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Teacher-child relationships and interaction processes: Effects on students' learning behaviors and reciprocal influences between teacher and child

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Interpersonal Behaviors and Complementarity in Interactions Between Teachers and Kindergartners with a Variety of Externalizing and Internalizing Behaviors

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This chapter has been submitted for publication.

Abstract

In the present study, it was investigated whether the complementarity principle (mutual interactive behaviors are opposite on control and similar on affiliation) applies to teacher-child interactions within the kindergarten classroom. Furthermore, it was examined whether interactive behaviors and complementarity depended on children's externalizing and internalizing behaviors, interaction time, and interaction frequency. Forty-eight teachers and 179 selected behaviorally different kindergartners (94 boys) were observed in a small group task setting in the natural ecology of the classroom. Teachers' and children's interactive behaviors were rated by independent observers. Teachers reported about children's externalizing and internalizing behaviors. Multilevel analyses showed that both teachers and children reacted complementarily on the control dimension but not on affiliation. Teachers showed more control and more affiliation toward children with relatively high levels of internalizing behavior. In addition, teachers displayed less affiliation toward relatively externalizing children, whereas those children did not show less affiliation themselves. Teachers' and children's complementarity tendencies on control were weaker if children had higher levels of externalizing behavior.

Introduction

Teacher-child relationships have been found to predict various aspects of children's social and academic school functioning (e.g., Hamre & Pianta, 2001; Hughes, Luo, Kwok, & Loyd, 2008; Peisner-Feinberg et al., 2001). Although in the last two decades the individual teacher-child relationship has often been subject of research, studies in the early school years mostly focus on teachers' global perceptions of the relationship. Fewer researchers used observations to measure teacher-child interactions or teachers' behaviors toward an individual child (e.g., Coplan & Prakash, 2003; De Mulder, Denham, Schmidt, & Mitchell, 2000; Downer, Booren, Lima, Luckner, & Pianta, 2010; Ladd, Birch, & Buhs, 1999; McDonald Connor, Son, Hindman, & Morrison, 2005; Thijs & Koomen, 2008). These observational studies generally used global ratings or time sampling methods which were aggregated to form an overall measure of interaction quality. Observations of reciprocal influences in interactions between teachers and individual children have been scarce.

The complementarity principle (Carson, 1969/1972), which is part of interpersonal theory, provides a framework to describe and explain mutual influences in interpersonal interactions. Moreover, this principle provides starting points to intervene in negative interaction cycles (Koomen, Verschueren, & Thijs, 2006; Spilt, Koomen, Thijs, & van der Leij, in press). Until now, most research about interpersonal complementarity has focused on interactions between college students and therapist-client dyads. Thijs, Koomen, Roorda, and ten Hagen (2011) provided a first indication that the complementarity principle also applies to reciprocal influences in interactions between teachers and kindergartners. However, this study solely focused on teacher-child interactions in a dyadic setting, whereas most teacher-child interactions take place in group settings. In addition, interactions were observed outside the natural setting of the classroom and the sample consisted of children who scored highest on social inhibition in their classroom according to the teacher. The overarching goal of the present study was to examine whether complementarity could also be found in a more ecological valid context: Interactions were observed in a small group setting within the classroom and the sample consisted of children with different behavior characteristics, representing the natural variations in externalizing and internalizing behavior in kindergarten classrooms. Our first aim was to investigate teachers' and children's complementarity tendencies in this more natural setting. Our second aim was to examine whether teachers' and children's interactive behaviors and interpersonal complementarity depended on children's externalizing and internalizing behaviors, interaction time (i.e., total length of interactions between teacher and child), and interaction frequency (i.e., number of separate interactions between teacher and child). In this way, we tried to gain more insight in mutual interaction processes between teachers and young children with different behavior profiles within the classroom setting.

Interactive Behaviors and Interpersonal Complementarity

According to interpersonal theory (Leary, 1957), interpersonal interaction styles and interactive behaviors can be captured by a limited set of dimensions. Most interpersonal models consist of two orthogonal dimensions: control and affiliation (e.g., Kiesler, 1983;

Leary, 1957). Control describes the degree of power and influence in the interaction, and varies from dominance to submissiveness. Affiliation represents the degree of proximity, warmth, and support in the interaction, and ranges from friendliness to hostility (Gurtman, 2001; Kiesler, 1996).

A central notion in interpersonal theory is the complementarity principle, which states that a person's interpersonal behaviors tend to evoke a particular set of responses from the interaction partner (Sadler & Woody, 2003). Carson's (1969/1972) approach is the most common conceptualization of interpersonal complementarity, and states that interactive behaviors are complementary if they are opposite on the control dimension and similar on affiliation. Thus, dominant behaviors will lead to submissiveness, whereas friendly behaviors will elicit friendliness in the interaction partner. Interpersonal complementarity is often considered an automatic and unconscious process (Leary, 1957; Tiedens & Fragale, 2003). It is theorized to exist because people constantly try to reconfirm their self-concepts through social interactions: Through interpersonal behaviors, people communicate to others how they view themselves and how they want to be responded to (Kiesler, 1996). Relationships with high levels of complementarity are considered to confirm these self-concepts and would therefore be experienced as comfortable and anxiety-free and are thought to be more stable over time (Kiesler, 1996; Tracey, 2004). In contrast, in relationships with low levels of complementarity peoples' self-definitions are thought to be constantly denied. Previous research has found positive associations of interpersonal complementarity with satisfaction with the interaction, comfort, positive evaluations, and liking of the interaction partner (Dryer & Horowitz, 1997; Tiedens & Fragale, 2003; Tracey, 2004). However, complementarity could also have negative consequences, as it may lead to self-fulfilling prophecies and the continuance of maladaptive interaction patterns (Kiesler, 1996).

