

# The dynamics of perception of social integration in primary school. The latent growth curve model

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The article discusses the specific character of changes in the assessment of the sense of social integration in the classroom between primary school third- and sixth-graders, and their social, demographic and cognitive determinants, with special consideration given to a pupil's position in the sociometric network. The analysis of latent growth curves – based on a scalar longitudinal measurement invariance, the bifactor model of the Perceived Peer Integration Questionnaire (PPI) and three rounds of the nationwide study School determinants of educational effectiveness ( $N = 4349$ ) – indicates that the second stage of learning in primary school is characterised by a more negative perception of peer integration in classroom settings, which cannot be explained by socio-demographic variables nor the relationships taking place within peer networks. This indicates that it may be linked to developmental changes rather than to the actual deterioration of peer relations.

**KEYWORDS:** sociology of education; latent growth curve; longitudinal bifactor model; relationships with classroom peers; a feeling of social integration; sociometric network; developmental changes.

Relationships with peers are a source of important development experiences. It is a well-known fact that even young children are aware of the negative consequences of the lack of satisfactory relationships with their peers. The classical studies carried out by Jude Cassidy and Steven Asher (1992) demonstrated that even children aged 5–7 associate exclusion from a community with sadness. Numerous later qualitative studies carried out with the use of in-depth interviews, projective tests, etc. resulted in similar findings (Humenny and Grygiel, 2015a). Also, quantitative research indicated that in the pre-school period, a majority of children correctly understood the words used

to describe the negative effects connected with peer relationships. For example, as many as 83% of children aged 5–6 correctly understand the word “loneliness” (Baron-Cohen, Golan, Wheelwright, Granader and Hill, 2010). As children become older, the notion of loneliness, understood as the simple absence of relationships with people, develops to include the subjective consequences of this absence (Liepins and Cline, 2011).

During school years, relationships in the classroom become very important. Two-thirds of persons recognised by third- to sixth-graders as best friends were in the respondent's class (Parker and Asher, 1989). Peers from the same class are a source of instrumental, social and emotional support

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for children (Wentzel, Battle, Russell and Looney, 2010). Long-term negative experiences with peers are the basis of a wide range of emotional disorders (Bukowski, Brendgen and Vitaro, 2007), which negatively impact school achievement (Ryan and Ladd, 2012).

Relationships with peers are particularly important for self-perception, which develops during school years. This perception is mostly the result of the progressive reflection of the subject's image in the eyes of others (Pfeifer and Peake, 2012), i.e. what a child thinks others think of him/her (Thomaes et al., 2010). The results of previous research indicate that initially, the assessment of the child him/herself and the others is not connected with external criteria (Marsh and Shavelson, 1985) and is burdened with an overestimation of the child's own abilities, which is characteristic for early childhood (Dweck, 2002). However, with the gradual inclusion of other people as a source of information about the child (Salley, Vannatta, Gerhardt and Noll, 2010), this assessment becomes, starting from about eight years of age (Cole, Jacquez and Maschman, 2001), more abstract and complex, based on a larger number of psychological descriptors (Anderman and Maehr, 1994) and – consequently – closer to reality (Wigfield et al., 1997).

The process of making the notion of “self” real leads to a weakening of the perception of peer integration during school years as compared to the pre-school period (Ladd and Burgess, 1999). This tendency continues in subsequent school years (Galanaki and Kalantzi-Azizi, 1999; Quay, 1992) and contributes to a gradual increase of a feeling of isolation among primary school pupils (Humenny and Grygiel, 2015a). However, it does not always result from a deterioration of real peer relationships (growth of interpersonal reluctance). The perception of integration with a community of peers should not be identified with an objective, structural dimension of the relationship (density of the

network, its hierarchy, position in this hierarchy, etc.). The two aspects of social relationships – the objective and subjective ones – are not equivalent, either in theoretical or empirical terms (Cacioppo, Cacioppo and Boomsma, 2014; Jong Gierveld, Van Tilburg and Dykstra, 2006). Individuals who perceive their own relationships with peers as negative are not always socially isolated in an objective sense (Heinrich and Gullone, 2006). Research demonstrates that correlations between sociometric status and children's perception of satisfaction with peer relationships are not particularly strong and reach at best 0.4 (see review in: Humenny and Grygiel, 2015a). A low position in the network increases the probability of a lack of satisfaction with peer relationships, but does not determine it.

Perceived peer integration depends on many factors. Intelligence is one of them. Cognitive abilities are directly related to position in a peer network – more gifted pupils are more frequently the popular ones, while those less gifted are often rejected by their peers (for example Czeschlik and Rost, 1995; Stone and La Greca, 1990). The relationship between intelligence and social acceptance remains strong almost throughout the primary school period. Changes are observed not earlier than puberty, more or less from the age of 13 (Austin and Draper, 1981). The community value of intelligence gradually decreases and children with greater cognitive abilities start experiencing difficulties in establishing and maintaining interpersonal relationships and, in consequence, feel more isolated in class (Lee, Olszewski-Kubilius and Thomson, 2012). In this case, the change of the subjective aspect of social relationships reflects changes in the objective aspect. Intelligence – at least during primary school years – may, however, contribute to a deterioration of the perceived quality of integration, irrespective of real interpersonal relationships. Greater cognitive abilities may involve

interpersonal sensitivity, particularly to critical signals sent by others (Schneider, 1987), which makes the image of a child's own peer relationships unduly pessimistic.

Another factor is the inconsistent age of a pupil with their class cohorts. In most cases, this inconsistency results from an untypical – delayed or accelerated – educational career. The delay may result from a child's late school start (which usually involves intellectual, emotional or social difficulties) or grade retention. It is connected with a pupil's intelligence but does not determine it. According to research examining the level of intelligence, more boys than girls and more children from poor families are among those repeating a grade (Guevremont, Roos and Brownell, 2007; Reynolds, 1992). In the analysed context, it is important that a late school start or grade retention negatively influences the quality of peer relationships. Pupils retained in a grade are less socially and emotionally adapted than pupils who have similar education results but did not repeat a grade (Holmes and Matthews, 1984). In teachers' opinions, pupils who repeat a grade are not liked by their peers (Pianta, Tietbohl and Bennett, 1997), which should translate into the perception that the quality of integration is worse.

The socio-economic status (SES) of a family is another factor that determines the objective and subjective dimension of peer relationships. It has a positive influence on the cognitive abilities of children (Duncan and Magnuson, 2003; Duyme, Dumaret and Tomkiewicz, 1999) and their social and emotional development (Bradley and Corwyn, 2002). Children from families with a poorer SES obtain less emotional support from their parents (Dodge, Pettit and Bates, 1994), which is one of the fundamental predictors of social competences and peer acceptance (Criss, Shaw, Moilanen, Hitchings and Ingoldsby, 2009). In consequence, a poorer family SES translates into poorer

social competences of children (Guidubaldi and Perry, 1984), more frequent socially unaccepted behaviours (Piotrowska, Stride, Croft and Rowe, 2015) and smaller peer networks – not only at puberty (Samuelsson, 1997), but also in adult life (Van Groenou and Van Tilburg, 2003). Children from families with a poorer SES are more often rejected by peers (Asher and Wheeler, 1985) and victimised by them (Due et al., 2009; Tippett and Wolke, 2014). After all, a poorer family SES translates into a stronger feeling of isolation (Higbee and Roberts, 1994).

