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Language skills and social contact among students with intellectual disabilities in special needs schools

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ABSTRACT

Children and adolescents with intellectual disabilities (ID) often have language difficulties. Guided by interactional theories of language acquisition, this study expected that more social contact with peers positively affects language development for this student group. Conversely, it was also hypothesized that poor language skills predict fewer social contacts with peers, thereby reducing their social inclusion. To test our hypotheses, we studied a sample of 1125 students (aged 4 to 19 years) in 16 Swiss special needs schools, on whom data was collected at the beginning and end of a school year. Social contact was measured as the number of peers at school with whom a student has frequent contact, according to teacher reports. Language skills were measured by teacher ratings of verbal and non-verbal abilities. Results of a cross-lagged multi-level model indicated that greater numbers of social contacts at the beginning of the school year were related to an increase in both verbal and non-verbal language skills. However, better verbal and non-verbal language skills at the beginning of the school year did not predict more social contacts later on. The findings support the assumption that more social contacts among students in special needs schools are conducive to language development.

1. Introduction

Language acquisition in children and adolescents with intellectual disabilities (ID) is often significantly delayed and many individuals with ID never acquire levels of linguistic competence comparable to those of typically developing individuals (World Health Organization, 2019). Several factors may explain these difficulties. Some theories emphasize native biological (Chomsky, 1965) or general cognitive preconditions (Piaget, 1979) for language acquisition while others highlight interactional processes between persons (Argyle, 2007; Tomasello, 2008; Vygotsky & Kozulin, 2012). The current study was particularly interested in factors related to interactions between individuals, while also acknowledging the important role that biological and cognitive preconditions play in language development for children and adolescents with ID. Within the field of interactional processes, we focused specifically on social contact as a precondition and starting point for social interaction between individuals (Sztompka, 2002). Thus, language skills in the present study were understood as all forms of verbal and non-verbal expressions that are intentionally used for communicative purposes (Buck & VanLear, 2002).

While primary caregivers provide the most important language learning opportunities for younger children (e.g., Huttenlocher et al., 1991; Landry et al., 1997), from pre-school age onward friends and other peers play an increasingly important role (e.g., Mashburn et al., 2009; Pellegrini et al., 2002). This is particularly crucial when considering the situation of children and adolescents

with ID. These individuals often experience difficulties expressing themselves verbally and non-verbally, even upon reaching school age (Dworschak et al., 2012; Memisevic & Hadzic, 2013). Peers at school may therefore represent an especially important context for this group, providing them with linguistic input and communicative learning occasions. However, students with special educational needs, and especially those with ID, are known to experience difficulties establishing social contacts with peers (e.g., Bossaert et al., 2013a, 2013b; Koster et al., 2009; Koster et al., 2010). Accordingly, students with ID at school often have smaller social peer networks than typically developing students (e.g., Schoop-Kasteler & Müller, 2020). As a result, students with ID may have reduced peer-related opportunities to improve their linguistic-communicative skills. In turn, since linguistic ability is also important for establishing social contacts (e.g., Hazen & Black, 1989; Rosenberg et al., 2017), lower language competences could lead to increasing social isolation. Indeed, research shows that loneliness is a frequent and severe problem for many persons with ID (e.g., Petroussou et al., 2018).

For students with ID, the school peer context may also pose challenges to language learning from peers, as many attend special needs schools for students with ID. The overall linguistic abilities among students at these schools are generally lower than in regular classrooms and may therefore provide less qualitative language input from peers. On the other hand, students in special needs schools are also characterized by a great heterogeneity of competence levels and types of language difficulties (Dworschak et al., 2012) such that learning occasions for individual students will nevertheless exist.

Given the significant challenges in language acquisition and the risk for social isolation of students with ID, it is of special importance to shed additional light on the reciprocal relationship between language skills and social contact with peers in special needs school contexts. Further knowledge on this issue may help create a social environment for students with ID that can be conducive to both their language development and their social inclusion.

1.1. Language skills among students with ID

ID is characterized by an individual's difficulties in intellectual functioning and adaptive behavior competences (i.e., conceptual, social, and practical skills) that are at least two standard deviations below the population mean (American Association on Intellectual and Developmental Disabilities, 2021; World Health Organization, 2019). Two educational opportunities for students with ID include inclusive schooling and special needs schools; attending the latter is especially common in those with more severe disabilities (Semier Dessemontet et al., 2012). In the US about 6.1% of students with ID attend special needs schools and 49.4% of students with ID attend a special needs class for more than 60% of the school day (National Center for Education Statistics, 2017). In European countries special needs school attendance by students with ID varies but can be very prevalent (e.g., Germany: 89.7%; the Netherlands: 80–99%; United Kingdom: 17.3%; Department for Education, n.d.; Kultusministerkonferenz, 2020; Smits & Schoonheim, 2016). The Swiss education system lacks a specific school administrative category for ID that would allow for clear conclusions on the percentage of students with ID attending special needs schools. Generally, according to the Swiss Federal Statistical Office (2020), in the school year 2018/2019, 1.4% of the whole student population in Switzerland attended a special needs classroom and 1.8% a special needs school (overall, 4.8% of students in Switzerland received special educational support).