Originally, the complementarity principle was considered to apply mainly to relatively unstructured settings, in which interaction partners have the same status (Kiesler, 1996). Interactions in the school setting, by contrast, are mostly relatively structured and teachers usually have more power in the relationship. Yet, there is some evidence that interpersonal complementarity can also be found in the school setting. Thijs and colleagues (2011) used micro-observations (i.e., behaviors were rated in five-second intervals) to investigate whether the complementarity principle holds in interactions between teachers and relatively inhibited kindergarten children. They found that teachers reacted complementarily on the control dimension, whereas children responded complementarily with respect to affiliation (Thijs et al., 2011). In the present study, we used a sample of behaviorally different children, and investigated whether support for the complementarity principle could also be found in a small group setting in the natural ecology of the kindergarten classroom.

The Influence of Children's Externalizing Behaviors

Children's externalizing behaviors could be expected to influence teachers' and children's mutual interactive behaviors. With respect to the affiliation dimension, interactions between teachers and externalizing children were rated by independent observers as being less secure and lower in teacher sensitivity (DeMulder et al., 2000; Rimm-Kaufman et al., 2002) and containing more anger (Henricsson & Rydell, 2004)

than interactions with normative children. Furthermore, both teacher and child reports indicate that relationships between teachers and externalizing children are characterized by relatively high levels of conflict, and also by somewhat lower levels of closeness, compared to relationships with average children (Birch & Ladd, 1998; Buyse, Verschueren, Doumen, van Damme, & Maes, 2008; Doumen et al., 2008; Henricsson & Rydell, 2004; Murray & Greenberg, 2000; Spilt, Koomen, & Mantzicopoulos, 2010; Thijs & Koomen, 2009). These findings suggest that externalizing children are at risk for developing negative interactions with their teacher on the affiliation dimension. With regard to the control dimension, Coplan and Prakash (2003) found that, during a free play setting, aggressive preschoolers more often initiated interactions toward teachers than non-aggressive children (i.e., they asked questions and drew the teacher's attention) and teachers initiated less interactions toward them. This finding suggests that externalizing children will be more dominant toward their teacher than average children, whereas teachers will be *less* dominant toward externalizing children. In contrast, teachers' self-reports indicated that they regulated hyperactive children's behaviors more often than those of average and inhibited children (Thijs, Koomen, & van der Leij, 2008), which suggests that teachers will be *more* dominant toward externalizing children.

We do not know of any research that has investigated the effect of children's externalizing behavior on teachers' and children's complementarity tendencies on either the control or affiliation dimension. However, observations of affect in parent-child interactions showed that children's externalizing behaviors were associated with higher levels of rigidity in the mutual interaction (i.e., diminished behavioral repertoire, inability to adapt to changes in the environment, and tendency to persevere in particular behaviors; Hollenstein, Granic, Stoolmiller, & Snyder, 2004). This higher rigidity in interactions with externalizing children was found independently of the content of the interaction (i.e., mutual positivity versus mutual negativity; Hollenstein et al. 2004). Persons with rigid interaction styles tend to resist pulls and invitations from their interaction partner to change their interpersonal behaviors and will therefore react less complementarily (Kiesler, 1983; Tracey, 2005). If this higher rigidity would also apply to teachers' interactions with externalizing children, this may indicate that externalizing children and their teachers respond less complementarily to each other. On the other hand, externalizing children's aggressive behaviors could also be expected to lead to coercive patterns in interactions with the teacher: Aggressive behavior might elicit angry reactions in the teacher, which will lead to even more aggression in the child, and may therefore lead to more complementarity on the negative end of the affiliation dimension (cf., Doumen et al., 2008; Kiesler, 1983). Due to the lack of research on this subject, we investigated the moderating role of externalizing behavior on complementarity tendencies without formulating specific hypotheses.

The Influence of Children's Internalizing Behaviors

In addition to externalizing behaviors, children's internalizing behaviors could also be expected to influence teachers' and children's interactive behaviors. Interactions between teachers and internalizing children were observed as being less secure than with average children (DeMulder et al., 2000) but were not characterized by more anger

(Henricsson & Rydell, 2004). Teachers perceived their relationships with internalizing children as being less close than their relationships with average children (Arbeau, Coplan, & Weeks, 2010; Birch & Ladd, 1998; Buyse et al., 2008; Thijs & Koomen, 2009). With regard to conflict, findings are less consistent: In some studies, teachers reported lower (Rydell, Bohlin, & Thorell, 2005) or similar (Arbeau et al., 2010) levels of conflict for internalizing and average children, whereas in other studies teachers reported more conflict in their relationships with internalizing children (Buyse et al., 2008). In contrast, there is some evidence that during actual interactions, teachers tend to show *more* support toward internalizing children than toward average children as indicated by observations and teachers' self-reports (Thijs & Koomen, 2008; Thijs et al., 2008). Internalizing children themselves generally viewed their relationship with their teacher just as positive as normative children (Henricsson & Rydell, 2004; Murray & Greenberg, 2000; Spilt et al., 2010). Based on teachers' perceptions of the relationship and the lower levels of security in interactions between teachers and internalizing children, we would expect that teachers and internalizing children display *less* affiliation toward each other. However, the higher levels of teacher support toward internalizing children suggest that teachers will show *more* affiliation toward those children. With regard to the control dimension, teachers primarily initiated interactions (i.e., they asked more questions and intervened more often) toward anxious/withdrawn preschool children and anxious/withdrawn children initiated fewer interactions toward their teacher as compared to non-anxious children (Coplan & Prakash, 2003). Rudasill and Rimm-Kaufman (2009) also found that shy children initiated fewer interactions toward their teacher than average children. These findings suggest that teachers will display more control toward internalizing children, whereas internalizing children will be more docile in interactions with their teacher than normative children.

