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Goemans, A.; Geel, M. van; Wilderjans, T.F.; Ginkel, J.R. van; Vedder, P.

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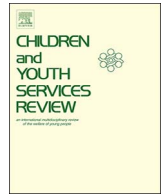
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Predictors of school engagement in foster children: A longitudinal study

Anouk Goemans^{a,*}, Mitch van Geel^a, Tom F. Wilderjans^{b,c}, Joost R. van Ginkel^b, Paul Vedder^a

^a Institute of Education and Child Studies, Leiden University, the Netherlands

^b Research Group of Methodology and Statistics, Institute of Psychology, Leiden University, the Netherlands

^c Research Group of Quantitative Psychology and Individual Differences, Faculty of Psychology and Educational Sciences, KU Leuven, Belgium

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ABSTRACT

Children in foster care are often characterized by low academic outcomes which negatively impact their later lives. School engagement may be a key element to promote their academic and educational outcomes. However, little is known about the development of school engagement in foster children and longitudinal studies are lacking. The current study reports the findings of a three-wave longitudinal study wherein we examined the development of school engagement and analyzed which factors were predictive of school engagement in a sample of 363 Dutch foster children (age range 5–18 years, 46.6% girls). Multilevel analyses showed that characteristics related to demographics, school functioning, foster children, and foster families predicted levels of school engagement of children in foster care. Foster children's behavioral functioning and foster parents' positive parenting appeared to be characteristics important to consider in screening and interventions. Based on the findings we suggest that teachers and foster care professionals should collaborate to ensure that school engagement and consequently school functioning becomes part of foster children's personal development plans.

1. Introduction

Children in foster care often experience school difficulties and poor educational outcomes (Berger, Cancian, Han, Noyes, & Rios-Salas, 2015; Jackson, 1994; O'Higgins, Sebba, & Luke, 2015; Sebba et al., 2015; Tilbury, 2010). They are disproportionately represented in special education, have higher grade retention rates and are more frequently suspended or expelled from school compared to their peers who live with their biological parents (see for a meta-analysis Scherr, 2007). These findings are worrying, even more so because they correspond to problematic adaptive functioning in the later lives of fostered children (Berlin, Vinnerljung, & Hjern, 2011; Harris, Jackson, O'Brien, & Pecora, 2009; Jackson, 1994). Persons formerly placed in foster care struggle with post-secondary school completion, are underemployed, have a higher chance of earnings below the poverty level and run a higher risk of future psychosocial problems than persons raised by biological parents (Berlin et al., 2011; Blome, 1997; Goerge et al., 2002; Harris et al., 2009; Pecora et al., 2006; Salazar, Jones, Emerson, & Mucha, 2016). Although we should be careful in the assumption of causal relations between school performance and outcomes later in life, Berlin et al. (2011) showed that the risk for such problems was reduced by 38–52% when adjusted for the results for school performance. Another study also confirmed this causal relation (Forsman, Brännström, Vinnerljung, & Hjern, 2016).

To improve foster children's educational outcomes and the quality of their adult lives, it is important to develop a good understanding of factors related to foster children's academic development. An important and frequently studied factor in this respect is school engagement (Finn, 1989; Forsman & Vinnerljung, 2012; Fredricks, Blumenfeld, Friedel, & Paris, 2005; Leonard, Stiles, & Gudiño, 2016; Pears, Kim, Fisher, & Yoerger, 2013; Tilbury, Creed, Buys, Osmond, & Crawford, 2014; Wang & Fredricks, 2014). School engagement is defined as the extent to which students are committed to and participate in the curriculum, school and social activities (Appleton, Christenson, & Furlong, 2008; Fredricks et al., 2005; Glanville & Wildhagen, 2007; Tilbury et al., 2014). Because school engagement is seen as malleable and susceptible to variation in environment, it is considered a key element for interventions that promote academic and educational outcomes (Fredricks, Blumenfeld, & Paris, 2004).

1.1. School engagement in foster children

Studies on school engagement in foster children have shown mixed results. Compared with children from the general population, both lower (Kortenkamp & Ehrle, 2002; Pears et al., 2013) and higher (Tilbury et al., 2014) levels of school engagement were reported for foster children. In comparison with children living in so-called 'high-risk' families, foster children's school engagement is reported to be

* Corresponding author at: Institute of Education and Child Studies, Leiden University, Wassenaarseweg 52, 2333 AK, Leiden, the Netherlands.
E-mail address: a.goemans@fsw.leidenuniv.nl (A. Goemans).

similar (Kortenkamp & Ehrle, 2002) or even better (Font & Maguire-Jack, 2013). Despite these different results, all studies acknowledge the educational difficulties of foster children and emphasize the importance of school engagement (e.g., Font & Maguire-Jack, 2013; Tilbury et al., 2014). Although the previous studies compared foster children's school engagement with children from the general population or with children at-risk, longitudinal studies on the development of school engagement in foster children are lacking. Longitudinal research is important because it gives insight in developmental trends in foster children's school engagement and allows to identify predictors related to the developmental trajectories of foster children. Longitudinal studies can also provide a knowledge base for the design of interventions or support services aimed to support foster children's school engagement.

Interventions or support services to promote successful academic trajectories in foster children have been developed, but only few have been rigorously examined for their effectiveness and to the best of our knowledge none of them specifically focused on promoting foster children's school engagement (Forsman & Vinnerljung, 2012; Liabo, Gray, & Mulcahy, 2013). Interventions and support aimed at improving school engagement in the general population do exist (Fredricks et al., 2004; Holt, Bry, & Johnson, 2008; Stormshak, Fosco, & Dishion, 2010). However, it cannot be assumed that interventions that have shown to be effective for one group of children (i.e., children from the general population) are automatically effective when used with another group of children (i.e., foster children). Interventions or support services aimed to promote school engagement in foster children should be tailored to their specific needs. Because of the differences between foster children and children from the general population, it is important to examine the predictors of school engagement in foster children, and to study both unique foster care predictors and the predictors of school engagement of children in the general population.

