., 2012; Tsigilis et al., 2017).

A limited number of studies have examined the invariance of the STRS's 3-factor structure across groups of younger and older children (Koomen et al., 2012; Milatz et al., 2014). Although their results suggest that the factor structure is equivalent across different age groups, further research is necessary to establish validity of the STRS when used as a repeated measure. Ensuring that measurement properties (e.g. factor loadings) are stable over time avoids that changes in measurement properties are mistakenly interpreted as changes in the constructs representing dimensions of the T-C relationship.

Teacher-child dependency: links with closeness and conflict

Previous studies examining the associations between T-C dependency, closeness and conflict suggest the concept of dependency may be subject to cultural differences. Although studies from Central and North Europe reported trivial to weak correlations between dependency and closeness (Fraire et al., 2013; Koomen et al., 2012; Milatz et al., 2014), medium to large positive correlations have been documented in studies from South European countries, namely Greece and Turkey (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017). These results have been interpreted using the distinction between individualistic and collectivistic cultures (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017; see also Gregoriadis et al., 2020). A culture described as more collectivistic emphasizes group goals over individual goals, whereas a culture described as individualistic stresses the achievement of the individual's full potential and goals (Hofstede, 1980). Accordingly, it has been argued that in more individualistic countries (such as from Central and North Europe) the conflicting nature of dependent relations might be more salient, whereas in more collectivist countries (mostly from South Europe) dependency may more commonly elicit feelings of protection and proximity (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017). So far, no study has examined how T-C dependency relates to T-C closeness and conflict in Portugal, a country usually seen as collectivistic (Hofstede, 1980).

Adding to cultural values, demographic characteristics such as children's age may be useful to understand the inconsistency of findings across studies from different countries. Indeed, the available evidence on the links between T-C dependency, closeness and conflict comes from different cross-sectional studies that include children in distinct age groups. For instance, Tsigilis et al. (2017) includes Greek children attending kindergarten only, while Milatz et al. (2014) combine children from kindergarten, first and second grade in their sample of German and Austrian children. The heterogeneity of samples hinders the establishment of meaningful comparisons among results from different countries, as both the degree of children's dependency on their teachers and the levels of teachers' acceptance of their students' dependence can be influenced by children's age. In early ages, teachers possibly interpret child dependency as normative. However, in later ages, they might interpret child dependency as a behavioral problem. Also, the presence of overdependent children in the classroom can be particularly challenging in later ages as it can impede classroom management and hinder the implementation of more complex educational activities. Therefore, the current understanding of T-C dependency would benefit from examining this relational dimension in narrower age ranges and from adopting longitudinal designs that can capture the changing interconnections between dependency, closeness, and conflict.

Teacher-child dependency: contribution to children's effortful control

The construct of self-regulation is nowadays a major topic of research in developmental psychology. Self-regulation generally refers to the processes through which children modulate and adjust their behavior to respond to the cognitive, emotional, and social demands of a specific situation (Calkins, 2007; Eisenberg & Spinrad, 2004). Changing emotional states, shifting attention, adjusting behaviors associated with emotional experiences, and reinterpreting the value of events are some examples of regulatory abilities (Eisenberg & Spinrad, 2004). Underlying these processes are cognitive, attentional, and behavioral mechanisms that are voluntarily controlled by the individual. The notion of self-regulation as a voluntary process is embodied in the concept of Effortful Control (EC) (Eisenberg & Spinrad, 2004). This construct has been defined as the “ability to inhibit a dominant response and/or to perform a subdominant response” (Rothbart & Bates, 2006, p. 129). Previous studies established a positive association between EC and children's social adjustment and competence (see Eisenberg et al., 2011, for a review). The ability to modulate emotional experience and to inhibit social inappropriate responses allows children a more effective control over social exchanges, facilitating the emergence of socially appropriate behaviors.