Gender is the last factor that diversifies peer relationships (Lubbers, 2003). Most social relationships during primary school years are maintained in sexually homogeneous groups. Over three-fourths of the friends of teenagers are persons of the same sex (Martin Babarro, Diaz-Aguado, Martinez Arias and Steglich, 2016). Segregation by gender is accompanied by differences in how leisure time is spent, types of preferred toys, tastes in literature or music, as well as a different understanding of friendship, preferences for a different type of interpersonal relationship, different ways of reacting to stressful situations and coping with them, different methods of resolving conflicts, etc. (Rose and Rudolph, 2006). Consequently, the peer networks of girls and boys are different both in terms of the structure and functions performed (Daniels-Beirness, 1989). Girls establish more intimate, horizontal relationships, while boys prefer wider peer networks with a clearer hierarchy. Close relationships with others are valuable for all children, however, for girls, the source of closeness is emotional support, while for boys, it is cooperation (Ko, Buskens and Wu, 2015).

In this context, the difference between research results on the perception of peer integration between girls and boys is interesting. Some results testify to a perception of worse integration quality among girls, some indicate a perception of better integration quality,

while others point to the lack of gender-based differences in this area (for example Maes, Klimstra, Van den Noortgate and Goossens, 2015). A greater pessimism of girls may be explained by a higher level of their “(self)-criticism” (Gentile et al., 2009; Kling, Hyde, Showers and Buswell, 1999), Rose and Rudolph, 2006), more attention paid to peer relationships (cf. Rose and Rudolph, 2006), higher (compared to boys) expectations of peer relationships and, in consequence, a larger probability of partners being disappointed (Weeks, 2013). On the other hand, a lower level of pessimism among girls may be due to the stronger emotional support offered by smaller girl networks (Prinstein, Borelli, Cheah, Simon and Aikins, 2005).

### Problem and research hypotheses

The deterioration of perceived quality of peer integration during primary school years confirmed by study results and, simultaneously, by the moderate strength of the relationship between perceived quality of integration and position in the peer network, give rise to the following question: To what extent does this negative trend result from subjective (intra-personal) factors and to what extent does it result from an actual deterioration of peer relationships (less mutual liking, intensification of conflicts, aggression, etc.)? If changes in the perception of peer relationships result primarily from the deterioration of actual relationships in a school class, then examining the influence of the objective dimensions of relationships should result in a weaker negative trend or its absence.

Our hypothesis is that having a higher position in peer networks translates into a stronger feeling of integration with peers, and that between the 3<sup>rd</sup> and 6<sup>th</sup> grade, the perceived quality of integration with class peers deteriorates. As the literature in this field does not include, to the best knowledge of the author, research on the influence of

the objective dimensions of relationships on changes in the perceived quality of integration, we do not formulate a directional hypothesis on this issue. As outlined above, both the hypothesis that a change in the perceived quality of integration is primarily conditioned by objective factors and the opposite hypothesis, that this change is mainly linked to subjective factors, can be justified theoretically (and by indirect empirical evidence).

Another interesting problem is whether (1) perceived integration quality and (2) changes in this perception depend on the intellectual abilities of pupils, their relative age (education mode), the socio-economic status of their families, and gender. We expect to find in the cross-sectional analysis (point 1) – according to the results of existing studies – that a higher level of a pupil’s intelligence and better socio-economic family status strengthens perceived integration quality and that late school start or grade retention does not favour an assessment of good peer relations. Due to the lack of clear findings in the research to date, we do not formulate directional hypotheses relating to the effect of gender and assume an exploratory rather than confirmational approach. The same refers to the potential influence of intelligence, family status, course of educational career (age), and gender on changes in perceived quality of integration with peers in the second stage of education (point 2). From a research perspective, this issue can be deemed *terra incognita*.

### Measures

***Perceived Peer Integration (PPI) Questionnaire.*** This is part of a larger scale: Fragebogen zur Erfassung von Dimensionen der Integration von Schülern (FDI 4–6; Haeblerlin, Moser, Bless and Klaghofer, 1989), used to measure pupils’ self-assessment of integration at school. The Polish adaptation was prepared by Grzegorz Szumski (2010). The PPI

questionnaire provides information about a given pupil's perception of positive and negative relationships with classmates. The scale consists of eight items that, if selected, indicate positive relationships with peers (for example "I have a lot of friends in my class") and seven items that, if selected, indicate negative relationships (for example "Many pupils in my class annoy me"). Negatively worded items from the data were recoded so that a higher score indicated a higher level of satisfaction with peer relationships. The PPI scaling method will be presented in the *Design and methods of statistical analyses* section.

**Sociometric Position (SP).** The standard sociometric procedure proposed by John Coie with his team (Coie, Dodge and Copotelli, 1982) was used to indicate a pupil's position in the network. The number of positive indications was estimated on the basis of the task: "List persons from your class with whom you most would like to play", whereas negative indications were estimated based on the task: "List persons from your class with whom you would rather not like to play". In both cases, pupils could list any number of peers, including persons of the opposite sex. The indicator of sociometric position is the within-class standardised difference between the standardised number of positive and negative indications. The analysis uses three sociometric measurements carried out at the same time as the perceived integration study: at the end of 3<sup>rd</sup> grade, at the beginning of 5<sup>th</sup> grade and at the end of 6<sup>th</sup> grade.

**Intelligence.** To measure fluid intelligence, the standard version of Raven's progressive matrices was used. After initial verification of the results, three items that turned out to be too difficult, i.e. whose discrimination was negative (task 12 from block C and tasks 11 and 12 from block E) were excluded. The fit of the one-factor model, estimated using the tetrachoric correlation

matrix and a WLSMV estimator from the Mplus 7.3 program (Muthén and Muthén, 2012) turned out to be satisfactory (RMSEA = 0.02; CFI = 0.95; TLI = 0.95).

**Gender.** Information about a pupil's gender was used in the analyses. A score of 0 is for girls and 1 – boys.

**Age.** Three different indicators were taken into account: age in weeks and two categorical variables: acceleration (taking the value of 1 for pupils younger than the main age cohort and 0 for the others) and delay (taking the value of 1 for pupils older than pupils from the main cohort and 0 for the others).

**Status factors.** Three indicators describing the status of a pupil's family were used: the international socio-economic index of occupational status (ISEI) and the level of parents' education and family financial status index. The ISEI indicator is a measure of the position occupied by an individual in the social structure based on occupation. It is included in the analyses as the higher of two scores assigned to parents' occupations (HISEI). The second indicator is the level of parents' education expressed in years of education. The analysis used the indicator pertaining to the better educated parent. The third indicator describes a family's saturation with material goods relevant to the intellectual development of a child and combines information about (a) the number of books for children at home, (b) housing conditions, (c) the number of information technology devices, (d) the number of non-fiction books, (e) the number of devices useful in teaching science and (f) the material resources available for a child to spend leisure time in a worthwhile manner. The synthetic financial status indicator consists of factor scores from the one-factor model that fitted the data well (RMSEA = 0.03; CFI = 0.99; TLI = 0.98). Higher scores correspond