1.2. Predictors of school engagement

Many studies have been performed on predictors of school engagement of children in the general population (e.g., Berends, 1995; Finn & Rock, 1997; Perdue, Manzeske, & Estell, 2009; Simons-Morton & Chen, 2009; Simons-Morton & Crump, 2003; Sirin & Rogers-Sirin, 2005; Steinberg, Lamborn, Dornbusch, & Darling, 1992; Wang & Eccles, 2012; Wentzel, 1993; Woolley & Bowen, 2007). These studies inform us about a variety of conventional characteristics, such as demographics and characteristics related to school functioning. It has, for example, been shown that girls have higher levels of school engagement than boys (Finn & Rock, 1997; Sirin & Rogers-Sirin, 2005; Wang & Eccles, 2012), and that socioeconomic status and parental level of education are positively related to levels of school engagement (Berends, 1995). In addition, previous academic achievement is related to school engagement (Finn & Rock, 1997), with children having higher grades showing higher levels of school engagement. It is of interest to examine whether these predictors can be generalized to the foster care population.

In addition, it is also important to examine the potential contribution of several characteristics that are distinctive or have distinctive manifestations for children in foster care. Previous studies on children in the general population have shown that behavior problems are negatively and prosocial behaviors are positively related to school engagement (Hirschfield & Gasper, 2011; Wentzel, 1993). In addition, positive parenting is found to be positively associated to children's engagement in school (Blondal & Adalbjarnardottir, 2014; Simons-Morton & Chen, 2009; Simons-Morton & Crump, 2003; Steinberg et al., 1992; Woolley & Bowen, 2007). However, foster children on average are characterized by lower levels of behavioral functioning compared with children from the general population (Goemans, Van Geel, Van Beem, & Vedder, 2016) and the behavior of foster children places a strain on foster parents which is reflected in higher levels of foster parents' stress and possibly also influences foster parenting (Farmer, Lipscombe, & Moyers, 2005; Jones and Morrisette, 1999;

Vanderfaellie, Van Holen, Trogh, & Andries, 2012). Furthermore, for foster children their placement histories and the length of their stay with the foster family are by definition distinct. A volatile placement history might be related to lower levels of school engagement, because previous studies have shown that placement history and school mobility co-vary (Conger & Finkelstein, 2003) and likely has consequences for school success (Clemens, Lalonde, & Sheesley, 2016; Drake, 2016; Gruman, Harachi, Abbott, Catalano, & Fleming, 2008; Herbers, Reynolds, & Chen, 2013; Mehana & Reynolds, 2004; Temple & Reynolds, 2000) and subsequently also for school engagement (Fredricks et al., 2004). With respect to duration of the foster placement, length of stay with the foster parents could be positively related to school engagement because the stability of the foster placement might result in a stable living environment, both in the foster home and at school, which is assumed to have a positive association with school engagement (Tilbury et al., 2014).

Although studies pointed out the importance of school engagement for foster children's academic and social success (e.g., Font & Maguire-Jack, 2013; Pears et al., 2013), little is known about the development of school engagement in foster children and knowledge about characteristics that precede and explain desirable levels of school engagement in foster children is lacking. The aim of the current study is therefore to examine foster children's school engagement and its predictors using a longitudinal design.

1.3. Current study

The current study aims to examine the development of school engagement and to analyze which factors are predictive of school engagement in a sample of Dutch foster children between 5 and 18 years old using a longitudinal design. Two blocks of characteristics predictive of school engagement are distinguished (see Table 1) and their unidirectional relations with school engagement are examined. The first block consists of demographics and school functioning variables (e.g., gender, age, socioeconomic status of the foster family, foster parents' level of education, children's grade point average and school absenteeism) and the second block consists of foster child and foster family factors (e.g., foster children's behavior problems and prosocial behavior, foster placement history, duration of the placement, foster parenting style, foster parents' stress). In line with the reviewed literature, we hypothesize that both blocks of characteristics will be predictive of foster children's school engagement. We expect higher GPA, foster parents' education and SES, and lower school absenteeism and age to correspond to higher levels of school engagement (Berends, 1995). In addition, we expect girls to have higher levels of school engagement than boys (Finn & Rock, 1997; Sirin & Rogers-Sirin, 2005; Wang & Eccles, 2012).

With respect to the second block of characteristics, we hypothesize that lower levels of behavior problems (both internalizing and externalizing), foster parents' stress, and negative foster parenting explain higher levels of school engagement (Hirschfield & Gasper, 2011; Wentzel, 1993). In addition, we expect higher levels of prosocial behavior and positive foster parenting to predict higher levels of school engagement (Hirschfield & Gasper, 2011; Wentzel, 1993). Lastly, we hypothesize fewer previous foster placements and a longer duration of the foster placement to explain higher levels of school engagement (Clemens et al., 2016; Drake, 2016; Gruman et al., 2008; Herbers et al., 2013; Mehana & Reynolds, 2004; Temple & Reynolds, 2000).

The current study aims to increase our knowledge of the developmental trajectory and predictors of school engagement of foster children. Given the potential of school engagement in an intervention setting, knowledge about school engagement in foster children might help to develop and enhance interventions and support services aimed at improving school engagement in foster children.

Table 1

Variables included in the multilevel analyses organized per block (general and foster care specific) and per measurement level (time varying or time-invariant).

Block 1 (general variables)		Block 2 (foster care specific variables)	
Variable	Level	Variable	Level
GPA-1	Level 1 (time-variant)	Internalizing behavior-1	Level 1 (time-variant)
GPA-2	Level 2 (time-invariant)	Internalizing behavior-2	Level 2 (time-invariant)
School absenteeism	Level 1 (time-variant)	Externalizing behavior-1	Level 1 (time-variant)
Gender	Level 2 (time-invariant)	Externalizing behavior-2	Level 2 (time-invariant)
Age at T1	Level 2 (time-invariant)	Prosocial behavior-1	Level 1 (time-variant)
Education foster father	Level 2 (time-invariant)	Prosocial behavior-2	Level 2 (time-invariant)
Education foster mother	Level 2 (time-invariant)	Foster parents' stress-1	Level 1 (time-variant)
SES	Level 2 (time-invariant)	Foster parents' stress-2	Level 2 (time-invariant)
		Positive foster parenting-1	Level 1 (time-variant)
		Positive foster parenting-2	Level 2 (time-invariant)
		Negative foster parenting-1	Level 1 (time-variant)
		Negative foster parenting-2	Level 2 (time-invariant)
		Placement history	Level 2 (time-invariant)
		Duration of the foster placement	Level 2 (time-invariant)

Note. Level 1 predictors were within-person centered, which implies that their effect was split into two: (1) a within-person effect (indicated by -1 after the 'Variable' name) and (2) a between person effect (indexed by -2)

2. Method

2.1. Participants

The participants in this study were 363 foster children residing in regular family foster care in the Netherlands. There were 169 girls (46.6%) and 194 boys (53.4%). The foster children were between 5 and 18 years old ($M = 11.30$, $SD = 3.22$) at Wave I and attended either primary ($N = 212$, 58.4%) or secondary ($N = 151$, 41.6%) education. The mean time in the foster placement at Wave I was 60 months ($SD = 48.23$) and the foster children experienced on average 1.22 previous foster placements ($SD = 1.48$). Almost one third (31.4%) of the foster children resided in kinship foster families. Most foster children (91.5%) resided in two-parent families. Almost one fifth (18.7%) of the foster mothers completed only primary or junior high school. For foster fathers, this was 13.8%. About one third of the foster mothers (36.1%) and foster fathers (34.2%) completed senior high school. Another one third of foster mothers (33.6%) and foster fathers (31.1%) held a bachelor's degree. A small percentage of foster mothers (8.5%) and foster fathers (12.9%) held a master's degree. For 3.1% of foster mothers and 8.0% of foster fathers data about education was missing.