Most students with ID have certain disorders or delays in language development (Diken, 2019; Dworschak et al., 2012; Memisevic & Hadzic, 2013). However, a large heterogeneity exists. For example, a study by Dworschak et al. (2012) in special needs schools for students with mild to profound ID revealed that some students had no verbal language skills at all, while others could form complex sentences. About 80% of students could produce at least one- or two-word sentences. They also found large heterogeneity regarding language comprehension, although overall scores in this domain were higher than those in language production: About 90% of students with ID could understand words, simple sentences, and instructions. Memisevic and Hadzic (2013) found speech-language disorders in 71.3% of students with mild to moderate ID in special needs schools, with severity of ID appearing to be an important predictor of speech-language disorder prevalence (93.9% among students with moderate ID vs. 49.4% among students with mild ID).

Students with ID also vary considerably in terms of pragmatic language competences, which are crucial for social interaction (Diken, 2019; Hatton, 1998). In a recent study by Diken (2019), which compared students with mild ID to typically developing students, nearly 80% of students with ID had below average, poor, or very poor pragmatic language skills. Nevertheless, more than 20% exhibited at least average competences. Besides verbal language, alternative non-verbal forms of communication are particularly important in students with ID (Dworschak et al., 2012; Sigafoos et al., 2014). Dworschak et al. (2012), for example, found that students with ID most frequently use physical forms of non-verbal communication such as gestures and facial expressions. In addition, aided systems such as pointing to pictures and symbols and high tech communication tools (ASHA, 2020) are used as well.

1.2. Language skills and social contact

In line with interactional theories of language acquisition (e.g., Tomasello, 2008; Vygotsky & Kozulin, 2012), social interaction is important for language development. Social and communicative exchange with other people offers opportunities to learn from linguistic role models and to practice and improve one's own linguistic and communicative skills. For this exchange to take place, social contact must be established. According to Sztompka's (2002) sociological hierarchy of interactions, social contacts can be understood as social actions that form the beginning of social interaction. As soon as children attend an extra-familial setting, social contact with peers plays an increasingly important role in language development. For example, Mashburn et al. (2009) found that in typically developing pre-kindergarten children, peers' expressive language abilities were positively associated with a child's individual expressive and receptive language development. Social contact with linguistically competent peers can therefore be expected to be beneficial for improving individual language competences in younger children. In contrast, it is an open question whether the same is true for individuals with ID, who often have persistent language problems that extend into school age and beyond (Hatton, 1998).

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Reduced linguistic abilities in children and adolescents with ID can at least partly be attributed to intellectual deficits and related biological factors (World Health Organization, 2019). Nevertheless, there are indications that language skills can be improved in persons with ID, even in adolescence and adulthood (Rvachew & Folden, 2018; Terband et al., 2018). Hence, under the assumption of the interaction hypothesis of language acquisition, it may be expected that children and adolescents with ID also benefit from rich linguistic input as provided by peers and communication opportunities. Yet students with ID who attend special needs schools typically have smaller social networks than students in regular schools (for a systematic review, see Schoop-Kasteler & Müller, 2020), and students in these schools may therefore be more dependent on teachers' efforts to actively create positive social learning opportunities through specific arrangements of instruction and breaks (Farmer et al., 2011). However, if social contacts are established, the heterogeneity of language skills in special needs schools (Dworschak et al., 2012) suggests that most students with ID will have contact with students whose linguistic abilities may benefit their own language development. In some respects, the peer environment in a special needs school could even be advantageous to language development compared to a regular school setting: Typically developing peers in mainstream schools often consider children with ID to be lower in social status, which might lead them to use more dominant and directive communication approaches (Guralnick & Paul-Brown, 1986). In contrast, communication among students who all have a disability and attend a special needs school might be characterized by less hierarchic social communication patterns, despite differences in ability. However, too little is known about interaction styles among students with ID in special needs schools to allow for clear predictions in this regard.