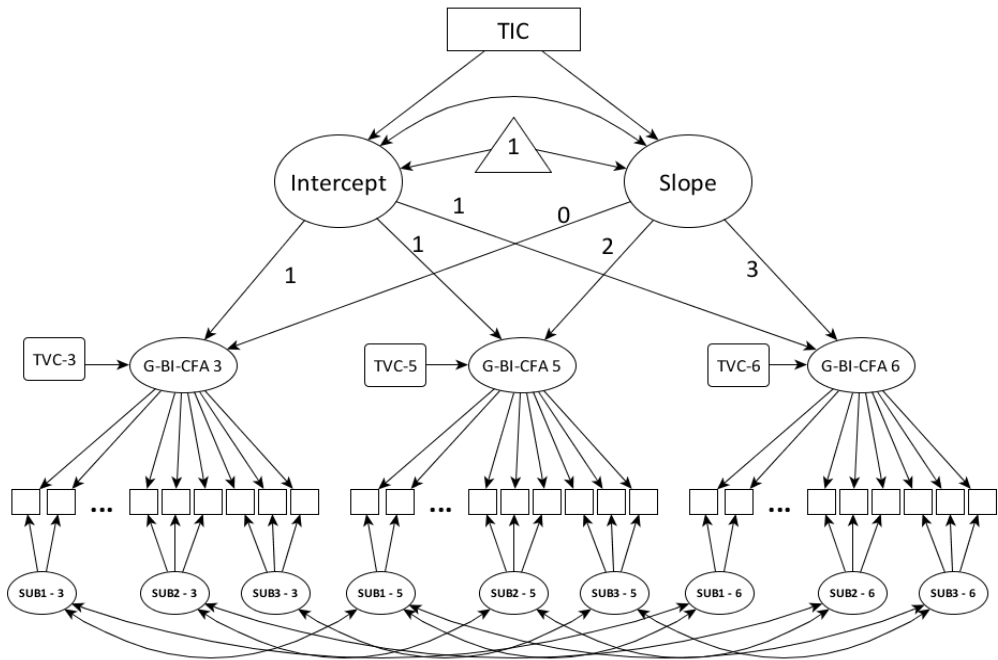


Figure 1. Model of latent growth curves with TICs and TVCs.

TIC – time-invariant covariates; TVC– time-varying covariates; Intercept – scores of the general factor from the bifactor model in the first round of the study (the 3<sup>rd</sup> grade); Slope – average change of the strength of the general factor from the bifactor model between the 3<sup>rd</sup> and 6<sup>th</sup> grade; G-BI-CFA – general factor of the bifactor model at the specific point of the measurement; SUB – following subfactors in specific rounds of research. Questionnaire items are marked with a square; the structure of means is marked with a triangle; longitudinal correlations between residuals of the corresponding items of the scale are omitted.

with a greater saturation of the household with goods<sup>1</sup>.

**Design and methods of statistical analyses**

The analysis of determinants of changes to perceived quality of integration with the class, i.e. the determinants of differences in the individual trajectories of change, is carried out using the latent growth curve (LGC) model (cf. Bollen and Curran, 2006; Konarski, 2009; Preacher, Wichman, MacCallum and Briggs, 2008). A confirmation

bifactor model<sup>2</sup> is the basis of the LGC estimation. It includes a general factor (determined by all items of the questionnaire) and three sub factors, orthogonal to each other and to the general factor (Figure 1). The first of the subfactors consists of all negatively

<sup>2</sup> The bifactor model assumes that the variance of the indicators can be divided into two groups: (a) common for all indicators and (b) specific for their parts. It is assumed that the general factor is defined by the factor loadings of all items in the scale, while the orthogonal subfactors – by smaller clusters of the items. Thus, the variance of the items is divided into three parts: (a) common for all; (b) common for a part (representing the part of the variance of a questionnaire’s items that cannot be explained by the general factor and that also cannot be reduced to the random error of a single indicator); (c) characteristic only for a single indicator. For more information about this type of model, see Humenny and Grygiel (2015b).

<sup>1</sup> More information about the structure of the listed variables are in the publication of Roman Dolata et al. (2013, particularly chapter 4).

worded items, while the second – of items describing positive non-school relationships with classmates. The third one consists of items describing positive relationships within the school.

The selection of this model was not accidental. It was based on the results of previous analyses carried out on data obtained from the same study (Grygiel, 2015; 2016). They showed that (a) the three-factor model was a better fit than one-, two- and four-factor models and that (b) the bifactor model with three orthogonal subfactors was a better fit than the model including only three correlated factors without a general factor (i.e. without a common source of the indicators' variance). The results of these analyses also showed that the PPI questionnaire was substantially (although not strictly) unidimensional, so that the existing subfactors demonstrated a low level of specific (independent of the general factor) reliability. In other words, the individual items of the scale transfer information about one construct rather than three and that which combines all the indicators is much stronger than that which combines their subsets. The estimated model not only adequately reflects the variance of the item in each of the three rounds of the study, but also that the bifactor structure of the PPI scale is a longitudinal scalar invariant. This means that both the factor loadings and thresholds of individual items do not differ significantly between the 3<sup>rd</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades, which makes it possible to compare the strength of perceived integration quality in consecutive rounds of the study and thus to use the LGC model.

The starting point of the LGC model is an estimation of individual changes of the level of the phenomenon (dependent variable) as a time function and their average trajectory. The basic parameters of the models are the intercept, i.e. the initial stage, and the slope, i.e. the change rate. The intercept is

the average level of the variable in the first analysed period – in our analysis, it is the strength of the perceived peer integration of third-graders. The slope is the average change in the level of the variable between subsequent rounds of the measurement – in our analysis, it is the average change of perceived peer integration quality between the 3<sup>rd</sup> and 6<sup>th</sup> grade.

From the perspective of the planned analyses, it is important that the LGC model makes it possible not only to simply describe the quantitative changes of the given phenomenon, but also to examine the influence of other factors (covariates) both on the initial condition and the change rate of this phenomenon. Covariates can be time-invariant covariates (TIC), such as pupil's gender, or time-varying covariates (TVC), such as sociometric position, which may differ between the 3<sup>rd</sup> and 6<sup>th</sup> grade. In the second case, the  $\beta$  coefficient is a measure of the occasion-specific dependency of the modelled phenomenon on the covariate. It is worth noting that  $\beta$  coefficients are estimated independently of slope coefficients. In other words, the slope is estimated as the net effect while controlling for the effects of the covariates. This makes it possible to answer an important question: What is the influence of the covariate that we introduce into the regression equation on the slope? Does it decrease or increase?

TVC type covariates can also have different scores among individual persons (pupils) in the study and the same scores from individual measurements taken during the study (Bollen and Curran, 2006; Preacher et al., 2008). Covariates of this type (FTVC) are averaged  $\beta$  coefficients of regression of the dependent variable on TVC for individual persons. Estimates of the correlation of this factor with the intercept and the slope makes it possible to state whether the individual "effectiveness" of the covariate depends on the level of the dependent variable in the first round of the study and changes of this level in consecutive rounds.

The plan of the analysis assumes that several models will be estimated of the perceived integration quality in the classroom of third-graders, as well as changes in this perception between the 3<sup>rd</sup> and 6<sup>th</sup> grade, which differ with (TIC and TVC) social, demographic and intellectual covariates. Analyses of this type will be performed twice: without inclusion of the position of respondents in the sociometric network and after introducing this position into the equation. We also examine whether the perceived peer integration quality of third-graders and the changes in this perception between the 3<sup>rd</sup> and 6<sup>th</sup> grade are linked to the average influence of sociometric position on perceived integration quality. The model of the analysis of the determinants of perceived peer integration quality is presented in Figure 1.

### Estimation methods

As respondents answered questions in the PPI questionnaire using a four-item ordinal scale, factor analyses were carried out on a polychoric correlation matrix with the use of an estimator of weighted least squares means and adjusted variance (WLSMV). The only exception is the estimation of Model 7, in which the maximum likelihood estimation with robust standard errors (MLR) was used<sup>3</sup>. Statistical analyses were performed using the Mplus 7.3 program. Due to the hierarchical character of data (pupils nested in classes), we used the Complex option reducing the bias of standard errors and statistical tests.