The development of self-regulation is highly influenced by the establishment of secure relationships with early caregivers (Thompson & Meyer, 2014). In preschool, T-C closeness and conflict have been associated with children's abilities to control their own emotions (Garner et al., 2014; Silva et al., 2011). For instance, Silva et al. (2011) reported a positive association between EC and T-C closeness, and a negative association between EC and T-C conflict. The connection between T-C dependency and self-regulation, however, remains scarcely explored. Based on attachment theory, children that excessively rely on their teachers are less likely to engage in classroom activities and social interactions (Pianta, 1992; Spilt et al., 2017; Vandenbroucke et al., 2017), limiting the opportunities for developing self-regulation abilities. On the other hand, particularly in more collectivistic cultures, children who display higher levels of dependency towards their teacher may benefit from teachers' proximity, modeling, and extra support to help them regulating emotions and behaviors (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017).

To our knowledge, the only study providing evidence on the link between T-C dependence and the self-regulation abilities was conducted by Garner et al. (2014), using a socially diverse sample of US preschoolers. Their results indicated a positive association between T-C dependency and children's emotion regulation, particularly in more structured and better-staffed preschool classrooms. Although based on a cross-sectional design, findings from Garner et al. (2014) suggest the impact of dependency on children's emotion regulation can change according to teachers' characteristics and the classroom environment. More research is needed to clarify whether the T-C dependency has a unique contribution to child self-regulation that goes beyond the contributions of T-C closeness and conflict.

The current study

Using a sample of Portuguese children, this study examined the within- and cross-time associations between dependency, closeness, and conflict, and explored the unique

contributions of each one of these relational dimensions to children's EC. Drawing from a sample of preschoolers and teachers from a collectivistic South European country, and based on previous evidence (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017), we expected a positive within-time association between dependency and closeness. Also, we anticipated a positive association between dependency and conflict and a negative association between closeness and conflict, based on what has been reported by studies using collectivistic and non-collectivistic samples (Demirkaya & Bakkaloglu, 2015; Fraire et al., 2013; Koomen et al., 2012; Milatz et al., 2014; Solheim et al., 2012; Tsigilis et al., 2017). Given the lack of previous evidence, no assumptions were made regarding the stability and associations between dependency, closeness and conflict over time. In addition, we examined the longitudinal relation between T-C dependency and children's EC. Although higher dependency can generally be expected to relate with lower EC based on attachment theory, studies in collectivistic countries suggest that children may benefit from high dependency levels, showing higher levels of EC (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017).

Method

Participants

Participants in this study were 199 Portuguese children (44% girls) and their preschool teachers. Data were collected in two consecutive school years, time 1 (T1) and time 2 (T2), during spring. Children were aged 31–68 months ($M = 47.47$; $SD = 6.99$) and 48–78 months ($M = 62.04$; $SD = 6.85$) at T1 and T2, respectively. As a requirement of our research project, all participating children came from families with working and cohabiting parents. The sample's characteristics were comparable with the averages of the Portuguese dual-earner population, namely regarding family structure, parents' age, and working hours, but included a large proportion of parents with higher education (Intelligent Network Element [INE], 2011). Nearly 60% of mothers ($n = 117$) and 40% of fathers ($n = 82$) attended or completed higher education. Children were enrolled in 46 classrooms from public and private schools. Teachers were all women with a university degree in education, aged between 22 and 54 years ($M = 39.39$, $SD = 9.30$). The average classroom size was 17.87 children ($SD = 4.19$). On average, there were 4.33 ($SD = 3.16$) children participating per classroom. Most children (66%) remained with the same teacher at T1 and T2. Parents and teachers were predominantly White/Caucasian.

Measures

T-C Relationship was assessed by a shortened version of the Student-Teacher Relationship Scale (STRS, Pianta, 2001), including the Closeness, Conflict and Dependency subscales. Items were rated by the teachers, using a 5-point Likert scale, ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). Higher scores indicate higher levels of T-C dependency, closeness, and conflict. The Dependency subscale (e.g. "This child reacts strongly to separation from me", 5 items) measures the degree to which the child is overly dependent on the teacher. This subscale included the two items proposed by Koomen et al. (2012). Items 6 ("Generally liked by other children"), 10 ("This child is overly dependent on me"), and 14 ("This child asks for my help when he/she really does not

need help”) were excluded due to reliability issues. Cronbach’s alphas were .76 at T1 and .81 at T2. The Closeness subscale (e.g. “I share an affectionate, warm relationship with this child”, 5 items) measures the degree of affection, warmth and open communication between the teacher and the child. Cronbach’s alphas were .66 at T1 and .70 at T2. The Conflict subscale (e.g. “The child and I always seem to be struggling with each other”, 5 items) captures the degree of negative and antagonistic interactions and emotions. Cronbach’s alpha was .84 both at T1 and T2.