While social contact can be expected to foster language development, in turn, language skills and especially pragmatic-communicative skills are also a precondition for establishing and maintaining social contacts (Hatton, 1998). According to Argyle (2007), human social behavior is largely based on language, where both verbal and non-verbal expressions are important for social interaction. As a result, students with lower language skills have fewer social contacts and are generally less accepted in class than other students (Black & Hazen, 1990; Fujiki et al., 1996; Hazen & Black, 1989; Nilsen & Bacso, 2017; Raghavendra et al., 2012; Rosenberg et al., 2017; Thirumanickam et al., 2011). Although most students in special needs schools are less proficient in their language skills than typically developing students in regular schools, findings of great heterogeneity (Dworschak et al., 2012) lead to the assumption that also within this student population, those with better language skills will have more social contacts than less competent students. However, we know of no studies that have investigated this question.

1.3. The present study

In the light of the open questions related to language acquisition and social contact in children and adolescents with ID, the current study investigated the reciprocal relationships between language skills development and social contact with peers in Swiss special needs schools. We expected that students with more social contacts would make greater progress in their language skills (Hypothesis 1). Conversely, we expected that better language skills would predict an increase in social contacts (Hypothesis 2). Given the great variability in language competences and the importance of non-verbal communication among students with ID (Sigafos et al., 2014), we have differentiated between verbal- and non-verbal language skills in our analyses.

2. Methods

2.1. Sample

To test our hypotheses, we used a longitudinal design with two measurement points at the beginning and end of the school year (T1: September–October 2019, T2: April–June 2020). This study was part of a larger research project that examined characteristics and peer relations among attendees of special needs schools for students with ID in the German speaking part of Switzerland. In Switzerland, special needs schools for students with ID can only be attended by children and adolescents who have a clinical diagnosis of ID (rare exceptions may be possible in practice). Following ICD-10 diagnostic criteria (World Health Organization, 2019), ID diagnosis in Switzerland is typically established using an IQ-test (IQ < 70) and a clinical estimate of adaptive behavior problems. In Swiss special needs schools, students with ID attend small classrooms in an all-day format where students are surrounded by their peers for a large part of the day. Data were assessed in 16 special needs schools. Within these schools, 1125 students (out of 1177 students total) from 179 classrooms (out of 182 classrooms total) participated in the study. The average school size at T1 was 80.28 students ($SD = 23.83$; range = 28–121) and the average number of students per classroom was 6.47 ($SD = 1.74$; range = 4–15). Of the 379 professionals providing information about the students they supervised, 79.1% were class teachers or co-teachers and 16.2% were other professionals, for example, subject teachers, assistants, trainees, social pedagogues, or therapists (no information was available for 4.7%).

Students' mean age at the first measurement was 11.30 years ($SD = 3.75$; range = 4.17–19.08). Boys were overrepresented (65.9%) and the average international socio-economic index (ISEI; Ganzeboom & Treiman, 1996) of 41.08 was rather low compared to Swiss regular schools with an average ISEI of 51.70 (Konsortium PISA.ch, 2018). Although we had no IQ scores to exactly identify students' severity of intellectual disability, assessment of adaptive competences, which are part of the ID diagnosis, revealed students were very heterogeneous in terms of their general functioning. Compared to the reference norms of the ABAS-3 (Adaptive Behavior Assessment System-3 for teachers; Bienstein et al., 2018; Harrison & Oakland, 2015), 47.2% of participating students had extremely low, 20.5% low, 22.8% below average, and 9.5% at least average adaptive competences.

2.2. Measures

2.2.1. Social contact

Social contact was measured as the number of peers at school with whom a student has frequent contact. Given that many students with ID lack the ability to fill out questionnaires and we sought to collect information from as many students at each school as possible, we used contact nominations of students as reported by school staff at the beginning (T1) and end of the school year (T2). As classrooms were small and students were closely supervised by adults throughout the whole school day (e.g., during breaks, lunch, etc.), staff could provide valid and reliable information on the frequent peer contacts of each student within the school environment. Since the forms of social contact may vary strongly between students with different ability levels (e.g., with regard to verbal and non-verbal interaction), we used a broad measure of social contact. The question was: "With whom does the student have frequent contact during the school day?" Professionals could nominate any student from their school. Larger numbers of received nominations indicated more social contacts.

2.2.2. Language skills

Teachers and other staff reported on students' language skills using a subscale of the Adaptive Behavior Assessment System-3 (Bienstein et al., 2018; Harrison & Oakland, 2015) at the beginning (T1) and end of the school year (T2). The subscale contains 22 items covering a wide range of language skills. These include linguistic competences such as: naming objects or using correct sentence structures and grammatical markers; basic communication skills such as greeting people, saying yes and no, and listening to others; more complex communication skills such as longer conversations on specific topics (e.g., "speaks to others for at least 10 minutes about complex topics [e.g., politics or current events]"). The questionnaire also includes items regarding the use of non-verbal forms of communication, such as gestures and facial expressions. Professionals used a 4-point response scale to indicate whether, and how frequently, the individual student performed each communicative activity (0 = lowest performance: the student is not able to exhibit the activity; 3 = highest performance: the student always exhibits the activity when required).