<sup>3</sup> The change of the estimator was forced by the fact that the model provided for the use of random effects, i.e. the analysis of the influence of independent variables on the averaged  $\beta$  coefficient from the regression of perceived integration quality on position in the peer network. At the time of writing this article, it was not possible to carry out such analyses using the WLSMV estimator. Additionally, the analyses relating to Model 7 used factor scores of the general factor of each pupil from the results of the bifactor model, obtained by the regression method (*maximum a posteriori*, MAP) from the scalar invariance model estimated with WLSMV.

### Sample

Analyses were performed on data obtained from three rounds of the longitudinal Polish nationwide study *School determinants of educational effectiveness* (*Szkolne uwarunkowania efektywności kształcenia*) carried out at the Educational Research Institute. The first round of the study took place in the second semester of the 2010/2011 school year with the participation of pupils from 181 randomly selected 3<sup>rd</sup> grade primary school classes. The next two rounds of the study were carried out with the same pupils in the first semester of 5<sup>th</sup> grade (2012/2013 school year) and in the second semester of 6<sup>th</sup> grade (2014/2015 school year). The analyses for this study used data from pupils who filled out the PPI questionnaire in each of the three rounds. The final sample for the study was 4349 pupils (49.7% girls). The average age of the respondents (in years) in the first round of the study was 9.6, with a variance of 0.1<sup>4</sup>.

### Results

Table 1 presents the parameters of six models. Model 1 does not include any predictors. It only shows that the perceived quality of integration with classmates gradually worsens between the 3<sup>rd</sup> and 6<sup>th</sup> grade. The annual average rate of this deterioration is -0.11 on the PPI scale. It is worth noting that both the variance of the intercept (0.77) and the slope (0.08) significantly differ from zero, which means that the perceived integration quality of third-graders and changes in this perception are not the same among all pupils. A negative correlation between the intercept and the change ( $r = -0.46$ ) was reported. The better the perceived quality

<sup>4</sup> A detailed description of the methodology used in the study is presented in the cited publications (Dolata et al., 2014; 2015), which can be downloaded from IBE's website (<http://eduentuzjasci.pl/publikacje-suek.html>).



Table 1  
Models of determinants of latent growth curves of PPI

Parameters of the model		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	
Mean	Intercept	0.0	0.0	0.0	0.0	0.0	0.0	
	Slope	-0.11**	-0.12**	-0.12**	-0.12**	-0.12**	-0.13**	
Variance	Intercept	0.77**	0.82**	0.81**	0.63**	0.70**	0.54**	
	Slope	0.08**	0.09**	0.09**	0.08**	0.09**	0.06**	
Correlation	<i>r</i> (intercept x slope)	-0.46**	-0.47**	-0.46**	-0.46**	-0.47**	-0.50**	
Explained variance (r2)	Intercept	–	0.01*	0.01*	0.16**	0.15**	0.01	
	Slope	–	0.00	0.01	0.01*	0.01*	0.01	
	SP 3	–	–	–	–	0.07**	–	
Regression coefficients (standardised)	TIC → PPI intercept	Gender	–	-0.01	-0.01	0.04	0.04	0.05
		Age	–	0.06*	0.06*	0.02	0.03	0.02
		Delay	–	-0.07**	-0.07**	-0.04	-0.04	-0.03
		Acceleration	–	-0.01	-0.01	-0.01	-0.01	-0.02
		HISEI	–	-0.06	-0.06	-0.07	-0.06	-0.08
		HEDU	–	0.03	0.02	-0.01	-0.01	-0.02
		Saturation	–	0.04	0.04	0.01	0.02	0.02
		Raven	–	–	0.05*	0.01	0.00	-0.01
		SP 3	–	–	–	0.39**	0.39**	–
	TIC → PPI slope	Gender	–	0.00	-0.01	-0.01	-0.01	-0.02
		Age	–	-0.02	-0.01	-0.01	-0.01	-0.02
		Delay	–	0.01	0.01	-0.00	-0.00	0.01
		Acceleration	–	-0.02	-0.01	-0.02	-0.01	-0.01
		HISEI	–	0.04	0.05	0.05	0.05	0.05
		HEDU	–	-0.06	-0.05	-0.05	-0.05	-0.06
		Saturation	–	0.01	0.02	0.025	0.02	0.03
		Raven	–	–	-0.09**	-0.08*	-0.08**	-0.10**
	TIC → SP 3	Gender	–	–	–	–	-0.11**	–
		Age	–	–	–	–	0.09**	–
		Delay	–	–	–	–	-0.08**	–
		Acceleration	–	–	–	–	-0.00	–
		HISEI	–	–	–	–	0.01	–
		HEDU	–	–	–	–	0.07**	–
		Saturation	–	–	–	–	0.06**	–
		Raven	–	–	–	–	0.13**	–
	TVC → PPI	SP 3 → PPI 3	–	–	–	–	–	0.23**
		SP 5 → PPI 5	–	–	–	–	–	0.33**
		SP 6 → PPI 6	–	–	–	–	–	0.35**
Measures of fit	RMSEA	0.02	0.02	0.02	0.02	0.02	0.02	
	CFI	0.98	0.98	0.98	0.98	0.98	0.97	
	TLI	0.98	0.98	0.98	0.98	0.98	0.97	

Intercept – initial condition; Slope – change rate; PPI – Perceived Peer Integration questionnaire; Gender (0 – girls; 1 – boys); Age (in weeks); Acceleration (0 – pupil from the main cohort; 1 – pupil from the younger cohort); Delay (0 – pupil from the main cohort; 1 – pupil from the older cohort); HISEI – index of the socio-economic status; HEDU – level of education; Saturation – amount of material goods; Raven – Raven’s progressive matrices; SP – sociometric position; TIC – time-invariable covariates; TVC – time-varying covariates. Regression and correlation coefficients are standardised, while the other coefficients are non-standardised; \*  $p < 0.05$ ; \*\*  $p < 0.01$ .

of the class's integration in the 3<sup>rd</sup> grade, the more it deteriorates in consecutive grades.

Model 2 includes seven covariates. Only two contributed significantly to the perceived peer integration quality of third-graders (intercept): age of pupil in weeks (positively) and late school start or grade retention (negatively). Independently of the other covariates, older pupils assess the quality of their integration with classmates better than younger ones, on the condition that they are not late school starters or have not repeated a grade. It is interesting that none of the included covariates influenced the change rate of perceived integration quality with classmates between the 3<sup>rd</sup> and 6<sup>th</sup> grade.

The variable of "intelligence" introduced into Model 3 and measured with Raven's progressive matrices did not change the role of a pupil's age and late school start/grade retention, but positively influenced the perceived integration quality of third-graders and its deterioration in the subsequent grades.

The sociometric position introduced in Model 4 strongly influenced the perceived integration quality of third-graders ( $\beta = 0.39$ ) and significantly increased the percentage of explained variance of the dependent variable compared to the previous model (from 1 to 15%). It also nullifies the effect of age, late school start or grade retention, and level of intelligence on perceived integration quality with 3<sup>rd</sup> grade classmates. Sociometric position also influences the rate of the deterioration of the perceived peer integration quality between 3<sup>rd</sup> and 6<sup>th</sup> grade. The higher position of a pupil in the first round of the study, the more probable that the perceived peer integration quality will worsen. It is worth noting that this effect is relatively weak and contributes only slightly to the increase of the explained variance of the PPI slope (from 0.9 to 1.4%). The inclusion of sociometric position in the model does not change the role of intelligence, which still influences the slope negatively.