In the Netherlands, with a population of 17 million, currently over 21,000 children are experiencing family foster care. An important characteristic of the Dutch foster care system is the distinction between short-term and long-term foster care. Adoption from care rarely takes place, and permanency planning is a lengthy and less definitive process compared to for example the U.S. (Vedder, Veenstra, Goemans, & Van Geel, 2015). The Dutch child protection system could thus be characterized as a 'family service' system (Gilbert, Parton, & Skivenness, 2011). We compared our sample with the total population of Dutch foster families and foster children to see whether our sample was representative (Pleegzorg Nederland, 2017). There were slightly fewer girls in our sample (46.6%) compared to the total population (51%), but the age distribution was comparable. Foster children in our sample had on average longer placement durations compared to the total sample of Dutch foster children. This could be explained by the longitudinal character of our study which made participation of foster families that expected to offer a long-term foster placement more likely. Furthermore, our sample consisted of fewer kinship foster placements (31.4%) compared to placements of the total Dutch foster care population (48%).

2.2. Measures

2.2.1. School engagement

Children's school engagement was measured each wave with a shortened version of the School Engagement Measure (Fredricks et al., 2005). Good internal consistency and validity have been reported for the School Engagement Measure (Fredricks et al., 2005; Fredricks & McColskey, 2012). Foster parents were asked to complete fourteen questions which had to be answered on a 4-point Likert scale ranging from 1 (*hardly ever*) to 4 (*always*). Sample items are: "My foster child pays attention in class" and "My foster child feels happy in school". In the current study, the fourteen items were combined into a single, general engagement scale (e.g., Marks, 2000). Internal consistencies for this single scale ranged from .798 to .811 across the three waves.

2.2.2. School functioning

Each wave, school functioning was measured by collecting data about grades and absenteeism of foster children. With respect to grades, foster parents were asked to report the most recent grades for math, language and spelling if their foster children were in elementary school or for math, Dutch and English if their foster children were in secondary school. These three grades were averaged into a 'Grade Point Average' (GPA). GPA could possibly range from one to ten and ranged from one to nine in our sample. School absenteeism was measured with one question about how many days the foster child had missed school during the last month, and which could be answered on a five-point scale (1 = *never*, 2 = *less than one day*, 3 = *one to five days*, 4 = *six to ten days*, 5 = *more than ten days*).

2.2.3. Demographics and foster child characteristics

In the first wave, foster parents provided information about their highest level of completed education and about their socioeconomic status by completing four items of the Family Affluence Scale (Currie, Elton, Todd, & Platt, 1997). The FAS has been found to be a valid measure of children's SES (Andersen et al., 2008; Boyce, Torsheim, Currie, & Zambon, 2006). Furthermore, foster parents gave information about the foster child (e.g., age, gender, placement history, duration of the current placement). Placement history was measured by asking the foster parents how many previous placements their foster child had experienced.

2.2.4. Psychosocial functioning

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used to measure foster children's psychosocial functioning in each wave. We used the Dutch version of the SDQ (Van Widenfelt, Goedhart,

Treffers, & Goodman, 2003). The SDQ consists of 25 items which can be answered on a 3-point Likert scale ranging from 0 (*not true*) to 2 (*very true*). As previously suggested (Goodman, Lamping, & Ploubidis, 2010), the 25 items were combined into three subscales: internalizing behavior problems, externalizing behavior problems, and prosocial behavior. The subscale internalizing behavior problems consists of ten items covering emotional and peer problems. Sample items are: 'has many worries or often seems worried' and 'picked on or bullied by other children'. The subscale externalizing behavior problems is formed by combining the ten items for conduct and hyperactivity problems. Items are for example 'often lies or cheats' and 'restless, overactive, cannot stay still for long'. The subscale prosocial behavior consists of five items and a sample item is: 'kind to younger children'. Previous studies have shown that the validity of the SDQ is good (Achenbach et al., 2008; Goodman et al., 2010; Van Widenfelt et al., 2003). Acceptable to good psychometric properties were also found for the Dutch version of the SDQ (Muris, Meesters, & Van den Berg, 2003; Van Widenfelt et al., 2003). In the current study, Cronbach's alphas for each wave ranged from .747 to .792 for internalizing, from .838 to .853 for externalizing problems and from .710 to .744 for prosocial behavior.

2.2.5. Parenting

Parenting was measured in each wave using the Dutch version (Van Lier & Crijnen, 1999) of the Alabama Parenting Questionnaire (APQ; Frick, 1991; Shelton, Frick, & Wootton, 1996). The APQ consists of 42 items which can be answered on a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*). The APQ measures five dimensions of parenting: positive involvement with children (10 items), use of positive discipline techniques (6 items), poor monitoring and supervision (10 items), inconsistency in the use of such discipline (6 items) and use of corporal punishment (3 items). Sample items for the five dimensions respectively are 'You have a friendly talk with your child', 'Your child fails to leave a note or to let you know where he/she is going', 'You let your child know when he/she is doing a good job with something', 'You threaten to punish your child and then do not actually punish him/her' and 'You spank your child with your hand when he/she has done something wrong'. In addition, seven items ascertain 'other discipline practices'. These items do not form a scale, but provide information on an item by item basis. For our analyses we combined the first two scales (i.e., positive involvement and positive discipline) and the other three scales (poor monitoring and supervision, inconsistency, corporal punishment) into two new scales which are termed positive and negative parenting. APQ has been shown to be a valid instrument for identifying parenting styles (Dadds, Maujean, & Fraser, 2003; Elgar, Waschbusch, Dadds, & Sigvaldason, 2007). Reported internal consistencies for the subscales vary somewhat between studies and between subscales (Dadds et al., 2003; Elgar et al., 2007; Shelton et al., 1996). Internal consistencies in this study ranged over waves from .601 to .833 for positive parenting and from .653 to .666 for negative parenting.