Previous studies indicated good reliability for the Closeness and Conflict subscales (Hamre & Pianta, 2001; Koomen et al., 2012; Tsigilis et al., 2017). The Dependency subscale has demonstrated some reliability issues, although recent studies reported Cronbach’s alphas between .70 and .80 (Koomen et al., 2012; Tsigilis et al., 2017). The STRS’s predictive and convergent validity has been established in samples of children of diverse ages and countries (see Koomen et al., 2012, for a review).

Children’s effortful control (EC) was assessed through teachers’ report, using the Effortful Control subscale (e.g. “When building or putting something together, becomes very involved in what s/he is doing, and works for long periods”, 12 items) from the Child Behavior Questionnaire – very short form (CBQ; Putnam & Rothbart, 2006). This subscale focuses on children’s ability to inhibit a dominant response and activate a non-dominant response, to plan own behavior and detect changes in the environment. These abilities are central elements of the definition of self-regulation (Calkins, 2007; Eisenberg & Spinrad, 2004). Items were rated on a 7-point Likert scale ranging from 1 (*extremely untrue*) to 7 (*extremely true*), higher scores indicating higher levels of child EC. Cronbach’s alpha was .83, both at T1 and T2. Previous studies indicated that the CBQ is a valid and reliable measure of children’s self-regulation (see Putnam & Rothbart, 2006, for a review).

Procedure

Children were recruited from preschool centers at the metropolitan area of Porto, Portugal. Most children were attending their first or second year of preschool when recruitment was conducted. In Portugal the preschool period takes place 3 years before compulsory schooling, covering children from 3 to 6 years of age. The recruitment process took place at the beginning of the school year, after fulfilling all the legal and ethical requirements for conducting the study. This study was part of a broader research project aiming to understand the impact of work–family dynamics on parenting and children’s development. This project was approved by the faculty’s institutional review board and children’s school boards. After these approvals, the study was explained to the teachers, who invited the families of all children in their classroom to participate in the study. The research team was only allowed to contact and collect information from families who agreed to participate and signed the informed consent. Participation rate was 38%. This fairly low participation rate was probably due to the characteristics of the recruitment process and the narrow eligibility requirements.

Attrition and missing data

The percentage of missing values was 34%. Missing data followed a monotone pattern (Dong & Peng, 2013), since most of the missing values were due to attrition – some children

at T2 have moved to an unidentified school or their parents and/or teachers refused to participate in data collection. Nearly sixty percent ($n = 113$) of the participants had data at T1 and T2. Logistic regression was conducted to examine the extent to which demographic and study variables were related to attrition. Parents of girls were more prone to dropout of the study at T2 ($b = -1.141, p = .028, 95\% \text{ CI } [-2.212, -.155], OR = 0.319$) and T-C dependency at T1 was also related to attrition ($b = 0.623, p = .036, 95\% \text{ CI } [.053, 1.228], OR = 1.864$). Under these circumstances, we assumed data were Missing at Random (MAR) and employed multiple imputation to carry out data analysis. According to Little and Rubin (2002), data are assumed to be MAR if missingness is related to measured variables, but not to values of an unmeasured variables. Our data appeared to be MAR, given the significant contributions of child sex and T-C dependency (T1) to attrition.

Data analyses

Descriptive statistics were examined and structural equation modeling was used to examine the measures' factorial structure and its invariance across time. Path analyses were used to address the main research questions. A modified version of maximum likelihood estimation method with robust standard errors was used. Data analyses were conducted in R (R Core Team, 2013) and all models were estimated using the "lavaan" package (Rosseel, 2012). Missing data were imputed through multiple imputations by chained equations (40 imputations), using the "mice" package for R (Van Buuren & Groothuis-Oudshoorn, 2011).