The results of Model 5, which additionally includes the influence of socio-demographic variables and intelligence on sociometric position, provide interesting information. Out of eight variables, six turned out to be statistically significantly relative to the position of pupils: gender (boys have a lower position than girls), age (older pupils have a higher position than younger ones), late school start or grade retention (pupils older than the main cohort have a lower position), level of parents' education, the indicator of household saturation with goods that are important for a child's education (in both cases, the higher the indicator, the higher the sociometric position) and the level of intelligence (pupil's position increases as intelligence level increases). Only two variables, early school entry and HISEI, are not connected with sociometric position. In this context, it becomes obvious why, after introducing sociometric position into Model 4, the variables of age, late school start/grade retention and intelligence cease to significantly influence perceived peer integration quality. The fact that they are linked to the perceived integration quality of third-graders results from their relationship to sociometric position.

In Model 6, we used the fact that sociometric position was measured each time perceived integration quality was measured. In this model, sociometric position is a TVC type of variable, which can have a different influence in individual grades. Let us recall that in the analysed model, we mainly focused on the question of whether including sociometric position will result in a decline of the downward trend. The results of the analysis indicate that although a pupil's sociometric position (positively) influences perceived peer integration quality in each of the studied periods, its inclusion in the regression equation does not influence its rate of decline. The mean of the rate is still statistically significant and its score (-0.13) does not significantly differ from the ones calculated in the previous models. In

Table 2  
Model 7 of determinants of latent growth curves of PPI

Parameters of the model		Coefficient	Regression coefficients (nonstandardised)			
Mean	PPI intercept	-0.04	Variable TIC	PPI intercept	PPI slope	FTVC
	PPI slope	-0.08**	Gender	0.02	-0.01	-0.01
	FTVC	0.27**	Age	0.00	0.00	0.00
Variance	PPI intercept	0.55**	Delay	-0.30	-0.01	0.08
	PPI slope	0.06**	Acceleration	-0.12	-0.04	0.05
	FTVC	0.03**	HISEI	-0.00	0.00	-0.01
Correlations	$r$ (intercept $\leftrightarrow$ slope PPI)	-0.08**	HEDU	0.00	-0.01	0.00
	$r$ (intercept $\leftrightarrow$ FTVC)	-0.03**	Saturation	0.05	0.02	0.03
	$r$ (slope $\leftrightarrow$ FTVC)	-0.01**	Raven	0.00	-0.02**	-0.01
Measures of fit				AIC	BIC	S-SA BIC
				29 007.26	29 234.06	29 119.67

Intercept – initial condition; Slope – change rate; PPI – Perceived Peer Integration questionnaire; Gender (0 – girls; 1 – boys); Age (in weeks); Acceleration (0 – pupil from the main cohort; 1 – pupil from the younger cohort); Delay (0 – pupil from the main cohort; 1 – pupil from the older cohort); HISEI – index of the socio-economic status; HEDU – level of education; Saturation – amount of material goods; Raven – Raven’s progressive matrices; TIC – time-invariable covariates; FTVC – mean effect of the influence of sociometric position on the dependent variable (PPI); AIC – Akaike information criterion; BIC – Bayesian information criterion, S-SA BIC – sample-size adjusted BIC. Nonstandardised coefficients. \* $p < 0.05$ ; \*\* $p < 0.01$ .

other words, although sociometric position translates into a feeling of being integrated (stronger in the 5<sup>th</sup> and 6<sup>th</sup> grade than the 3<sup>rd</sup>), it has no significant influence on the fact that this perception weakens or on its rate of decline.

The analyses were extended to include Model 7 (Table 2), in which the influence of sociometric position in various periods is treated as a synthetic variable reflecting the average effect of the influence of sociometric position on the dependent variable for individual pupils (FTVC). The model also includes the influence of all eight social and demographic variables and the level of intelligence on the FTVC variable<sup>5</sup>.

<sup>5</sup> It should be noted that estimating the parameters of this model – as a model with random effects – requires using the most reliable estimator (ML/MLR) and they are not directly comparable to estimates performed with the WLSMV estimator. Please remember that in order to compute this model, we used the factor scores of the PPI general factor calculated using the regression method, obtained from the bifactor’s solution from the scalar invariance model, estimated by means of the WLSMV.

The average of the FTVC factor is positive and statistically significant, which indicates that a higher sociometric position improves perceived peer integration quality. As the variance of this effect is also statistically significant, the effect is not identically strong among all of the pupils subject to the study. The influence of social and demographic variables and intelligence on the intercept and PPI slope does not differ from that described in Model 6. None of them is related to the intercept. Only intelligence influenced (negatively) the slope: the higher its level in the 3<sup>rd</sup> grade, the more perceived peer integration quality between the 3<sup>rd</sup> and 6<sup>th</sup> grade deteriorates. None of the included variables affected the average influence of sociometric position on perceived peer integration quality (FTVC).

The significant and negative correlations of FTVC with the intercept and PPI slope are most interesting. Correlation with the intercept means that as the effect of sociometric position on perceived peer integration

quality strengthens, the perception of the quality of peer integration worsens. Correlation with the slope means that as the influence of sociometric position on perceived integration quality increases, so does the downward trend between the 3<sup>rd</sup> and 6<sup>th</sup> grade. Generally, the stronger the influence of position in the network on a pupil's perceived integration, the worse is the quality of perceived peer integration for this pupil.

### Findings

This article has two objectives: first, to examine how perceived integration among classmates between the 3<sup>rd</sup> and 6<sup>th</sup> grade of primary school changes, and second, to describe the determinants of perceived peer integration quality and changes in this perception, particularly stressing the role of a pupil's position in the peer network. The analyses performed indicate that:

- According to prior studies and expectations (hypothesis), a deterioration of the perceived quality of integration with peers is observed over time;
  - A higher position in the peer network translates into the perception of a better quality of integration in the classroom between the 3<sup>rd</sup>, 5<sup>th</sup> and 6<sup>th</sup> grade, which is also in line with expectations;
  - Position in the peer network is more sensitive to social and demographic factors than perceived peer integration quality;
  - A higher sociometric position is enjoyed by girls, older pupils (although not older than the main cohort), children with a higher level of intelligence, pupils with better educated parents and living in households more saturated with goods useful for a child's education;
  - After including position in the peer network, neither gender nor variables relating to pupil's age, level of intelligence or socio-economic position of the family are linked to perceived peer integration quality;
- Pupil's intelligence is the only variable that modifies changes in perceived peer integration quality between the 3<sup>rd</sup> and 6<sup>th</sup> grade. Its higher level in the 3<sup>rd</sup> grade involves a more dynamic deterioration of the perceived quality of peer relationships;
  - The connection of sociometric position with perceived peer integration quality in each of the studied periods (a) does not change the fact that the perceived peer integration quality deteriorates in consecutive grades and (b) has no influence on the rate of this deterioration. This lends credence to the hypothesis that this change is subjective rather than objective;
  - The stronger the relationship of position in the sociometric network with perceived peer integration quality, (a) the worse the perceived quality of peer relationships and (b) the stronger the downward trend between the 3<sup>rd</sup> and 6<sup>th</sup> grade.