2.2.6. Parenting stress

The short version of the Nijmeegse Ouderlijke Stress Index (NOSI-K; De Brock, Vermulst, Gerris, & Abidin, 1992) was used to measure parenting stress in each wave. The NOSI-K is based on the Parenting Stress Index (PSI; Abidin, 1990) and has been previously used in studies on foster parents (Maaskant et al., 2016; Murray et al., 2011; Nilsen, 2007; Timmer et al., 2006; Van Andel, 2015). The reliability of the NOSI-K is shown to be good (De Brock et al., 1992). The NOSI-K contains 25 items that foster parents have to evaluate on a 6-point Likert scale ranging from 1 (*totally disagree*) to 6 (*totally agree*). A sample item is: 'Child does things that bother me a great deal'. Internal consistencies of the NOSI-K have been reported to be high (De Brock et al., 1992; Haskett et al., 2006). The internal consistencies in the current study varied over waves between .957 and .963.

2.3. Procedure

The study was approved by the Leiden University Ethics Review Board. At the start of the study, we invited all foster care agencies in the Netherlands ($N = 28$) to participate, of which seven agencies (25%) agreed to participate. Reasons for not participating were mainly related to their participation in other studies on foster children and the wish to prevent a research overload for their foster families. The participating foster care agencies informed foster parents about the study objectives. Foster parents' consent was asked by the foster care agencies. For foster parents who gave consent, contact information was provided by the agencies to the researchers. We followed foster children for twelve months when they stayed with their foster parents. During these twelve months there were three measurements: one baseline (Wave I: October 2014) and two subsequent measurements (Wave II: April 2015, Wave III: October 2015). For the first wave, we invited 1,387 foster families to participate in the study and to complete a questionnaire with questions about their foster child, the foster family, and the foster placement. Most invitations were sent by email, but for those foster families who could not be reached by email (5.2%) we sent paper questionnaires. At each wave, we sent two reminders to complete the questionnaire. All foster parents who participated in Wave I were also invited to participate in both Wave II and Wave III. The initial sample that participated in Wave I consisted of 549 children. We excluded foster children who were not (yet) going to elementary or high school ($N = 145$), and children who resided in part-time foster care ($N = 41$), resulting in a final sample of 363 foster children. All foster children came from different foster families, i.e., we did not include multiple foster children who resided in the same foster family.

Of these 363 foster children, 191 also participated in Wave II (attrition rate 47.4%) and 159 in Wave III (attrition rate 56.2%). Reasons for attrition were mostly unknown ($N = 168$), but reunification with birth parents ($N = 18$), placement change to another foster family ($N = 7$), placement change to residential or group care ($N = 8$), and leaving foster care because of independent living of the foster child ($N = 3$), were communicated. We compared the foster children who participated in Wave I ($N = 145$) only to the foster children who participated in Wave I and Wave II and/or III ($N = 216$) on the following variables which were relevant with respect to the current study: demographic variables (age, gender, SES, parental level of education), school functioning variables (GPA), foster child (school absenteeism, placement history, duration placement, psychosocial function) and foster family variables (parental stress and parenting). t -tests and chi-square tests revealed only one difference between the two groups. Foster children who only participated in Wave I had slightly lower SES ($M = 6.08$, $SD = 1.51$) than foster children who participated in Wave I and Wave II and/or Wave III ($M = 6.40$, $SD = 1.47$), with this difference being significant ($t(359) = 2.008$, $p = .05$).

2.4. Analyses

To examine the change in foster children's school engagement over time and how this change depends on two blocks of predictors, we used multilevel modeling because this statistical technique can deal with the hierarchical structure of the data (i.e., waves nested within foster children, causing school engagement scores within a child being correlated) and allows to examine within-person differences (Singer & Willett, 2003). The statistical software R 3.3.1 was used for the analyses (R Core Team, 2016). As can be seen in Table 1, both predictor blocks contain both level 1 (time-varying) and level 2 (time invariant) variables.

Before we ran our multilevel models, we dealt with the missing data by using multiple imputation in SPSS. We performed the Little's MCAR test which indicated that the missing data were not missing completely at random ($\chi^2(968) = 1143,711$, $p = .00$). Because it is only possible to test the assumption whether the data is MCAR, we cannot make

statements about whether the data was MNAR or MAR. However, multiple imputation is still the best option under NMAR because it is less biased than listwise deletion (Schafer, 1997, pp.26–27) and the more predictors are included in the imputation model, the more plausible MAR becomes (Schafer, 1997, pp.28). It is for these reasons that multiple imputation is always preferred, regardless of the missingness mechanism, and regardless the MCAR test. Multiple imputation is a modern technique to handle missing data which incorporates auxiliary information in the estimation process (Graham, 2009; Rubin, 2004; Van Buuren, 2012) and preserves the important characteristics of the data set as a whole (Baraldi & Enders, 2010; Graham, 2009). The data were imputed 100 times using linear regression, incorporating both predictors included in the model tested in this study and auxiliary variables. Auxiliary variables are variables that are not part of the model, but which are supposed to be correlated to the variables included in the model (Graham, 2009). The auxiliary variables included were type of foster placement (kinship / non-kinship), whether or not foster parents were thinking about quitting foster care, whether or not the foster child and/or the foster parents received additional support during the placement, whether or not the foster child was placed with his/her siblings, and whether or not plans for reunification were made (Goemans, Van Geel, & Vedder, 2016; Winokur, Holtan, & Batchelder, 2014). After multiple imputation of the data, we compared the correlations between the variables of interest in our original dataset with the same correlations in the imputed datasets. The correlations were slightly weaker in the imputed datasets. It was checked whether the imputed values converged, i.e., become stable, by examining time-series and autocorrelation function (ACF) plots (Azur, Stuart, Frangakis, & Leaf, 2011; Schafer & Olsen, 1998). It appears that all imputations converged.