Concerning interpersonal complementarity, Thijs and colleagues (2011) found that shy kindergartners reacted complementarily to their teachers on the control dimension, whereas less shy children did not. Probably, because shy children are usually afraid of negative evaluations by others, and therefore more sensitive to teachers' behaviors and more willing to change their own behaviors correspondingly (Magai & McFadden, 1995; Thijs et al., 2011; Weeks, Coplan, & Kingsbury, 2009). Children's complementarity on the affiliation dimension and teachers' complementarity tendencies on both dimensions were not influenced by children's shyness (Thijs et al., 2011).

Interaction Time and Interaction Frequency

In contrast with the dyadic setting of Thijs and colleagues (2011), teachers in our small group interaction setting had to divide their attention between four children. Previous research has found that externalizing children usually have more interactions with their teachers than internalizing or normative children (Henricsson & Rydell, 2004; Rimm-Kaufman et al., 2002). Because the children in our sample differed in their levels of externalizing and internalizing behavior, it was expected that teachers would interact longer with some of the children in the group than with others. Differences in the length and number of interactions may influence the quality of interactive behaviors and interpersonal complementarity. In the literature, it has been suggested that complementarity tendencies might be stronger as interactions last longer (Sadler

& Woody, 2003). During initial stages of interpersonal interactions, behaviors are considered to be mostly guided by general expectancies and codes of manners, whereas complementarity is thought to be more important during later stages of the interaction (Kiesler, 1996; Sadler & Woody, 2003). Nowicki and Manheim (1991) found that complementarity in interpersonal style was associated with more verbal exchanges between interaction partners. However, those suggestions were based on research with adults who were previously unacquainted. In contrast, the teachers and children in our sample already knew each other for at least six months. The present study will investigate the effect of length and number of interactions on complementarity tendencies between partners who are familiar to each other. Because teachers and children could interact for a continuous period of time but also during several short episodes, we distinguished between the total length of the interaction between the teacher and a specific child (i.e., interaction time) and the number of separate interactions between teacher and child (i.e., interaction frequency).

The Present Study

In the present study, we investigated teachers' and children's mutual interactive behaviors and complementarity tendencies during a small group task within the kindergarten classroom. Children were selected based on their scores on internalizing and externalizing behavior relative to their classmates to create a subgroup of four children with different behavior profiles. Teachers' and children's control and affiliation behaviors were rated every five seconds to permit the examination of reciprocal influences.

The overarching goal of the present study was to investigate whether the complementarity principle applies to teacher-child interactions that were observed in the natural ecology of the kindergarten classroom in a sample of behaviorally different kindergartners. Consequently, two main aims were formulated: Our first aim was to examine teachers' and children's complementarity tendencies. We expected that both teachers and children would respond complementarily to each other (i.e., react opposite on the control dimension and similar on affiliation). Thus, we expected to find negative associations on the control dimension and positive associations on the affiliation dimension. Based on Thijs and colleagues (2011), we hypothesized that teachers' complementarity tendencies would be stronger on the control dimension, whereas children's complementarity would be stronger on affiliation.

The second aim was to investigate whether teachers' and children's mutual interactive behaviors and complementarity tendencies could be predicted by children's externalizing and internalizing behaviors as rated by the teacher, interaction time, and interaction frequency. We expected that higher levels of externalizing behavior would be associated with relatively low teacher affiliation and that higher levels of internalizing behavior would be related to relatively high teacher control. Because of contradictory findings in previous research, we did not formulate specific hypotheses about the association between internalizing behavior and teacher affiliation and between externalizing behavior and teacher control. In addition, we hypothesized that higher levels of externalizing behavior would be associated with relatively low child affiliation and relatively high child control, whereas higher levels of internalizing behavior would be

related to relatively low child control and relatively low child affiliation. With regard to complementarity tendencies, it was expected that higher levels of internalizing behavior would be associated with more complementarity in children's responses on the control dimension, whereas children's complementarity tendencies on the affiliation dimension and teachers' complementarity on both dimensions would not depend on children's internalizing behavior. The moderating role of externalizing behavior on complementarity tendencies was investigated without formulating specific hypotheses. Finally, due to the explorative nature of our research with regard to the possible role of interaction time (i.e., total length of interactions) and interaction frequency (i.e., number of separate interactions), we did not formulate specific hypotheses for those two variables.

Method

Sample and Procedure

Our sample consisted of 48 teachers (all female) and 179 kindergartners (94 boys) from 23 Dutch regular schools. Teachers' mean age was 40.37 years ($SD = 11.76$) and they had on average 13.27 years of teaching experience ($SD = 11.19$). Children were on average 66.75 months old ($SD = 6.41$). Ethnic composition was 127 Dutch, 11 Surinamese, 8 Turkish, 3 Moroccan, 1 Antillean, 1 Chinese, 8 other ethnicity, and for 20 children their ethnic background was unknown. Our sample was part of a short-term intervention study, in which teachers and children were observed at five occasions within nine weeks. In the present study, observations from the first occasion (pre-intervention) were analyzed. The total sample consisted of 192 children (105 boys), however, 13 children were absent during the first occasion.