This study used a hierarchically nested sample of preschoolers. Examination of the intraclass correlation coefficients (ICCs) indicated that the variance at the classroom level was statistically significant ($p < .05$) for all the study variables at T1: child EC (30%); T-C dependency (71%); T-C closeness (38%); and T-C conflict (29%). At T2, the classroom-level variance was only significant for child EC (42%) and T-C dependency (46%). We adopted a design-based approach to account for the fact that children were nested within classrooms, implemented through the "lavaan.survey" package for R (Oberski, 2014). In this approach, parameters estimates are aggregated according to a cluster variable (i.e. classroom) and standard errors are corrected taking into account the non-independence of observation (Muthen & Satorra, 1995).

Models' testing proceeded in two phases. First, measures' factor structure and stability across time were evaluated through CFA and Measurement Invariance (MI) procedures – measurement models were specified using three parcels to define the latent variables for T-C dependency, closeness, and conflict, and children's EC. Second, a cross-lagged panel model examining the associations among T-C dependency, closeness, and conflict, and children's EC (T2) was tested, using the composite scores. We computed these scores by averaging the items' scores for each subscale. Covariates for this model included: child age, sex (0 = boys; 1 = girls), maternal education, and whether there was a teacher switch from T1 to T2 (0 = no; 1 = yes). Model fit was examined using the chi-square goodness-of-fit statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the standardized root mean square residual (SRMR). Values lower than .06 for RMSEA, greater than .95 for CFI, and lower than .08 for SRMR indicate good model fit (Hu & Bentler, 1999).

Results

We examined the descriptive statistics for all study variables. Means, standard deviations and zero-order observed correlations can be found in [Table 1](#).

CFA and Measurement invariance for T-C relationship and children's EC

The measurement model for teacher-child (T-C) relationships across time included latent variables for T-C Closeness, Conflict and Dependency, both measured at T1 and T2. These six latent variables were allowed to correlate freely with one another as well as the residual variances of the corresponding indicators measured at different time points. The residual variances of the indicators of T-C conflict and dependency were also allowed to correlate based on the modification indices, reflecting the construct of relational negativity previously identified by Hamre and Pianta (2001). Results from CFA in [Table 2](#) indicated the unconstrained measurement model fitted the data well, $\chi^2(107) = 128.345$, $p = .078$, RMSEA = .036 (90% CI [.000;.058]), CFI = .980, SRMR = .059. A longitudinal measurement invariance model was then tested in sequential steps (see results in [Table 2](#)). Metric invariance was tested by comparing the unconstrained model previously described (Model A) with a nested and more restricted model (Model B) in which the factor loading of a given indicator was constrained to be equal across time. Results from the likelihood ratio test indicated that Model A and B were significantly different, $\Delta\chi^2(6) = 15.701$, $p = .016$. Nevertheless, the magnitude of the difference in fit between the two models ($\Delta\text{CFI} = 0.009$) was below the critical value pointed out by the literature (Cheung & Rensvold, 2002), supporting the assumption of metric invariance across time. Although full scalar invariance did not hold, $\Delta\chi^2(6) = 25.962$, $p < .001$, $\Delta\text{CFI} = 0.021$ (Model C), partial scalar invariance was achieved, $\Delta\chi^2(4) = 8.569$, $p = .045$, $\Delta\text{CFI} = 0.006$ (Model D) by releasing imposed equality constraints on all the items' intercepts for T-C conflict at T2.

A similar procedure was followed to inspect the measurement model for children's EC and its invariance across time. Results in [Table 2](#) indicated the unconstrained measurement model for children's EC fitted the data well, $\chi^2(5) = 10.066$, $p = .073$, RMSEA = .071 (90% CI [.011;.123]), CFI = .981, SRMR = .039. Furthermore, results provide support for the invariance of the EC measurement model across time, both metric, $\Delta\chi^2(2) = 0.895$, $p = .639$, $\Delta\text{CFI} = -.003$, and scalar, $\Delta\chi^2(2) = 0.078$, $p = .962$, $\Delta\text{CFI} = -.007$.