### Discussion

The results of the present study confirm the phenomenon of the gradual deterioration of the perceived quality of integration with classmates in the second stage of education in primary school. They also prove that the subjective perception of integration and the objective measure of sociometric position are two, mutually non-reducible aspects of social relationships. This is evidenced first, by the moderate correlation of both phenomena, and second, by the fact that sociometric position is determined more by social and demographic variables than by perceived integration quality.

The adopted method of measuring sociometric position does not allow us to determine how the "density" of sociometric networks changes between the 3<sup>rd</sup> and 6<sup>th</sup> grade. Estimating the sociometric position based on selections (twice) standardised in grades in each of the studied periods makes them fluctuate around zero (cf. Velásquez, 2010;

Velásquez, Bukowski and Saldarriaga, 2013). However, the results indicate that including the individual sociometric position in the regression model as a score that changes over time and may differently influence perceived integration quality in each of the studied periods, does not stop or weaken the downward trend. This is further proof that both the phenomena – even correlated – are substantially independent.

Previous studies indicate that perception of social integration quality depends not only on the objective characteristics of social networks, but also on individual (subjective), though culturally deep-rooted, standards and expectations relating to their optimal form (Lykes and Kemmelmeier, 2014; Rokach, 2007; Rokach and Neto, 2005). In this context, we can list the following factors that are potentially between network position and level of satisfaction with social relationships: the need to belong (Leary, Kelly, Cottrell and Schreindorfer, 2013; Pickett, 2004), preference for loneliness (Burger, 1995), sensitivity to rejection (London, Downey, Bonica and Paltin, 2007), personality features (Teppers et al., 2013), self-esteem (Çivitci and Çivitci, 2009), conviction of one's own effectiveness (Wei, Russell and Zakalik, 2005) or even genetic factors (Goossens et al., 2015). Any of these could be the reason for a different assessment of analogous peer relationships.

The role of intelligence is interesting in this context. Let us recall that in the case of the 3<sup>rd</sup> grade, intelligence is no longer related to perceived integration quality if we introduce position in the peer network into the regression equation. In other words, children with a higher level of intelligence in the 3<sup>rd</sup> grade perceive a better quality of peer integration only because they occupy a higher position in the sociometric network, which confirms the findings of earlier research (cf. Wentzel, 1991). The “initial” negative relationship of intelligence with later changes in perceived integration seems less obvious.

This effect – by assuming that greater cognitive abilities allow a more accurate perception of what is actually going on in the class – may be interpreted as an argument for the thesis that at this stage of development, the relationship of perceived and actual interpersonal relationships is strongly determined by within-subject (individual) factors. The single measurement of intelligence (only for the 3<sup>rd</sup> grade) restricts the ability to more fully assess the role of this variable in the context of the development of perceived integration quality with classmates. We cannot examine to what extent changes in the level of intelligence are linked to perceived integration quality.

Another result of the performed analysis should be noted here: the more the perception of integration quality corresponds to the position of the pupil in the network, the worse is the perceived quality of peer relationships, both in the static (for the 3<sup>rd</sup> grade) and in the dynamic (between the 3<sup>rd</sup> and 6<sup>th</sup> grade) aspect. It seems that this effect constitutes an empirical confirmation of the “actualising” role of peer networks, which at puberty become an “external criterion” of perceived integration quality. If objective reality is more clearly perceived, its mental representation becomes more pessimistic.

The statement that perception of a pupil's own social position does not correspond to his/her objective position may seem general, but it also has specific practical implications. As changes in the perceived quality of interpersonal relationships are a consequence of subjective developmental changes, rather than of actual processes taking place in the social environment, a question arises as to whether our knowledge on what is actually happening in the peer environment at puberty is accurate. To what extent are our convictions concerning, for example, changes in the intensity of aggression in consecutive stages of education justified if they are based on measures of pupils' perceptions (e.g. Przewłocka, 2015)?

Moreover, if perceived integration quality is a phenomenon at least partially independent of what actually occurs in peer networks, and also, according to research, determines negative emotional symptoms, e.g. feelings of loneliness, more intensely than objective social isolation, then a therapy, such as a cognitive-behavioural one aimed at correcting the inadequate social cognition (cf. Masi, Chen, Hawkey and Cacioppo, 2011), may weaken such symptoms as fear or depression without needing to involve other members of the community, which is time-consuming and costly.

Finally, it is worth noting that the study under discussion has another interesting aspect. Both the intercept of the perceived integration quality of third-graders and its slope have a statistically significant variance. This means that there are significant differences between pupils in the initial strength of perceived integration quality and its later changes. This fact gives rise to new questions: How large is the pupil group affected by the downward trend? Does a long-term perception of decreased integration quality have any specific consequences for a pupil? And particularly, does it influence his or her educational achievements?

### Literature

- Anderman, E. M. and Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research*, 64(2), 287–309.
- Asher, S. R. and Wheeler, V. A. (1985). Children's loneliness: a comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, 53(4), 500–505.
- Austin, A. B. and Draper, D. C. (1981). Peer relationships of the academically gifted: a review. *Gifted Child Quarterly*, 25(3), 129–133.
- Baron-Cohen, S., Golan, O., Wheelwright, S., Granader, Y. and Hill, J. (2010). Emotion word comprehension from 4 to 16 years old: a developmental survey. *Frontiers in Evolutionary Neuroscience*, 2. doi: 10.3389/fnevo.2010.00109
- Bollen, K. A. and Curran, P. J. (2006). *Latent curve models: a structural equation perspective*. Hoboken: Wiley Interscience.
- Bradley, R. H. and Corwyn, R. F. (2002). Socio-economic status and child development. *Annual Review of Psychology*, 53(1), 371–399.
- Bukowski, W. M., Brendgen, M. and Vitaro, F. (2007). Peer and socialization: effects on externalizing and internalizing problems. In J. E. Grusec and P. D. Hastings (eds.), *Handbook of socialization: theory and research* (pp. 355–381). New York: Guilford Press.
- Burger, J. M. (1995). Individual differences in preference for solitude. *Journal of Research in Personality*, 29(1), 85–108.
- Cacioppo, J. T., Cacioppo, S. and Boomsma, D. I. (2014). Evolutionary mechanisms for loneliness. *Cognition and Emotion*, 28(1), 3–21.
- Cassidy, J. and Asher, S. R. (1992). Loneliness and peer relations in young children. *Child Development*, 63(2), 350–365.
- Çivitci, N. and Çivitci, A. (2009). Self-esteem as mediator and moderator of the relationship between loneliness and life satisfaction in adolescents. *Personality and Individual Differences*, 47(8), 954–958.
- Coie, J. D., Dodge, K. A. and Coppotelli, H. (1982). Dimensions and types of social status: a cross-age perspective. *Developmental Psychology*, 18(4), 557–570.
- Cole, D. A., Jacquez, F. M. and Maschman, T. L. (2001). Social origins of depressive cognitions: a longitudinal study of self-perceived competence in children. *Cognitive Therapy and Research*, 25(4), 377–395.
- Criss, M. M., Shaw, D. S., Moilanen, K. L., Hitchings, J. E. and Ingoldsby, E. M. (2009). Family, neighborhood, and peer characteristics as predictors of child adjustment: a longitudinal analysis of additive and mediation models. *Social Development*, 18(3), 511–535.
- Czeschlik, T. and Rost, D. H. (1995). Sociometric types and children's intelligence. *British Journal of Developmental Psychology*, 13(2), 177–189.
- Daniels-Beirness, T. (1989). Measuring peer status in boys and girls: a problem of apples and oranges? In B. H. Schneider, G. Attili, J. Nadel and R. P. Weissberg (ed.), *Social Competence in developmental perspective* (pp. 107–120). Dordrecht: Springer Netherlands.
- Jong Gierveld, J. de, Van Tilburg, T. and Dykstra, P. A. (2006). Loneliness and social isolation. In A. L. Vangelisti (ed.), *Cambridge handbook of personal relationships* (pp. 485–500). Cambridge: Cambridge University Press.