Children were selected based on their scores on a Dutch adaptation of the Preschool Behavior Questionnaire (Thijs, Koomen, de Jong, van der Leij, & van Leeuwen, 2004), which teachers completed for all children over five years old in their classrooms. In every classroom, children were categorized in four groups: 1) 'average children' with relatively low scores on both externalizing and internalizing behavior; 2) 'inhibited children' with relatively high scores on internalizing behavior but relatively low scores on externalizing behavior; 3) 'disruptive children' with relatively high scores on externalizing behavior only; 4) 'inhibited-disruptive children' with relatively high scores on both externalizing and internalizing behavior. Cut-off scores were 1.33 and 1.21 on a four-point scale (ranging from 1 to 4) for internalizing and externalizing behavior, respectively. Those cut-off scores were based on the median values derived from a large randomly-selected kindergarten sample ($N = 1559$). From each group, one child was randomly selected for participation in the present study. Teachers were not aware of these selection guidelines. Teachers and children were observed during an interaction task in a small group setting (i.e., one teacher and the four selected children) in the kindergarten classroom during regular school time. Children had to place different sets of three pictures in a logical chronological order and tell the corresponding story to the teacher. Teachers were told that we were interested in how they usually interacted with each child and that they could do the task in their own way. Therefore, the length of the video-recordings (fragments) ranged from 7.58 to 30.75 minutes ($M = 16.17$, $SD = 4.52$). Observations took

place in the spring of the kindergarten school year. Teachers' and children's interactive behaviors (i.e., control and affiliation) were coded by trained observers.

Measures

Children's behavior characteristics. Children's behavior characteristics were measured with the Behavior Questionnaire for Two- to Six-Year-Olds-Modified (BQTSYO-M; Thijs et al., 2004), which is an adaptation of the widely-used Preschool Behavior Questionnaire (PBQ; Behar, 1977). The broadband scales for Externalizing (14 items; e.g., 'Bullies other children', 'A busy child') and Internalizing Behavior (15 items; e.g., 'Shy or timid toward other children', 'Easily upset') were used. Previous research has reported high internal consistencies (Cronbach's alpha's $\geq .81$ and $.91$ for Internalizing and Externalizing Behavior, respectively) and supported the validity of both scales (Thijs & Koomen, 2009; Thijs, Koomen, & van der Leij, 2008).

Teachers' and children's interactive behaviors. Teachers' interactive behaviors toward each individual child and children's interactive behaviors toward the teacher were rated independently by different groups of trained observers on four six-point scales (i.e., control and affiliation; Thijs et al., 2011). Interactive behaviors were rated in episodes of five seconds (i.e., interval ratings) to allow the analysis of reciprocal influences between teacher and child. Ratings were only given for episodes in which there actually was an interaction between the teacher and a specific child. Teacher Control ranged from *very low* (1) "shows a passive attitude toward the child, and does not try to influence his/her behavior at all" to *very high* (6) "tries to have a strong influence on the child, has (or takes) complete control over the situation without acknowledging and permitting any independent contribution from the child". Teacher Affiliation ranged from *very low* (1) "is defensive, morose, or unfriendly to the child" to *very high* (6) "is strongly positive, clearly supportive, companionable, or warm, both verbally and nonverbally". Child Control ranged from *very low* (1) "is totally passive and shows no initiative, acts only when explicitly or repeatedly asked by the teacher" to *very high* (6) "adopts an active self-assured attitude toward the teacher". Child Affiliation ranged from *very low* (1) "is indifferent, defensive, morose, unfriendly, or cheeky to the teacher" to *very high* (6) "is very pleasant, companionable, spontaneous, or warm to the teacher".

Each observer rated only one of the four variables. Per variable, most video-fragments were rated by only one observer but several randomly selected fragments (11-15 %) were double coded to allow the examination of interrater reliability. Intraclass Correlation Coefficients (ICCs) for absolute agreement in scale scores could be interpreted as fair for Teacher Affiliation (ICC = $.54$; 3 raters) and as good for Teacher Control (ICC = $.74$; 3 raters), Child Control (ICC = $.65$; 8 raters), and Child Affiliation (ICC = $.61$; 8 raters) according to the guidelines of Cicchetti and colleagues (2006). In addition, we investigated the agreement between observers in whether they scored an interaction between teacher and child in a certain episode or not: Cohen's Kappa ranged from $.76$ to $.87$ for the four variables. Episodes in which there was disagreement between raters in whether there was an interaction or not, were excluded from the analyses. Twenty-five to 34 percent of the scale scores were deleted for this reason. However, results were largely the same as for the original dataset in which all scale scores were included. Previous studies have supported the validity of these scales for use in dyadic (Thijs et

al., 2011) and group settings (Roorda, Koomen, & Oort, in press).

Interaction Time. Interaction Time was based on the number of episodes in which there was an interaction between the teacher and an individual child. It was coded to represent the total number of episodes in which the teacher interacted with a particular child as a percentage of the total length of the video-fragment.

Interaction Frequency. Interaction Frequency represents the number of times there was an interaction between the teacher and a particular child. An interaction could last only one episode or a series of episodes.

Analyses

Hierarchical linear modeling was used to analyze the data: Five-second episodes were considered as nested within children and children as nested within teachers. We used deviance tests to check whether it was necessary to distinguish between variance on the child and teacher level. For Teacher Control and Teacher Affiliation, three level models with variance at the episode, child, and teacher level were used, whereas for Child Control and Child Affiliation two level models with variance at the episode and child level were used, because variance at the teacher level was not significant for those last two variables. To ease interpretation of results, each variable was standardized (*z*-scores) at its own level in the analyses.

We used a three-step procedure to answer our research questions: First, to examine complementarity tendencies, we included the interaction partner's behavior on the same dimension one episode before the dependent variable was measured ($Other_{t-1}$) in the model. In addition, we added the actor's own behavior on the same dimension, one episode earlier than the dependent variable ($Self_{t-1}$) to the model, to control for intrapersonal stability. Furthermore, we included the actor's own and the interaction partner's behavior at *t*-1 on the other dimension in the model, because control and affiliation were significantly correlated (see Table 1). Second, to investigate the unique influence of each predictor variable (i.e., Externalizing Behavior, Internalizing Behavior, Interaction Time, and Interaction Frequency) on teachers' and children's interactive behaviors, all predictors were included together in the model. In addition, we examined interaction effects of all predictor variables. Only significant interaction effects were included in the model. Third, to investigate whether teachers' and children's complementarity tendencies were moderated by Externalizing Behavior, Internalizing Behavior, Interaction Time, and Interaction Frequency, we added interactions of $Other_{t-1}$ (on the same dimension as the dependent variable) and the moderator variables to the models in the first step.