Cross-lagged panel model examining bidirectional relationships among T-C relationship variables and children's EC

Path analysis was used to examine the within- and across-time associations between T-C Dependency, Closeness, Conflict, and children's EC, while controlling for potential confounding effects of child sex, age, maternal education and teacher shifting at T2. The final model, with non-significant parameters trimmed, fitted the data well, $\chi^2(18) = 18.847$, $p = .401$, RMSEA = .015 (90% CI [.000;.058]), CFI = .997, SRMR = .041. Results from the likelihood ratio test indicated that the non-trimmed and trimmed models were not significantly different, $\Delta\chi^2(17) = 7.802$, $p = .971$.

[Figure 1](#) presents standardized coefficients for the final model. The predictor variables in the model explained 9% of the variance in T-C Dependency, 38% in T-C Closeness, 32%

Table 1. Means, standard deviations, and zero-order correlation matrix of observed variables.

	<i>M</i>	<i>(SD)</i>	1	2	3	4	5	6	7	8	9	10	11	12
<i>T1</i>														
1. Teacher-child dependency	2.06	(.85)	–											
2. Teacher-child closeness	4.38	(.55)	.00	–										
3. Teacher-child conflict	1.37	(.71)	.16	–.38**	–									
4. Effortful control	4.99	(1.03)	.00	.46**	–.43**	–								
<i>T2</i>														
5. Teacher-child dependency	2.17	(.95)	.20	.03	.25*	.02	–							
6. Teacher-child closeness	4.53	(.49)	.24*	.56**	.02	.23*	.27**	–						
7. Teacher-child conflict	1.39	(.64)	–.02	.00	.50**	–.20*	.29**	.03	–					
8. Effortful control	5.52	(.84)	.35**	.24*	–.05	.47**	.11	.42**	–.10					
<i>Covariates</i>														
9. Child age	47.47	(6.99)	–.27**	.15	.04	.08	–.22*	–.05	–.02	–				
10. Child sex (1 = girl)	0.44	(.50)	.12	.22*	–.18	.25**	.02	.17*	–.15	.32**	–			
11. Maternal education	4.44	(.85)	.10	–.01	–.08	.08	.12	.10	.00	.04	–.03	–		
12. Teacher switch at T2	0.34	(.48)	.16	–.22*	.25**	–.20*	.09	–.31**	.16	–.37**	.18*	–.03	–	
													–.04	

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

Table 2. Goodness of fit statistics for the nested sequence in CFA and test for longitudinal measurement invariance.

Model tested	$\chi^2(df)$	RMSEA (90% CI)	CFI	SRMR	Compared Model	$\Delta\chi^2(\Delta df)$	ΔCFI
Teacher-child relationship							
Null model	1007.498 (171)**	—	—	—	—	—	—
A Configural invariance	128.345 (107)	.036 (.000;.058)	.980	.059	—	—	—
B Metric invariance	143.870 (113)*	.042 (.015;.062)	.971	.064	A	15.701 (6)*	.009
C Scalar invariance	174.510 (119)**	.056 (.037;.073)	.948	.068	B	26.942 (6)**	.021
D Partial scalar invariance	154.303 (117)*	.046 (.023;.064)	.965	.065	B	8.569 (4)*	.006
Effortful control							
Null model	168 (21)**	—	—	—	—	—	—
E Configural invariance	10.066 (5)	.071 (.011;.123)	.981	.039	—	—	—
F Metric invariance	11.720 (7)	.058 (.000;.106)	.984	.042	E	0.895 (2)	-.003
G Scalar invariance	11.478(9)	.037 (.000;.084)	.991	.042	B	0.077 (2)	-.007

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

in T-C Conflict, and 41% in children's EC at T2. Results indicated that, at T1, children displaying higher EC were more likely to experience lower T-C Conflict ($r = -.33, p < .001$) and higher T-C Closeness ($r = .34, p < .001$). T-C Conflict was negatively linked to T-C Closeness ($r = -.26, p = .015$). The positive connection between T-C Conflict and Dependency was only marginally significant ($r = .16, p = .069$). At T2, children whose teachers reported higher T-C Dependency were more likely to show higher rates of Closeness ($r = .25, p < .001$) and Conflict ($r = .27, p = .005$), and to display lower EC ($r = -.14, p = .069$).