Regarding centering, we decided to center all continuous predictors. Time-variant (level 1) continuous predictors were group-mean centered, also called within person centered (Singer & Willett, 2003), thereby creating two new variables, one being time-varying (level 1, within subject) and the other one time-invariant (level 2, between subjects). As a consequence, the information in the original variable is spread out across the two levels in the data (i.e., within and between subjects), see also Table 1. The first variable (level 1) was created by centering the scores for each foster child around their (child specific) mean, thereby indicating the relative change in the variable within an individual foster child with respect to his/her own mean level. The second variable (level 2) included the individual's mean for that variable over the three waves, indicating the relative position of the foster child in the total group of foster children (Singer & Willett, 2003). Continuous level 2 predictors were centered around the mean of the total group of foster children. We used the *mice* and *mitml* packages in R to fit a (pooled) multilevel model to our (in SPSS) multiply imputed dataset and pool the results (Grund, Robitzsch, & Lüdtke, 2016; Van Buuren & Groothuis-Oudshoorn, 2011).

Using the pooled data, we first tested three consecutive models that increase in complexity. First, we tested the unconditional means model (Model 1) with and without quadratic time effect to decompose the variance within and between persons. We then added time (the Wave number here) as predictor and tested the unconditional growth model – random intercepts only (Model 2), and the unconditional growth model – random intercepts and slopes (Model 3). In the fourth and fifth model, we successively added the predictors from block one and block two. To test whether the model improved, we used the Likelihood Ratio Test (Grund, Lüdtke, & Robitzsch, 2016). In Model 4, every block one predictor and its interaction with time (i.e., whether this predictor influences the evolution of school engagement over the three waves) was added one by one (considering level 1-predictors first) to see whether it resulted in an improved model. We included every block 1 predictor that led to a significant model improvement in a 'parsimonious' Model 4. This parsimonious Model 4 served as a basis for the next step wherein we tested for the inclusion of block 2 predictors in Model 5. In Model 5, we applied the same strategy by adding one by one every block 2

predictor and its interaction with time, adding level 1 predictors first, and by including all predictors that led to model improvement in a 'parsimonious' Model 5, which we retained as the final model for our data set. The results presented further pertain to this final model.

As a last step, we tested, at both levels, the assumptions of linearity, normality of residuals, and homoscedasticity of residuals for the retained Model 5. We tested linearity at level 1 by exploring the individual trajectories of school engagement over time. We also included a quadratic time effect to the model to see whether that would lead to a better fitting model. At level 2 we tested linearity by checking whether there is a linear relation between subject specific OLS estimates of intercepts and slopes and time-invariant predictors. We checked for normality by inspecting the (level 1 and level 2) residuals via QQ-plots. We tested homoscedasticity by plotting the (level 1/level 2) residuals against the (level 1/level 2) predictors and by checking whether the variance of the residuals was stable across the different values of the predictors. As a final check, we also performed clustered bootstrap analyses to estimate standard errors and to determine confidence intervals for the model parameters (also with a 5% error level). The strength of this bootstrap method is that it yields correct standard errors and confidence intervals even when key assumptions of the multilevel model are (seriously) violated. When assumptions are not violated, the clustered bootstrap, in general, results in conservative (i.e., wider) confidence intervals (Davison & Hinkley, 1997; Deen & De Rooij, 2016). Because we used multiple imputation and running the bootstrap for each imputed data set would be very labor intensive, we decided to perform the bootstrap analyses on five randomly selected imputed datasets only. It was examined whether the conclusions obtained with the clustered bootstrap paralleled the conclusions obtained from the multilevel model. If the results from one or more bootstrap analyses differed from the original analyses, it is reported in our results section.

3. Results

Descriptive statistics (mean, standard deviation) and correlations are presented in Supplementary Table 2. Frequencies for school absenteeism are presented in Table 3. There was no multicollinearity among the predictors included in our study (Tabachnik & Fidell, 2001). The mean school engagement score of our sample was generally stable over time ($M_{\text{WaveI}} = 39.98$, $SD_{\text{WaveI}} = 5.95$; $M_{\text{WaveII}} = 38.93$, $SD_{\text{WaveII}} = 6.47$; $M_{\text{WaveIII}} = 39.64$, $SD_{\text{WaveIII}} = 5.76$) and correlated positively with prosocial behavior, positive parenting, and GPA. School engagement was negatively correlated with age, placement history, internalizing and externalizing behaviors, foster parents' stress, and negative parenting.

3.1. Model 1–3: average trajectories of school engagement

The results of the unconditional means model (Model 1), the unconditional growth model with random intercepts only (Model 2), and the unconditional growth model with random intercepts and slopes (Model 3) are presented in Table 4. Based on Model 1, we estimated the intra-class correlation (i.e., correlation between measurements of the same child) being .53, indicating that more than half of the total variance in school engagement pertains to differences between subjects. To

Table 3
Frequencies of the variable 'School Absenteeism'.

	Wave I	Wave II	Wave III
Never	61.2%	23.4%	21.8%
Less than one day	21.5%	14.6%	10.7%
One to five days	13.2%	10.2%	9.9%
Six to ten days	1.9%	1.7%	0.8%
More than ten days	0.0%	1.4%	0.0%
Missing	2.2%	48.5%	56.7%

Table 4
Results of the (pooled) unconditional models 1–3 fitted to the imputed datasets. Fixed effects.

Parameter	Model 1		Model 2		Model 3	
	Coefficient (SE)	<i>t</i>	Coefficient (SE)	<i>t</i>	Coefficient (SE)	<i>t</i>
Intercept	39.08 (0.53)	74.23***	40.01 (0.43)	92.98***	40.01 (0.41)	96.69***
Time (wave)			−0.93 (.50)	−0.187*	−0.93 (0.50)	−1.86*

* $p < .05$.

*** $p < .001$.

account for the dependency between observations within a foster child, multilevel modeling is needed. Model 2 showed the presence of a small decreasing trend in school engagement over time. Although only a small percentage (5.5%) of the variation in school engagement was explained by time (i.e., wave), the likelihood ratio test (LRT) indicated that Model 2 fits the data better than Model 1 (χ^2 ($df = 1$) = 5.693, $p = .02$). Model 3 tested whether subjects differ in their intercepts and slopes (i.e., difference in the effect of time on school engagement between persons). There appears to be no significant improvement in model fit when comparing Model 2 to Model 3 (χ^2 ($df = 2$) = 2.694, $p = .26$). The residual variance in Model 3 decreased with 10.2% in comparison to Model 1. Although Model 3 does not seem to fit the data better than Model 2, we decided to continue with Model 3 as keeping a (non-significant) random slope in the model allows for extra modeling flexibility while not harming the estimates for the other model parameters.