Results

Descriptive statistics and correlations for predictors and outcome variables are presented in Table 1.

Teachers' and Children's Interpersonal Complementarity

Within actors, significant positive effects of Control $Self_{t-1}$ on Teacher and Child

Table 1.

Descriptive statistics and correlations for predictors and outcome variables

Predictors (n = 179)								
	M (SD)	1.	2.	3.	4.	5.	6.	7.
1. Externalizing	1.39 (.49)	-						
2. Internalizing	1.40 (.39)	-.06	-					
3. Interaction Time	29.15 (9.31)	.10	-.01	-				
4. Interaction Freq.	8.96 (4.04)	.07	-.04	.36**	-			
Outcome variables (n = 8179 ^a)								
	M (SD)	1.	2.	3.	4.	5.	6.	7.
5. Teacher Control	3.90 (.94)	-.02	.05**	.06**	-.01	-		
6. Teacher Affiliation	4.39 (.63)	-.11**	.02	.05**	.06**	.00	-	
7. Child Control	2.97 (.88)	.11**	-.12**	-.00	.02*	-.21**	-.12**	-
8. Child Affiliation	3.57 (.81)	.04**	-.08**	.03**	.00	-.24**	.02*	.41**

Note 1. ** $p < .01$

Note 2. a. This number refers to the total number of episodes in the analyses

Control, and of Affiliation $Self_{t-1}$ on Teacher and Child Affiliation were found (see Table 2), indicating a certain degree of intrapersonal stability. Children's interactive behaviors seemed to be somewhat more stable than teachers' interactive behaviors (i.e., $\beta = .33$ for Child Control versus $\beta = .17$ for Teacher Control; $\beta = .35$ for Child Affiliation versus $\beta = .23$ for Teacher Affiliation). In addition, Teacher Affiliation $_{t-1}$ positively predicted Teacher Control, whereas Teacher Control $_{t-1}$ had a negative effect on Teacher Affiliation. For children, Control $_{t-1}$ had a positive effect on Child Affiliation. Between actors, a negative effect of Control Other $_{t-1}$ on Teacher Control was found, whereas the effect of Affiliation Other $_{t-1}$ on Teacher Affiliation was not significant. Thus, teachers reacted complementarily on the Control dimension, but not on the Affiliation dimension. In addition, Affiliation Other $_{t-1}$ had a negative effect on Teacher Control

Table 2.

Teachers' and children's complementarity tendencies

	Teacher		Child	
	Control	Affiliation	Control	Affiliation
	β (SE)	β (SE)	β (SE)	β (SE)
<i>Predictors</i>				
Control $Self_{t-1}$.172 (.015)**	-.041 (.014)**	.325 (.015)**	.057 (.016)**
Affiliation $Self_{t-1}$.038 (.014)**	.230 (.013)**	.021 (.012)	.346 (.013)**
Control Other $_{t-1}$	-.046 (.019)*	-.038 (.017)*	-.034 (.011)**	-.070 (.013)**
Affiliation Other $_{t-1}$	-.044 (.015)**	.016 (.014)	-.026 (.011)*	.002 (.012)
<i>Variance</i>				
Episodes	.907	.771	.532	.667
Children	.032	.011	.063	.090
Teachers	.016	.051	-	-

Note 1. The subscript t-1 indicates that predictors were measured one episode (five seconds) earlier than the dependent variable.

Note 2. Standardized beta coefficients are reported

Note 3. * $p < .05$ ** $p < .01$

Table 3.

Influence of predictors on teachers' and children's interactive behaviors

	Teacher		Child	
	Control	Affiliation	Control	Affiliation
	β (SE)	β (SE)	β (SE)	β (SE)
<i>Predictors</i>				
Externalizing Behavior	-.023 (.022)	-.084 (.019)**	.090 (.030)**	.009 (.037)
Internalizing Behavior	.064 (.021)**	.039 (.018)*	-.094 (.029)**	-.087 (.037)*
Interaction Time	.134 (.024)**	.026 (.020)	-.051 (.032)	-.001 (.041)
Interaction Frequency	-.054 (.028)	.031 (.029)	-.022 (.031)	-.008 (.040)
Extern. x Internalizing	-	-	.081 (.034)*	-
Internalizing x Frequency	-	-	-	-.116 (.039)**
<i>Variance</i>				
Episodes	.930	.802	.583	.763
Children	.040	.019	.131	.217
Teachers	.022	.084	-	-

Note 1. Standardized beta coefficients are reported

Note 2. * $p < .05$ ** $p < .01$

and Control Other_{t-1} negatively predicted Teacher Affiliation, indicating that teachers responded less dominant if children showed more affiliation and with less affiliation if children showed more control. For children, there was a negative association between Control Other_{t-1} and Child Control, whereas the effect of Affiliation Other_{t-1} on Child Affiliation was not significant. Thus, children also responded complementarily on Control, but not on Affiliation. Furthermore, Teacher Control_{t-1} had a significant negative effect on Child Affiliation: Children displayed less affiliation if teachers behaved more dominant. Teacher Affiliation_{t-1} also had a significant negative effect on Child Control: Children showed less control if teachers displayed more affiliation.