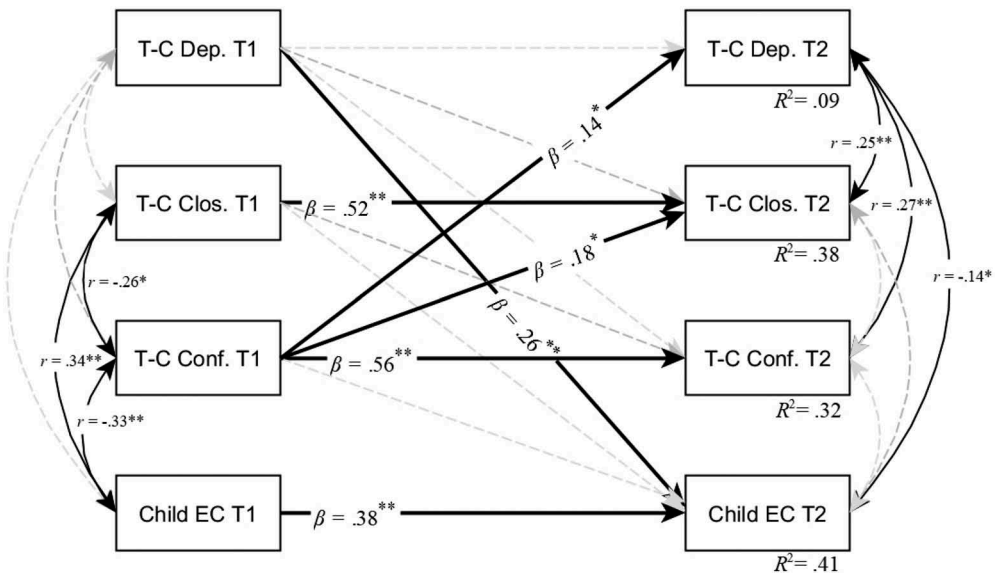


Figure 1. Cross-lagged panel model examining associations between teacher-child dependency (T-C Dep.), closeness (T-C Clos.), conflict (T-C conflict) and children's effortful control (child EC). Child sex, age, mother education and teacher shifting at T2 were included as control variables; Dashed lines indicate non-significant paths; T1 = First time of data collection; T2 = Second time of data collection; * $p < .05$; ** $p < .01$.

($r = -.14$, $p = .015$). A marginally significant positive correlation was found between T-C Closeness and children's EC ($r = .12$, $p = .077$).

Across-time, the auto-regressive paths were significant for T-C Closeness ($b = 0.475$, $p < .001$, 95% CI = 0.312 to 0.638, $\beta = .515$), Conflict ($b = 0.528$, $p < .001$, 95% CI = 0.352 to 0.703, $\beta = .556$), and children's EC ($b = 0.332$, $p < .001$, 95% CI = 0.164 to 0.499, $\beta = .384$) but not for T-C Dependency ($b = 0.148$, $p = .172$, 95% CI = -0.064 to 0.359, $\beta = .130$). Children who showed higher T-C Dependency at T1 showed more gains in teacher-reported EC at T2 ($b = 0.258$, $p < .001$, 95% CI = 0.146 to 0.369, $\beta = .258$), while accounting for EC and values of Closeness and Conflict at T1. T-C Conflict at T1 predicted higher Dependency ($b = 0.201$, $p = .047$, 95% CI = 0.003 to 0.399, $\beta = .140$) and Closeness at T2 ($b = 0.129$, $p = .026$, 95% CI = 0.016 to 0.241, $\beta = .183$), while controlling for previous values of Dependency and Closeness.