3.2. Model 4: adding demographics and school functioning (block 1 predictors)

In Model 4, we added block 1 predictors (GPA, school absenteeism, gender, age, education foster parents, SES) one at a time. Table 5 presents the parsimonious Model 4 with only those predictors that resulted in a significant LRT when added one by one. In line with Model 3, there were no significant interactions with time (wave), implying that block 1 predictors do not influence the change in school engagement over time. However, there were several main effects, indicating that predictors explain the absolute level of school engagement (i.e., starting point at wave 1). School engagement was predicted by grade point average and school absenteeism. School engagement of foster children increased with every grade point average unit ($b = 1.41$, $p < .001$). Further, school engagement was lower when foster children missed 1–5 days of school compared to children who never missed out ($b = -4.13$, $p < .05$). School engagement was higher for foster girls than for boys ($b = 1.56$, $p < .01$), and decreased with every year that foster children were older ($b = -.38$, $p < .001$). Also, the education of the foster father predicted foster children's school engagement. Foster children from foster fathers who completed the lowest level of education had higher levels of school engagement compared to all other categories. The LRT showed that the parsimonious Model 4 fits the data significantly better than Model 3 (χ^2 ($df = 10$) = 51.12, $p < .001$) and Model 2 (χ^2 ($df = 12$) = 55.64, $p < .001$).

3.3. Model 5 (final model): adding foster child and foster family variables (block 2 predictors)

In Model 5 we added predictors with respect to the foster child (child internalizing, externalizing, and prosocial behavior, placement history, and duration of the placement) and the foster family (foster parents' stress and foster parenting). Table 5 presents the parsimonious Model 5 with only those predictors that lead to a significant model improvement from Model 4 to Model 5 when added one by one. The LRT indicated a significant model improvement when comparing the parsimonious Model 5 to the (previous) parsimonious Model 4 (χ^2

Table 5

Parameter estimates (fixed effects only) of the (pooled) parsimonious models 4 and 5 fitted to the imputed datasets.

Parameter	Parsimonious model 4			Parsimonious model 5	
	Coefficient (SE)	<i>t</i>		Coefficient (SE)	<i>t</i>
Intercept	32.35 (1.92)	16.87***		26.26 (3.62)	7.26***
Time (wave)	−0.37 (0.32)	−1.16		−0.42 (0.29)	−1.46†
Block 1					
GPA-2	1.41 (0.26)	5.44***		0.87 (0.24)	3.69***
Gender	1.56 (0.61)	2.56**		1.53 (0.51)	2.98**
Age	−0.38 (0.10)	−4.08***		−0.34 (0.10)	−3.35***
School Absenteeism					
< 1 day	−0.36 (0.62)	−0.58		−0.40 (0.60)	−0.66†
1–5 days	−4.13 (2.15)	−1.92*		−3.82 (2.11)	−1.81**†
6–10 days	2.61 (1.97)	1.33		2.73 (1.93)	1.41†
> 10 days	.28 (0.56)	0.49		.20 (0.53)	0.39†
Education foster father					
Senior high school	−3.21 (0.95)	−3.37***		−1.83 (0.83)	−2.21***
Bachelor's degree	−2.21 (0.91)	−2.44**		−.45 (0.82)	−0.55
Master's degree	−2.87 (1.11)	−2.61**		−1.33 (0.95)	−1.40†
Block 2					
Externalizing behavior-1				−0.41 (0.15)	−2.74**
Externalizing behavior-2				−0.50 (0.07)	−7.03***
Prosocial behavior-2				0.45 (0.15)	3.02**
Positive parenting-2				0.17 (0.06)	2.78**

Note. Gender coded as 0 = boys, 1 = girls. School absenteeism coded as 1 = never, 2 = < 1 day, 3 = 1–5 days, 4 = 6–10 days, 5 = > 10 days. Education foster father coded as 1 = primary/secondary school, 2 = senior high school, 3 = bachelor's degree, 4 = master's degree.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

† Significant in one or more bootstrap but not in original analysis.

* Not-significant in one or more bootstrap but significant in original analysis.

($df = 4$) = 39.16, $p < .001$), resulting in retaining Model 5 as the final model for our data. With respect to the foster child predictors: externalizing behaviors (both level 1 and level 2 effects) and prosocial behaviors (only level 2 effect) resulted in a significant model improvement. Foster children with, on average, higher levels of externalizing behavior problems and lower levels of prosocial behavior had, on average, lower levels of school engagement (externalizing behavior-2: $b = -0.50$, $p < .001$, prosocial behavior-2: $b = 0.45$, $p < .01$). Furthermore, foster children who, irrespective of their absolute level of externalizing behaviors problems, increased in problem behavior during the one-year longitudinal study, also showed a significant decrease in school engagement (externalizing behavior-1, $b = -0.41$, $p < .01$). With respect to the foster family predictors: positive parenting was a significant predictor (level 2 effect only). Higher average levels of positive parenting were associated with higher average levels of school engagement in foster children (level 2 effect: $b = 0.17$, $p < .01$). The evolution of positive parenting within a foster family (i.e., irrespective of the mean parenting level of that family) did

not predict (the evolution in) school engagement. Looking at block 1 predictors, there was a difference with Model 4 with respect to the role of education of foster fathers. Foster children from foster fathers that completed senior high school had lower levels of school engagement than foster children from foster fathers that completed the lowest level of education (primary or secondary school). No difference in foster children's school engagement was observed when comparing foster fathers at the lowest education level with foster fathers from the two highest education levels (i.e., Bachelor's and Master's degree). Further, as Model 5 also corrects the effect estimates for the block 2 predictors, the effect of GPA (level 2) and school absenteeism became less strong. Finally, for an average foster child, school engagement does not seem to change over time ($b = -0.42$, $p = .29$).

No clear violations of the assumptions of linearity, normality of residuals, and homoscedasticity were encountered. The bootstrap analyses showed similar results with respect to most of the predictors. However, as can be seen in Table 5, some predictors which were not significant in Model 5 were significant in some of the bootstrap analyses and vice versa, indicating that some caution is needed when interpreting the results of these predictors. The general pattern of the results, however, stays unchanged.