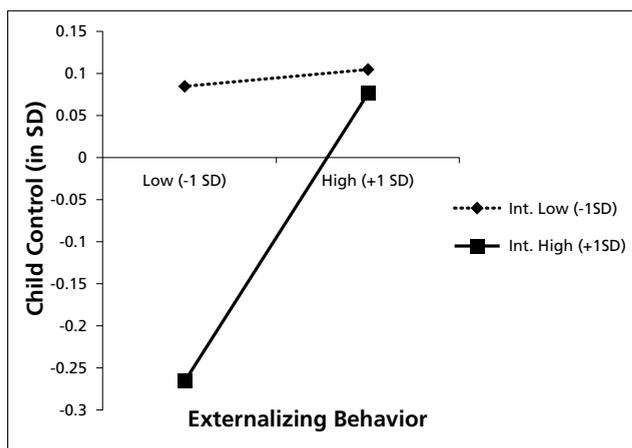


Figure 1. Interaction effect of Externalizing Behavior and Internalizing Behavior (= Int.) on Child Control.

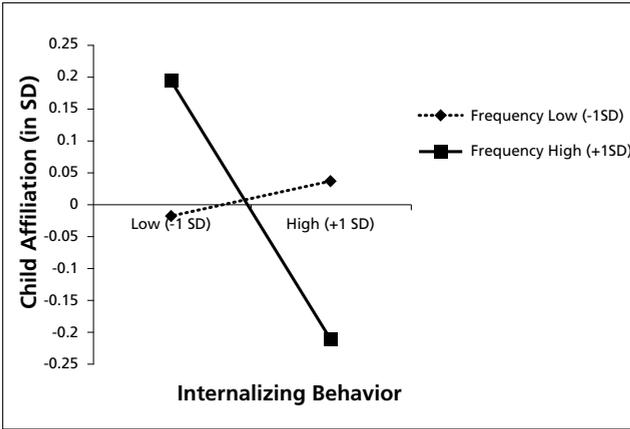


Figure 2. Interaction effect of Internalizing Behavior and Interaction Frequency on Child Affiliation.

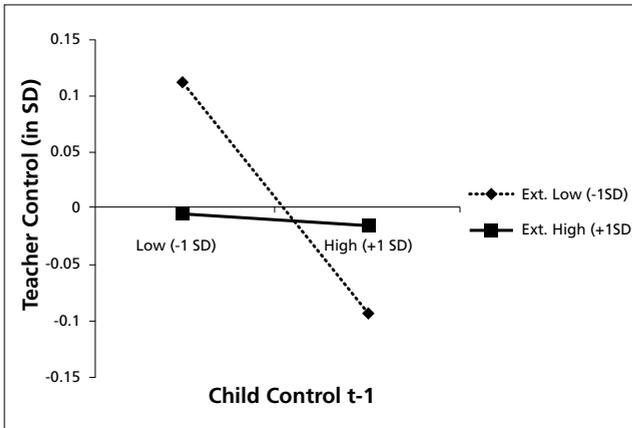


Figure 3. Interaction effect of Child Control_{t-1} and Externalizing Behavior (= Ext.) on Teacher Control.

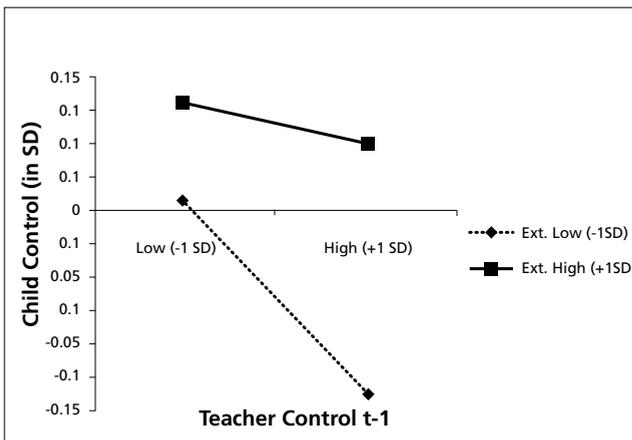


Figure 4. Interaction effect of Teacher Control_{t-1} and Externalizing Behavior (= Ext.) on Child Control.

Teachers' and Children's Interactive Behaviors

Both Internalizing Behavior and Interaction Time had a significant effect on Teacher Control (see Table 3): Higher levels of Internalizing Behavior and longer Interaction Time were associated with more Teacher Control. Both Externalizing and Internalizing Behavior significantly predicted Teacher Affiliation: Higher levels of Externalizing Behavior were associated with *lower* levels of Teacher Affiliation, whereas higher levels of Internalizing Behavior were related to *higher* levels of Teacher Affiliation. Externalizing and Internalizing Behavior were also significantly associated with Child Control: Higher levels of Externalizing Behavior were related to *higher* levels of Child Control, whereas higher levels of Internalizing Behavior were associated with *lower* levels of Child Control.

In addition, a significant interaction effect of Externalizing and Internalizing Behavior on Child Control was found: Children with relatively high levels of internalizing behavior and relatively low levels of externalizing behavior showed less control toward their teacher than children with relatively low levels of both externalizing and internalizing behavior and children with relatively high levels of externalizing behavior and either high or low levels of internalizing behavior (see Figure 1). Finally, Internalizing Behavior significantly predicted Child Affiliation: Higher levels of Internalizing Behavior were associated with *less* Child Affiliation. However, a significant interaction effect of Internalizing Behavior and Interaction Frequency was found, which indicated that this effect of Internalizing Behavior

only holds if children had many interactions with their teacher. If children had only a few

interactions with their teacher, Internalizing Behavior did not affect the degree of Child Affiliation (see Figure 2).

Moderating Effects on Complementarity Tendencies

Teachers' complementarity tendencies on the Control dimension were influenced by the child's level of Externalizing Behavior ($\beta = .049, p = .002$) but not by Internalizing Behavior ($\beta = -.018, p = .267$), Interaction Time ($\beta = .015, p = .418$), and Interaction Frequency ($\beta = -.001, p = .953$). Teachers reacted more complementarily on Control to children with lower levels of externalizing behavior (see Figure 3). Children's complementarity tendencies on the Control dimension were also affected by the child's level of Externalizing Behavior ($\beta = .023, p = .028$) but not by Internalizing Behavior ($\beta = -.004, p = .737$), Interaction Time ($\beta = -.011, p = .385$), and Interaction Frequency ($\beta = .013, p = .259$). Children with low levels of externalizing behavior also reacted more complementarily to their teacher on the Control dimension than children with higher levels of externalizing behavior (see Figure 4). Both teachers' and children's complementarity tendencies on the Affiliation dimension were not significantly influenced by any of the four moderator variables.