Discussion

The current study aimed to understand the interconnections between T-C dependency, closeness and, conflict, as well as to investigate the role of T-C dependency in predicting children's effortful control (EC). Three main contributions can be highlighted. First, this study provides new data to clarify the construct validity of the STRS (Pianta, 2001), investigating the longitudinal invariance of three attachment-based dimensions of T-C relationships, namely dependency, closeness, and conflict. Second, this investigation specifically focuses on T-C dependency, elucidating how this less explored dimension of T-C relationships relates to closeness and conflict across time. Finally, this study clarifies the unique contribution of T-C dependency to children's EC, examining how T-C dependency, closeness, and conflict differentially predict EC across time.

We began by examining the STRS's measurement qualities, considering the 3-factor solution originally proposed by Pianta (2001). This instrument provided acceptable reliability scores of T-C dependency, closeness and conflict for the two assessment points. Results from longitudinal CFA indicated the STRS can be used as a valid measure of the quality of T-C relationships across different years of preschool. Longitudinal invariance is a necessary condition for assessing a child's relationship with the teacher at different time points and to judge the stability of its quality across time (Millsap & Cham, 2012). Thus, this finding has practical implications for future longitudinal research using the STRS to measure the quality of T-C relationships. It is worth mentioning that we used a shortened version of the STRS, excluding most of the previously considered "problematic" items (Fraire et al., 2013; Koomen et al., 2012; Solheim et al., 2012; Tsigilis et al., 2017), which could have positively influenced the STRS's model fit and invariance. However, as in most of the previous studies, full scalar invariance was not confirmed, indicating that some items, particularly from the conflict subscale, can systematically produce higher or lower scores depending on children's time of assessment. Because the current study did not specifically focus on examining latent mean differences across time, the satisfaction of the metric invariance assumption, stating that the constructs under analysis have the same meaning when measured at different time points, was sufficient (Steinmetz et al., 2009).

The current study investigated the connections between T-C dependency, closeness and conflict. Results suggest that the concurrent associations among these relational

dimensions can change over time. Specifically, we found within-time positive associations between T-C dependency and conflict both at T1 (though only marginally significant) and T2, indicating that teachers reporting higher levels of dependency from their students are also more likely to experience higher levels of relational conflict. This positive association between T-C dependency and conflict seems to slightly increase as children move forward in the preschool period. Unlike what was observed at T1, there was a significant positive correlation between T-C dependency and closeness at T2. This result indicates that children displaying higher levels of T-C dependency had higher ratings of closeness, which is consistent with prior research from South European countries (Demirkaya & Bakkaloglu, 2015; Tsigilis et al., 2017; see also Gregoriadis et al., 2020). This finding supports the idea that within more collectivistic cultures, children's dependency can be linked to increased feelings of protection and proximity by the teacher.

Nevertheless, the pattern of positive associations between T-C dependency and conflict observed in the current study, particularly at T2, is also consistent with findings from studies examining T-C relationship in non-collectivistic countries from Central and North Europe (Fraire et al., 2013; Koomen et al., 2012; Milatz et al., 2014; Solheim et al., 2012). Portugal has been globally recognized as a collectivistic country mostly based on Hofstede's work (Hofstede, 1980). However, after nearly 40 years since this study, there is no updated characterization of Portuguese cultural values and important political, societal, and economical factors may have led to significant changes in people's cultural values.

Despite the importance of distal cultural values, more proximal variables can also be considered to explain the different associations between dimensions of T-C relationships observed across different countries. For instance, teachers' beliefs concerning pedagogical aspects such as autonomy support, sensitive caregiving, behavior control, and valuing of children's choices may help clarify their interpretation of T-C dependency. Teachers who are highly committed to promoting autonomy in their classrooms may perceive children's dependency as a negative relational aspect. In this scenario, T-C dependency could be associated with increased levels of conflict. The distinct associations between T-C dependency and child EC observed at T1 and T2 might suggest that teachers change their perspectives on child T-C dependency across time. Although there was not a significant association between dependency and EC at T1, at T2, the relation between these variables was negative. All these findings suggest that, as children grow older, teachers tend to perceive dependency as a behavioral problem and a threat to classroom well-functioning. This might explain why dependency was positively linked to conflict and negatively linked to EC at T2 but not at T1.