- Dodge, K. A., Pettit, G. S. and Bates, J. E. (1994). Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Development*, 65(2), 649–665.
- Dolata, R. (ed). (2014). *Czy szkoła ma znaczenie? Analiza zróżnicowania efektywności nauczania na pierwszym etapie edukacyjnym* (vol. 1). Warszawa: Instytut Badań Edukacyjnych.
- Dolata, R., Grygiel, P., Jankowska, D. M., Jarnutowska, E., Jasińska-Maciążek, A., Karwowski, M., ... Pisarek, J. (2015). *Szkolne pytania. Wyniki badań nad efektywnością nauczania w klasach IV–VI*. Warszawa: Instytut Badań Edukacyjnych.
- Dolata, R., Hawrot, A., Humenny, G., Jasińska, A., Koniewski, M., Majkut, P. and Żółtak, T. (2013). *Trafność metody edukacyjnej wartości dodanej dla gimnazjów*. Warszawa: Instytut Badań Edukacyjnych.
- Due, P., Merlo, J., Harel-Fisch, Y., Damsgaard, M. T., Holstein, B. E., ... Lynch, J. (2009). Socioeconomic inequality in exposure to bullying during adolescence: a comparative, cross-sectional, multilevel study in 35 countries. *American Journal of Public Health*, 99(5), 907–914.
- Duncan, G. J. and Magnuson, K. A. (2003). Off with hollingshead: socioeconomic resources, parenting, and child development. In M. H. Bornstein and R. H. Bradley (eds.), *Socioeconomic status, parenting, and child development* (pp. 83–106). Mahwah: Lawrence Erlbaum.
- Duyme, M., Dumaret, A.-C. and Tomkiewicz, S. (1999). How can we boost IQs of “dull children”? A late adoption study. *Proceedings of the National Academy of Sciences*, 96, 8790–8794.
- Dweck, C. S. (2002). The development of ability conceptions. In A. Wigfield and J. S. Eccles (eds.), *Development of achievement motivation* (pp. 57–88). San Diego: Academic Press.
- Galanaki, E. P. and Kalantzi-Azizi, A. (1999). Loneliness and social dissatisfaction: its relation with children’s self-efficacy for peer interaction. *Child Study Journal*, 29(1), 1–22.
- Gentile, B., Grabe, S., Dolan-Pascoe, B., Twenge, J. M., Wells, B. E. and Maitino, A. (2009). Gender differences in domain-specific self-esteem: a meta-analysis. *Review of General Psychology*, 13(1), 34–45.
- Goossens, L., Roedel, E. van, Verhagen, M., Cacioppo, J. T., Cacioppo, S., Maes, M. and Boomsma, D. I. (2015). The genetics of loneliness: linking evolutionary theory to genome-wide genetics, epigenetics, and social science. *Perspectives on Psychological Science*, 10(2), 213–226.
- Guevremont, A., Roos, N. P. and Brownell, M. (2007). Predictors and consequences of grade retention: examining data from Manitoba, Canada. *Canadian Journal of School Psychology*, 22(1), 50–67.
- Guidubaldi, J. and Perry, J. D. (1984). Divorce, socioeconomic status, and children’s cognitive-social competence at school entry. *American Journal of Orthopsychiatry*, 54(3), 459–468.
- Grygiel, P. (2015). Test ukrytej struktury kwestionariusza „Poczucie Integracji Rówieśniczej”. Częściowo konfirmacyjny model podwójnego czynnika z ładunkami krzyżowymi. In B. Niemierko and M. K. Szmigel (eds.), *Zastosowania diagnozy edukacyjnej* (pp. 438–458). Kraków: Polskie Towarzystwo Diagnostyki Edukacyjnej.
- Grygiel, P. (2016). Test podłużnej niezmienności modelu podwójnego czynnika na przykładzie Kwestionariusza poczucia integracji rówieśniczej. *Edukacja*, 137(2), 79–99.
- Haeberlin, U., Moser, U., Bless, G. and Klaghofer, R. (1989). *Integration in die Schulklasse: Fragebogen zur Erfassung von Dimensionen der Integration von Schülern: FDI 4–6*. Bern–Stuttgart: Verlag Paul Haupt.
- Heinrich, L. M. and Gullone, E. (2006). The clinical significance of loneliness: a literature review. *Clinical Psychology Review*, 26(6), 695–718.
- Higbee, K. R. and Roberts, R. E. (1994). Reliability and validity of a brief measure of loneliness with Anglo-American and Mexican American adolescents. *Hispanic Journal of Behavioral Sciences*, 16(4), 459–474.
- Holmes, C. T. and Matthews, K. M. (1984). The effects of nonpromotion on elementary and junior high school pupils: a meta-analysis. *Review of Educational Research*, 54(2), 225–236.
- Humenny, G. and Grygiel, P. (2015a). Poza ścisłą jedno- i wielowymiarowość. Struktura czynnikowa skali samotności de Jong Gierveld wśród dzieci. In A. Pokropek (ed.), *Modele cech ukrytych w badaniach edukacyjnych, psychologii i socjologii. Teoria i zastosowania* (pp. 400–424). Warszawa: Instytut Badań Edukacyjnych.
- Humenny, G. and Grygiel, P. (2015b). Wielowymiarowa struktura latentna w perspektywie analizy czynnikowej. In A. Pokropek (ed.), *Modele cech ukrytych w badaniach edukacyjnych, psychologii i socjologii. Teoria i zastosowania* (pp. 130–165). Warszawa: Instytut Badań Edukacyjnych.
- Kling, K. C., Hyde, J. S., Showers, C. J. and Buswell, B. N. (1999). Gender differences in self-esteem: a meta-analysis. *Psychological Bulletin*, 125(4), 470–500.