Discussion

Research on reciprocal influences in teacher-child interactions has been scarce. In the present study, we used interpersonal theory and the complementarity principle to

describe and explain mutual interaction processes between teacher and child. Thijs and colleagues (2011) found evidence for the applicability of the complementarity principle to teacher-child interactions in a dyadic setting outside the classroom in a sample of socially inhibited children. The present study aimed to further extend evidence for the use of interpersonal theory and the validity of the complementarity principle in the school setting by observing teacher-child interactions in a more ecological valid setting: Interactions took place in a small group setting within the kindergarten classroom during regular school time. In addition, the sample consisted of children who were selected to represent the natural variation of externalizing and internalizing behavior in the classroom. Our second aim was to investigate whether teachers' and children's mutual interactive behaviors and their complementarity tendencies could be predicted by children's externalizing and internalizing behaviors, interaction time, and interaction frequency. Teachers' and children's behaviors on the control and affiliation dimension were rated in intervals of five seconds to allow the investigation of reciprocal influences. Both teachers and children reacted complementarily on the control dimension (i.e., dominance was returned with submissiveness and vice versa), but not on the affiliation dimension (i.e., friendliness did not elicit friendly behaviors and hostile behaviors did not elicit hostility). Both teachers' and children's interactive behaviors were influenced by children's behavior characteristics and interaction time. Finally, both teachers and children responded more complementarily on control if children had lower levels of externalizing behavior.

Interpersonal Complementarity in Teacher-Child Interactions

Both teachers and children reacted complementarily on the control dimension: They reciprocated dominance with submissiveness, and submissiveness with dominance. Thijs and colleagues (2011) found that in a dyadic setting outside the classroom, only children with high levels of internalizing behavior reacted complementarily on the control dimension, whereas children with low levels of internalizing behavior did not. In the present study, however, children with low levels of internalizing behavior also responded complementarily on control. It could be that teachers' control behaviors have more impact on children in a group setting, because they depend on their teacher to decide whose turn it is and who is allowed to speak. The present findings are more ecologically valid as the interaction setting was more equivalent to natural interactions in the everyday practice of the kindergarten classroom. Overall, our findings suggest that the complementarity principle applies to interactions on the control dimension between teachers and behaviorally different children within the classroom setting. With regard to the affiliation dimension, the results did not support the validity of the complementarity principle in the school setting: Both teachers and children did not respond complementarily on the affiliation dimension (i.e., they did not return friendliness with friendly behaviors or hostility with hostile behaviors). It could be that teachers only reacted complementarily on children's positive behaviors but not on their negative behaviors, which would be in agreement with their professional role as teacher (Thijs et al., 2011): Teachers are supposed to act in the best interest of the child. Therefore, they will have to suppress their automatic tendency to respond complementarily and not return children's aloofness with detached behaviors (Thijs et al., 2011). Spilt and

Koomen (2009) found that positive affect and negative affect (or anger) in teachers' relationship perceptions were not significantly associated with each other, indicating that these are two separate dimensions of teacher-child relationships. Future research could investigate whether complementarity in teachers' interactive behaviors on affiliation is found if separate observation scales are used for positive affiliation and negative affiliation. Furthermore, teachers' affiliation behaviors were influenced by children's control behaviors. Teachers displayed less affiliation if children showed more control. This finding suggests that teachers do not always appreciate children's initiative, which may threaten children's feelings of autonomy and, hence, hinder their engagement in learning activities and school performance (Connell & Wellborn, 1991). However, more research is needed to investigate whether teachers' negative reactions to children's dominance indeed have such deteriorating consequences for children.

Regarding children's complementarity tendencies on the affiliation dimension, previous research has found that in a dyadic setting outside the classroom relatively inhibited children did react complementarily on affiliation (Thijs et al., 2011). However, in the present small group setting within the classroom, children's affiliation behaviors seemed to be more influenced by teachers' behaviors on the control dimension, with more teacher control eliciting lower levels of affiliation in the child. Perhaps, in a group setting, teachers' control behaviors are more influential, because more time is spent on behavior regulation and turn-taking. In sum, our findings do not support the applicability of the complementarity principle to teacher-child interactions on the affiliation dimension. Instead, they suggest that teachers' and children's affiliation behaviors are negatively influenced by their interaction partner's behaviors on the control dimension.

Externalizing Behaviors and Teacher-Child Interactions

As hypothesized, teachers showed less affiliation toward children with higher levels of externalizing behavior. In contrast, relatively externalizing children did not display less affiliation toward their teacher than children with lower levels of externalizing behavior. Furthermore, the interaction effect of externalizing and internalizing behavior showed that children with elevated levels of externalizing behavior displayed the same degree of control toward the teacher as typical children (i.e., children with low levels of both externalizing and internalizing behavior; see Figure 1). Thus, relatively externalizing children did not seem to differ from typical children with regard to the degree of affiliation and control displayed toward their teacher. However, significant differences in complementarity tendencies on the control dimension were found: Both teachers and relatively externalizing children reacted less complementarily on control than typical children and their teachers. As complementarity has been found to be associated with comfort, liking of the interaction partner, and satisfaction with the interaction (Dryer & Horowitz, 1997; Tiedens & Fragale, 2003), the lower levels of complementarity may explain why both teachers and externalizing children usually perceive their mutual relationship as less positive and more conflictual than average children (e.g., Birch & Ladd, 1998; Doumen et al., 2008; Murray & Greenberg, 2000; Spilt et al. 2010), and why teachers experience more feelings of helplessness about their relationships with those children (Spilt & Koomen, 2009). Future research could further examine the link between complementarity in teacher-child interactions and relationship quality.