A noteworthy strength of the current study was the adoption of a longitudinal design that allowed to document the stability of distinct dimensions of T-C relationship across time and to inspect the unique contribution of each one of these dimensions to children's EC, a skill linked to children's self-regulation abilities. Regarding the stability of T-C relationships across time, we found that T-C closeness and conflict are relatively stable across time. On the contrary, T-C dependency showed lack of stability over time, suggesting that this may be a more transitory and circumstantial relational dimension than T-C closeness and conflict. Furthermore, in this study, we only focused on individual predictors of T-C relationship quality and child EC. However, as the ICCs indicated, a substantial amount of the T-C dependency variance was explained by the classroom

level. This suggests a limited contribution of child-level variables to T-C dependency, explaining the lack of stability over time, and the relatively low amount of explained variance (9%). Although we controlled for the nesting effect, it should be noted that no classroom-level variable was included in the model. Teachers' perceptions of child autonomy and emotional needs are some of the classroom-level variables that future studies could use to predict T-C dependency.

Regarding the unique contribution of the different dimensions of T-C relationship to children's EC, our findings suggest that dependency towards the teacher in early stages of preschool has a positive contribution to children's later EC. This contribution was established while controlling for the influence of T-C closeness and conflict. Similar results were previously reported by Garner et al. (2014). They found a positive connection between T-C dependency and emotion regulation, specifically in children attending more organized, equipped and better staffed classrooms. These classroom assets may help teachers dealing with children's dependency without compromising the quality of the T-C relationship and the implementation of classroom activities that can foster children's self-regulation. The current study included classrooms from middle-class backgrounds, which may be characterized by relatively high levels of structure. Also, in early ages, higher levels of dependency towards the teacher can characterize an immature stage which some children need to overcome before achieving the ability to autonomously explore the classroom environment (Ainsworth, 1969). It is possible that teachers respond supportively to dependency when children are younger, fostering their EC abilities. On the contrary, T-C dependency in older children might be perceived as a liability, contributing to a stronger association of dependency with T-C conflict at T2. As previously discussed, these links between different dimensions of T-C relationships might be influenced by the classroom cultural context.

Unlike previous studies (Garner et al., 2014; Silva et al., 2011), we did not find support for the contributions of T-C closeness and conflict to child EC. There was a significant zero-order correlation between T-C closeness (T1) and child EC (T2). However, the model simultaneously examining the unique contributions of all three T-C relational dimensions (i.e. dependency, closeness, and conflict) indicated that only dependency at T1 predicted child EC at T2. Maybe the experience of T-C dependency mitigated the influence of T-C closeness on child EC. It is, however, also possible that the relatively low variability of T-C closeness and conflict limited our model's ability to capture the contributions of these variables to child EC.

The current work represents one of the first attempts to understand the links between the different dimensions of T-C relationship over the preschool period and the contribution of T-C dependency to children's self-regulation. Among the strengths of this study is the adoption of a longitudinal design and the use of a robust analytical approach. Nevertheless, some limitations should be noted. The correlational nature of this study precludes making conclusions regarding causality. Also, results may have been influenced by shared method bias due to an exclusive reliance on teachers to report the study main variables. The use of a questionnaire to collect all the information may also constitute a source of bias. This study used a 15-item version of the STRS (Pianta, 2001). Despite the good psychometric qualities revealed, the use of this short form makes it difficult to compare our results with results from previous studies that use the STRS's full version. As previously highlighted, our results indicated that the concurrent associations between the

dimensions of T-C relationship can change over time. Therefore, it is unreasonable to assume that the pattern of longitudinal associations observed between T1 and T2 would also emerge if a third wave of data was obtained. Additional assessment waves are needed to confirm this assumption. Despite these limitations, this study clarifies the meaning of T-C dependency across the preschool period, indicating that, early in preschool, child dependency towards the teacher can contribute to promoting self-regulation abilities.

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