- Ko, P.-C., Buskens, V. and Wu, C.-I. (2015). The interplay between gender and structure: dynamics of adolescent friendships in single-gender classes and mixed-gender classes. *Journal of Research on Adolescence*, 25(2), 387–401.
- Konarski, R. (2009). *Modele równań strukturalnych: teoria i praktyka*. Warszawa: Wydawnictwo Naukowe PWN.
- Ladd, G. W. and Burgess, K. B. (1999). Charting the relationship trajectories of aggressive, withdrawn, and aggressive/withdrawn children during early grade school. *Child Development*, 70(4), 910–929.
- Leary, M. R., Kelly, K. M., Cottrell, C. A. and Schreindorfer, L. S. (2013). Construct validity of the need to belong scale: mapping the nomological network. *Journal of Personality Assessment*, 95(6), 610–624.
- Lee, S.-Y., Olszewski-Kubilius, P. and Thomson, D. T. (2012). Academically gifted students' perceived interpersonal competence and peer relationships. *Gifted Child Quarterly*, 56(2), 90–104.
- Liepins, M. and Cline, T. (2011). The development of concepts of loneliness during the early years in school. *School Psychology International*, 32(4), 397–411.
- London, B., Downey, G., Bonica, C. and Paltin, I. (2007). Social causes and consequences of rejection sensitivity. *Journal of Research on Adolescence*, 17(3), 481–506.
- Lubbers, M. J. (2003). Group composition and network structure in school classes: a multilevel application of the p\* model. *Social Networks*, 25(4), 309–332.
- Lykes, V. A. and Kimmelmeier, M. (2014). What predicts loneliness? Cultural difference between individualistic and collectivistic societies in Europe. *Journal of Cross-Cultural Psychology*, 45(3), 468–490.
- Maes, M., Klimstra, T., Van den Noortgate, W. and Goossens, L. (2015). Factor structure and measurement invariance of a multidimensional loneliness scale: comparisons across gender and age. *Journal of Child and Family Studies*, 24(6), 1829–1837.
- Marsh, H. W. and Shavelson, R. (1985). Self-concept: its multifaceted, hierarchical structure. *Educational Psychologist*, 20(3), 107–123.
- Martin Babarro, J., Diaz-Aguado, M. J., Martinez Arias, R. and Steglich, C. (2016). Power structure in the peer group: the role of classroom cohesion and hierarchy in peer acceptance and rejection of victimized and aggressive students. *The Journal of Early Adolescence*. doi: 10.1177/0272431616648451
- Masi, C. M., Chen, H.-Y., Hawkey, L. C. and Cacioppo, J. T. (2011). A meta-analysis of interventions to reduce loneliness. *Personality and Social Psychology Review*, 15(3), 219–266.
- Muthén, L. K. and Muthén, B. O. (2012). *Mplus user's guide. Seventh edition*. Los Angeles: Muthén&Muthén.
- Parker, J. G. and Asher, S. R. (1989). Peer relations and social adjustment: are friendship and group acceptance distinct domains? Referat wygłoszony podczas The Biennial Meeting of the Society for Research in Child Development, Kansas City.
- Pfeifer, J. H. and Peake, S. J. (2012). Self-development: integrating cognitive, socioemotional, and neuroimaging perspectives. *Developmental Cognitive Neuroscience*, 2(1), 55–69.
- Pianta, R. C., Tietbohl, P. J. and Bennett, E. M. (1997). Differences in social adjustment and classroom behavior between children retained in kindergarten and groups of age and grade matched peers. *Early Education and Development*, 8(2), 137–152.
- Pickett, C. L. (2004). Getting a cue: the need to belong and enhanced sensitivity to social cues. *Personality and Social Psychology Bulletin*, 30(9), 1095–1107.
- Piotrowska, P. J., Stride, C. B., Croft, S. E. and Rowe, R. (2015). Socioeconomic status and antisocial behaviour among children and adolescents: a systematic review and meta-analysis. *Clinical Psychology Review*, 35, 47–55.
- Preacher, K. J., Wichman, A. L., MacCallum, R. C. and Briggs, N. E. (2008). *Latent growth curve modeling*. Los Angeles: Sage.
- Prinstein, M. J., Borelli, J. L., Cheah, C. S. L., Simon, V. A. and Aikins, J. W. (2005). Adolescent girls' interpersonal vulnerability to depressive symptoms: a longitudinal examination of reassurance-seeking and peer relationships. *Journal of Abnormal Psychology*, 114(4), 676–688.
- Przewłocka, J. (2015). *Bezpieczeństwo uczniów i klimat społeczny w polskich szkołach*. Warszawa: Instytut Badań Edukacyjnych.
- Quay, L. C. (1992). Personal and family effects on loneliness. *Journal of Applied Developmental Psychology*, 13(1), 97–110.
- Reynolds, A. J. (1992). Grade retention and school adjustment: an explanatory analysis. *Educational Evaluation and Policy Analysis*, 14(2), 101–121.
- Rokach, A. (2007). The effect of age and culture on the causes of loneliness. *Social Behavior and Personality: An International Journal*, 35(2), 169–186.
- Rokach, A. and Neto, F. (2005). Age, culture, and the antecedents of loneliness. *Social Behavior and Personality: An International Journal*, 33(5), 477–494.
- Rose, A. J. and Rudolph, K. D. (2006). A review of sex differences in peer relationship processes: poten-



- tial trade-offs for the emotional and behavioral development of girls and boys. *Psychological Bulletin*, 132(1), 98–131.
- Ryan, A. M. and Ladd, G. W. (eds.). (2012). *Peer relationships and adjustment at school*. Charlotte: Information Age Pub.
- Salley, C. G., Vannatta, K., Gerhardt, C. A. and Noll, R. B. (2010). Social self-perception accuracy: variations as a function of child age and gender. *Self and Identity*, 9(2), 209–223.
- Samuelsson, M. (1997). Social networks of children in single-parent families: differences according to sex, age, socioeconomic status and housing-type and their associations with behavioural disturbances. *Social Networks*, 19(2), 113–127.
- Schneider, B. H. (1987). *The gifted child in peer group perspective*. New York: Springer.
- Stone, W. L. and La Greca, A. M. (1990). The social status of children with learning disabilities: a reexamination. *Journal of Learning Disabilities*, 23(1), 32–37.
- Szumski, G. (2010). *Wokół edukacji włączającej: efekty kształcenia uczniów z niepełnosprawnością intelektualną w stopniu lekkim w klasach specjalnych, integracyjnych i ogólnodostępnych*. Warszawa: Wydawnictwo Akademii Pedagogiki Specjalnej.
- Teppers, E., Klimstra, T. A., Damme, C. V., Luyckx, K., Vanhalst, J. and Goossens, L. (2013). Personality traits, loneliness, and attitudes toward aloneness in adolescence. *Journal of Social and Personal Relationships*, 30(8), 1045–1063.
- Thomaes, S., Reijntjes, A., Orobio de Castro, B., Bushman, B. J., Poorthuis, A. and Telch, M. J. (2010). I like me if you like me: on the interpersonal modulation and regulation of preadolescents' state self-esteem. *Child Development*, 81(3), 811–825.
- Tippett, N. and Wolke, D. (2014). Socioeconomic status and bullying: a meta-analysis. *American Journal of Public Health*, 104(6), e48–e59.
- Van Groenou, M. I. B. and Van Tilburg, T. (2003). Network size and support in old age: differentials by socio-economic status in childhood and adulthood. *Ageing and Society*, 23(5), 625–645.
- Velásquez, A. M. (2010). *Classroom context and aggression: understanding the effects of and change in classroom social structure*. Montreal: Concordia University.
- Velásquez, A. M., Bukowski, W. M. and Saldarriaga, L. M. (2013). Adjusting for group size effects in peer nomination data. *Social Development*, 22(4), 845–863.
- Weeks, M. S. (2013). *Gender, loneliness, and friendship satisfaction in early adulthood: the role of friendship features and friendship expectations*. Durham: Duke University.
- Wei, M., Russell, D. W. and Zakalik, R. A. (2005). Adult attachment, social self-efficacy, self-disclosure, loneliness, and subsequent depression for freshman college students: a longitudinal study. *Journal of Counseling Psychology*, 52(4), 602–614.
- Wentzel, K. R. (1991). Relations between social competence and academic achievement in early adolescence. *Child Development*, 62(5), 1066–1078.
- Wentzel, K. R., Battle, A., Russell, S. L. and Looney, L. B. (2010). Social supports from teachers and peers as predictors of academic and social motivation. *Contemporary Educational Psychology*, 35(3), 193–202.
- Wigfield, A., Eccles, J. S., Yoon, K. S., Harold, R. D., A. J., Freedman-Doan, C. and Blumenfeld, P. C. (1997). Change in children's competence beliefs and subjective task values across the elementary school years: a 3-year study. *Journal of Educational Psychology*, 89(3), 451–469.

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