Internalizing Behaviors and Teacher-Child Interactions

Relatively internalizing children (without comorbid externalizing problems) were more passive and submissive during interactions with their teacher than typical children. As internalizing children tend to be fearful and withdrawn in social situations (Thijs et al., 2004; Weeks et al., 2009), this passiveness and submissiveness seems to be characteristic for these children. In addition, children with higher levels of internalizing behavior showed less affiliation toward their teacher. The interaction effect of internalizing behavior and interaction frequency, however, showed that this effect was only found if children had many interactions with their teacher. Thus, it seems that the deteriorating effect of internalizing behavior becomes stronger as children have more interactions with teachers. In those cases, highly internalizing children do not only seem to react more passive on the control dimension but are also less inclined to openly express their feelings and emotions toward their teacher.

Teachers responded complementarily to the passiveness of relatively internalizing children and displayed more control toward them as compared to normative children. Consequently, those children probably become even more passive. In addition, teachers displayed more affiliation toward these children, which is in agreement with the higher levels of teacher support for internalizing children that were found in some previous studies (Thijs & Koomen, 2008; Thijs et al., 2008). Previous research has found positive associations between higher levels of teacher support and sensitivity and children's emotional security, task engagement, and achievement (McDonald Connor et al., 2005; Thijs & Koomen, 2008). However, the negative association between teacher affiliation and child control suggests that higher levels of teacher affiliation may not be merely advantageous. For children did not reciprocate teachers' higher levels of affiliation with more affiliation themselves. In contrast, more teacher affiliation seemed to increase children's passiveness toward their teacher. Therefore, to improve their interactions with relatively internalizing children, teachers should probably focus on being less controlling toward these children, whereas attempts to increase teacher affiliation should have less priority. In this way, teachers could not only stimulate more initiative in children, but also elicit more affiliation from them. It could be that neutral levels of teacher affiliation are even better for internalizing children, as high degrees of teacher affiliation may be perceived as threatening by those children. Moreover, efforts to improve interactions with internalizing children may be more effective in dyadic settings, as inhibited children's complementarity tendencies were stronger in a dyadic setting (Thijs et al., 2011).

Interaction Time and Interactive Behaviors

Teachers were more in control as interactions lasted longer. It seems that teachers spend more time in regulating children's behaviors and are less inclined to leave the initiative with the child if they have longer interactions with that child. In addition, it could be that teachers became more impatient as interactions lasted longer, and were therefore more inclined to take control over the situation. However, effects could also be the other way around: Interactions may last longer if there is more perceived need to control the child's behavior. Overall, our findings seem to indicate that the length and number of interactions does not have much impact on teachers' and children's interactive behaviors and complementarity tendencies.

Qualifications

Some qualifications should be taken into account with regard to the interpretation of the results. First, most of the significant effects in the present study were relatively small. However, associations could still be relevant as complementary reactions between teacher and child will reinforce these effects. In this way, effects will become substantial in the long run.

Second, although the observations took place in the natural ecology of the kindergarten classroom, the small group task setting was relatively structured. As interactive behaviors and complementarity tendencies are considered to be influenced by the degree of structure in the interaction setting (Kiesler, 1996), more research is needed to investigate whether our results could be replicated during free play or in whole group settings.

Third, the present study used a cross-sectional design. Due to the use of interval ratings for interactive behaviors, we were able to investigate causality of interpersonal influences within interaction cycles. However, because of our cross-sectional design, long-term directions of influence of children's behavior characteristics on changes in interaction patterns over time could not be investigated. Future research should include more measurement occasions to examine causality of associations and possible changes in interactive behaviors and interpersonal complementarity over time.

Finally, children were selected based on their relative scores on externalizing and internalizing behavior compared to their classmates in regular kindergarten classes. Because of this selection procedure, we were able to obtain a normal distribution of externalizing and internalizing behavior. It should be noted, however, that because of this selection procedure, externalizing and internalizing behaviors were not in the (sub)clinical range. Future research could investigate whether our findings also apply to children with (sub)clinical levels of externalizing and internalizing behavior or in special educational settings.

Implications and Conclusions

The present study indicates that interpersonal theory and the complementarity principle (Carson, 1969/1972; Leary, 1957) can be used to describe and explain teachers' interactions with behaviorally different children in a small group setting within the kindergarten classroom. Both teachers and children reacted complementarily on the control dimension. Although effects are small, they indicate that an intentional change in teachers' interactive behaviors may lead to changes in children's interactive behaviors. Therefore, teachers and school psychologists may use interpersonal complementarity to promote positive teacher-child interactions and to intervene in negative interaction cycles (Koomen et al., 2006; Spilt et al., in press). The lack of complementarity on the affiliation dimension raises doubts about the usefulness of the complementarity principle as a basis for intervention in negative interactions on this dimension. It seems that children's negative affect will be more easily resolved by changing teachers' behaviors on the control dimension. Teachers should be aware of the fact that their controlling behaviors will not only lead to passivity but also to less affiliation in the child. Therefore, teachers should be especially cautious about how they intervene in and regulate children's behaviors.

In addition, interaction patterns of teachers and children with high levels of externalizing and/or internalizing behaviors were different from, and probably more dysfunctional than, interactions between teachers and typical children. If teachers want to improve their interactions with internalizing children, their first priority should be to behave less dominant toward them. In that way, internalizing children will not only display more initiative toward their teacher but will also show more affiliation toward them. With regard to externalizing children, school psychologists could train teachers to recognize and value externalizing children's expression of affiliation toward them and help them to reciprocate the positive affect of these children.

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