4. Discussion

This three wave longitudinal study examined both the development and factors predictive of school engagement of children in foster care. Studying school engagement in foster children is important because children's engagement in school is strongly connected to their academic development (Finn, 1989; Fredricks et al., 2004; Fredricks et al., 2005). Given that school engagement is considered as malleable and susceptible to environmental change (Fredricks et al., 2004), promoting school engagement could be a means toward improving foster children's academic functioning and as a consequence their adaptive functioning later in life (Berlin et al., 2011; Harris et al., 2009; Jackson, 1994). In order to do so, knowledge about the predictors of school engagement in foster children is needed. This study analyzed whether two blocks of factors, those related to demographics and school functioning and those related to foster children and foster families, predicted levels of school engagement of children in foster care.

This study found that both blocks of predictors were related to foster children's school engagement. In the first block of predictors it was shown that school functioning explained school engagement. Both grade point average and school absenteeism explained foster children's levels of school engagement. Children who, on average, had a higher GPA also reported higher average levels of school engagement (Finn & Rock, 1997). We did not find an effect of within-person change in GPA. This suggests that if foster children scored higher or lower grades than they did previously, this did not affect their school engagement. It is known that school grades are affected by stressful or negative life events of children (Masten et al., 1988), and that the lives of foster children can sometimes be characterized by such events, for example because of changes of youth care workers, foster placement breakdown, and change of schools (Conger & Finkelstein, 2003; Minty, 1999). Even if such stressful events had occurred and affected foster children's grades, it seemed that changes in GPA subsequently did not explain their (changes in) school engagement. However, it should also be noted that this study included a sample that had relatively stable placements and it would be of interest to compare children who are in stable placements with children in more unstable placements to better study a potential role of stressful events for GPA and school engagement (Barber & Delfabbro, 2003). Furthermore, we found an effect of school absenteeism. Children who missed out 1–5 days at school had on average lower levels of school engagement than children who never missed a day at school. We did not, however, find a significant effect for children who missed 6–10 days of school or even more than 10 days. This may be explained by the relatively low number of foster children in

our sample that fell in these two extreme categories, so that there was not enough power to detect differences with respect to school engagement. Although attendance rates of children are found to improve after placement in foster care (Barber & Delfabbro, 2005; Conger & Rebeck, 2001), most studies (see for an exception Fantuzzo & Perlman, 2007) also showed that foster children still tend to experience more school absenteeism than their peers (Conger & Rebeck, 2001; Weiss & Fantuzzo, 2001). Reasons for lower attendance rates in foster children are suggested to be related to mandated court appearances (Finkelstein, Wamsley, & Miranda, 2002). Tilbury et al. (2014) noted that foster children's appointments during school hours to receive support services or interventions are related to educational disruption. The professionals involved should attempt to prevent school absenteeism (Kearney, 2008) and try to schedule appointments outside school hours.

Demographic characteristics were also found to be predictive of school engagement in foster children. In line with previous studies, foster girls and younger children were found to have higher levels of school engagement (Finn & Rock, 1997; Johnson et al., 2001; Sirin & Rogers-Sirin, 2005; Wang & Eccles, 2012). Gender differences in school engagement might be related to the fact that girls and boys experience different levels of support in school from their peers and teachers (Rueger, Malecki, & Demaray, 2010). A meta-analysis also suggested that teacher student relationships might be more important for the engagement of boys than of girls (Roorda, Koomen, Split, & Oort, 2011). Based on these findings it seems safe to suggest that teachers are well-advised to enhance foster boys school engagement. In contrast to gender and age, both socioeconomic status and education of the foster mother did not predict school engagement. Moreover, while parental level of education has previously been found to be positively related to school engagement (Berends, 1995), we found with respect to foster fathers that foster fathers who completed senior high school had lower levels of engagement than foster children of foster fathers who completed the lowest level of education; i.e., primary or secondary school. However, we did not find relationships for the other categories of foster fathers' education. Although we should be careful in our interpretation because the results of the bootstrap analyses were inconclusive, an explanation for the finding that neither SES nor education of foster parents was predictive of school engagement, or, for education of foster fathers, not in a way that was hypothesized, could be that previous studies focused on the socioeconomic background and education of biological parents-child dyads, which is not necessarily the same as foster parents' SES and education. Compared to children from the general population, previous studies have shown that foster parents are less likely to monitor foster children's school performance or their homework, or to express concern for learning (Blome, 1997). This might be because foster parents are more concerned with the foster children's behavioral development (Finkelstein et al., 2002), and focus less on school functioning. Although findings have been inconclusive (Heath et al., 1994), some studies suggest that teachers' and foster parents' lower expectations of foster children's academic achievement impact foster children's academic outcomes (Jackson, 2004; Tideman et al., 2011). Indeed, the Golem effect, which is the opposite of the Pygmalion effect, may be working here (Rosenthal, 1963; 2002). The Pygmalion effect is the phenomenon that higher expectations of the environment result in better performance, whereas the Golem effect is the opposite effect, wherein lower expectations lead to lower performance. Whether or not these effects actually explain foster children's school performance (Elliott, 2002; Fletcher-Campbell, 2001), it seems safe to advice that both professionals (i.e., teachers and child welfare workers) and foster parents prioritize education and communicate positive expectations toward foster children.

This study also examined whether specific foster child and foster family characteristics were predictive of foster children's school engagement. In line with previous research (Carter, McGee, Taylor, & Williams, 2007; Hirschfield & Gasper, 2011; Simons-Morton, 2004), foster children's externalizing behavior problems, both general levels

and within-person changes, appeared to be a significant predictor of the level of school engagement. In contrast, internalizing behavior problems were not significantly related to school engagement. It is known that in the classroom context externalizing behaviors are more disturbing than internalizing behaviors, possibly resulting in negative feedback by teachers and peers (Silver, Measelle, Armstrong, & Essex, 2005). An important condition for children to engage in school is their feeling of relatedness (Fredricks et al., 2004). In reaction to foster children's externalizing behavior problems, teachers and peers might not create the caring and supporting environment that foster children need to fully engage in school (Fredricks et al., 2004; Silver et al., 2005). It is therefore suggested that, especially teachers, need to try to be inclusive and react in a non-punitive manner to externalizing behaviors of foster children (Hoff & DuPaul, 1998; Nelson, 1996; Tilbury et al., 2014). In this way they contribute to a more caring school environment fostering positive social behavior. Actually, our study did find a significant relation between prosocial behavior and school engagement, possibly indicating that prosocial behaviors of foster children facilitate relation building and experiencing relatedness (Silver et al., 2005). Furthermore, with respect to foster family characteristics, it was found that positive parenting predicted school engagement in children. In this study, positive parenting was measured with the Alabama Parenting Questionnaire (APQ; Frick, 1991; Shelton et al., 1996) which also includes several questions related to foster parent's involvement in school (e.g., asking the child how his/her day at school was, attending PTA meetings, helping with homework). Foster parents scoring higher on the APQ might simply be more involved in their foster children's school functioning thereby supporting school engagement (Mo & Singh, 2008; Simons-Morton & Chen, 2009). On a more general level, this study found that almost no level 1 foster child and foster family characteristics predicted changes in foster children's school engagement. Changes in a foster child's internalizing and prosocial behavior or in foster parents' stress or parenting did not predict an increase or decrease in foster children's school engagement. This means that foster children's school engagement is not significantly affected by fluctuations in foster children themselves or in their environments. For some foster child and foster family characteristics (e.g., externalizing and prosocial behavior, and positive parenting), it is the absolute level that counts with respect to foster children's average levels of school engagement. However, foster children's intra-individual changes in externalizing behavior formed an exception to this regularity, because an increase in foster children's externalizing behaviors did predict a decrease in foster children's school engagement. In line with previous research, this finding again stresses the important role of externalizing behavior problems in developmental outcomes for foster children (Oosterman, Schuengel, Slot, Bullens, & Doreleijers, 2007). Foster children's externalizing behavior problems do not only predict negative outcomes such as foster placement breakdown, but may also place children at risk for lower levels of school engagement.

5. Limitations and directions for future research

The vast majority of previous research on predictors of school engagement examined unidirectional relationships (Li & Lerner, 2011; Motti-Stefanidi, Masten, & Asendorpf, 2015). In line with this, we hypothesized that several demographic, school, child and family characteristics precede school engagement (Carter et al., 2007; Hirschfield & Gasper, 2011; Simons-Morton, 2004). However, our study did not consider potential bidirectionality. As suggested by Fredricks et al. (2004), the association between school engagement and school achievement is likely to be bidirectional, which is indeed confirmed by the scant studies that examined the direction of effects (Hughes, Luo, Kwok, & Loyd, 2008; Lord, Eccles, & McCarthy, 1994). Longitudinal research has also shown that poor school performance predicts foster children's psychosocial problems (Forsman et al., 2016). The interplay between school engagement and several demographic, child and family

characteristics is of interest because information about the predominant direction of effects could inform policies and practices about how to target available resources for support and intervention services.

Another limitation of this study is the high rate of attrition over the waves. Although we used incentives and sent several reminders, we could not prevent a considerable amount of wave nonresponse. Attrition and missing data is a problem which is common in longitudinal studies, and longitudinal studies on foster children are not an exception (Jackson, Gabrielli, Tunno, & Hambrick, 2012). We reported about our missing data, examined whether the foster children who fell out after Wave I differed from the foster children that did not fall out, and applied a modern technique to handle missing data, i.e., multiple imputation (Jeličić, Phelps, & Lerner, 2009; Rubin, 2004; Van Buuren, 2012). However, future research should attempt to avoid missing data, for example by forming research collaborations between foster care agencies and researchers (Trocme, Roy, & Esposito, 2016).

A third point limitation is that we made use of foster parent reports only. Previous studies have shown that foster parents do not always report in a similar way and intensity as foster children themselves or their teachers (McAuley & Trew, 2000). In addition, the main outcome variable in this study (i.e., school engagement) is often measured by student self-report or teacher report or observation (Fredricks & McColskey, 2012) and it is not known how school engagement reports of foster parents relate to the reports of foster children or teachers. Furthermore, we were not able to use more objective measures, such as case file analysis of the foster child's school files. As a consequence, we were unable to measure how long the foster children had been at their current school. We know from previous studies that student mobility is negatively related to school engagement (Reynolds, Chen, & Herbers, 2009; South, Haynie, & Bose, 2007). Given the fact that foster children may have high rates of school mobility (Conger & Finkelstein, 2003), this might have impacted the findings. Lastly, the short-follow up time could be a limitation. It can be questioned whether it is reasonable to expect measurable change in a relatively short time frame (viz. one year) and whether our measures were sensitive enough to measure change. Future research should try to include both multiple informants, objective measures (e.g., with respect to how long children had been at their current school), and extend the follow-up time.

A last point of attention is that this study has been performed in a Dutch setting. Because of differences in educational and child welfare contexts and policies between countries, the findings of this study might not be automatically generalizable to other contexts (Gilbert et al., 2011; Thoburn, 2007).

6. Conclusion

Children in foster care generally show relatively stable levels of school engagement. It is known from previous studies that functioning of foster children is fairly stable over time, but that there is large heterogeneity indicating that developmental trajectories of foster children vary greatly (Goemans, Van Geel, & Vedder, 2015; Welbourne & Leeson, 2012). The current study also showed that foster children are a diverse group with respect to their school engagement, with some children showing relatively low, and some children showing relatively high levels of school engagement. As suggested, the functioning of foster children is likely to be a mix between children's individual characteristics such as their pre-care experienced adversities, cognitive ability, or birth parents' characteristics on the one hand, and their in-care experiences on the other hand (O'Higgins et al., 2015). This study aimed to indicate which characteristics precede and explain levels of school engagement in foster children. Among others, foster children's behavioral functioning and foster parents' positive parenting appeared to be characteristics important to consider in screening and interventions. Foster care professionals, teachers, and foster parents should be aware of the role of these factors with respect to foster children's school engagement, and that all parties support children in this respect

(Finkelstein et al., 2002; Tilbury et al., 2014). Promoting school engagement by foster parents might start by stressing the importance to not only focus on foster children's social-emotional functioning (Finkelstein et al., 2002), but to also focus on foster children's school functioning and to communicate positive expectations in this respect. Also the effect of a role model, mentor or educational specialist (e.g., Geenen et al., 2015; Zetlin, Weinberg, & Kimm, 2004) as well as the potential educational benefits of extending foster care to young adults (Courtney & Hook, 2017) have been given attention in the literature as promising initiatives for foster children. At the same time, schools and teachers should be aware of the special needs of children in foster care. Taking care of adequate school transfers, building strong relationships between teachers and foster children, and providing support might improve school engagement in foster children (Harker, Dobel-Ober, Lawrence, Berridge, & Sinclair, 2003; Pears et al., 2013; Tilbury et al., 2014; Wang & Eccles, 2012). In addition, foster care professionals should collaborate with schools and ensure that school functioning becomes part of foster children's personal development plans (Altshuler, 2003; Conger et al., 2001; Jackson, 2004).

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Conflict of interest

The authors declare that they have no conflict of interest.

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