Since the questionnaire deals with a variety of verbal and non-verbal competences, we used exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to determine verbal and non-verbal subdimensions of language skills, which are measured by the instrument. To control for clustering of students in classrooms, we performed two-level EFA and CFA. The results of the T1 EFA revealed two distinct factors of language competences, which was confirmed in the T1 CFA: One factor with 12 items measured verbal skills and another factor with 6 items measured non-verbal skills (model fit: $\chi^2(401) = 2051.77$, $p < .001$; RMSEA = 0.059; CFI = 0.94; TLI = 0.94). The verbal factor included both basic linguistic skills such as naming ability, grammatical skills, and clear pronunciation, as well as more complex conversation skills as described above. There was no further differentiation within the verbal factor (e.g., with respect to more basic and more advanced abilities). The second factor involved the use of gestures and facial expressions for communicative purposes, listening attentively, and understanding instructions. Since we used a longitudinal design for hypotheses tests, we tested for measurement invariance of the factor structure and loadings from T1 to T2. The model with equal factor loadings over time showed a satisfactory model fit ($\chi^2(1234) = 3223.28$, $p < .001$; RMSEA = 0.059; CFI = 0.94; TLI = 0.94).

2.3. Procedure

The present study was reviewed and approved for scientific procedure and ethical conduct by the institutional research commission of the Department of Special Education of the University of Fribourg. The sample was accessed by means of informational letters to the special needs schools and subsequent personal consultations with the school directors. Data collection was completely anonymous, so that the researchers never had access to any names of reporting school staff, parents, or students. Numerical codes were used to link data from the two measurement points. Parents were informed by letter that the study was anonymous, no information on medical diagnoses would be collected, and participation was voluntary. They were free to inform the class teacher if they did not wish for anonymous information about their child to be provided. Teachers and other professionals could opt out of participating, as well.

2.4. Data analyses

Before testing our hypotheses, some preliminary analyses were conducted using the software SPSS version 26 (IBM Corp., 2019). In a first step, we calculated descriptive statistics on social contacts and the two factors of language skills described above, in order to provide an overview of the sample's mean social contacts and language skills and how the scores varied between students. In addition, we used dependent sample *t*-tests to indicate whether T1 and T2 measures differed significantly. As the number of students per school ranged from 28 to 121 students, we further tested whether school size mattered in terms of contact nominations. For the preliminary analyses, scale means of the two factors relating to language skills were calculated, while the main analyses were performed using latent variables.

In the main analyses, we first tested the correlations between the T1 variables to find out how social contact nominations and the two latent factors of verbal and non-verbal language skills are related to each other at the beginning of the school year. To answer our research questions, we conducted longitudinal analyses with two measurement occasions. Using a cross-lagged autoregressive model (Selig & Little, 2012), the latent variables of verbal and non-verbal skills at the second measurement point (T2) were predicted by received contact nominations at the first measurement occasion (T1). In addition, contact nominations at T2 were predicted by verbal and non-verbal skills at T1. At the same time, we controlled for T1 correlations between all variables, cross-lagged effects between the two latent language factors, and the dependence of repeated measures within the same construct over time (autoregressive effects; see

Fig. 1). Although we only used student-level variables, we still controlled for non-independence of students within the same classroom by using a two-level analysis. This procedure is recommended in case of nested data (Raudenbush & Bryk, 2002). All main analyses were performed using the software Mplus Version 8 (Muthén & Muthén, 2017).

3. Results

3.1. Preliminary analyses

Table 1 shows the descriptive results. The average number of contact nominations students received (according to staff reports) increased significantly from 3.74 at T1 to 4.19 at T2 ($t(1122) = -7.040, p < .001$). The range remained nearly the same for both measurements (0 to 15 at T1 and 0 to 14 at T2). We further found that there was a significant but very small negative correlation between T1 school size and T1 contact nominations ($r = -0.08; p = .004$) and no significant correlation between the two variables at T2 ($r = -0.05; p = .076$). We therefore concluded that the number of nominations a student received was scarcely related to school size.

Verbal skills, which were measured on a scale from 0 (lowest performance) to 3 (highest performance), were on average slightly below the scale mean of 1.5 (T1: $M = 1.34$; T2: $M = 1.41$), whereas non-verbal language skills were on average above the scale mean (T1: $M = 2.04$; T2: $M = 2.07$). Dependent sample *T*-Tests revealed, however, that verbal skills increased significantly from T1 to T2 ($t(1035) = -4.821, p < .001$), whereas non-verbal skills did not ($t(1033) = -1.313, p = .189$).

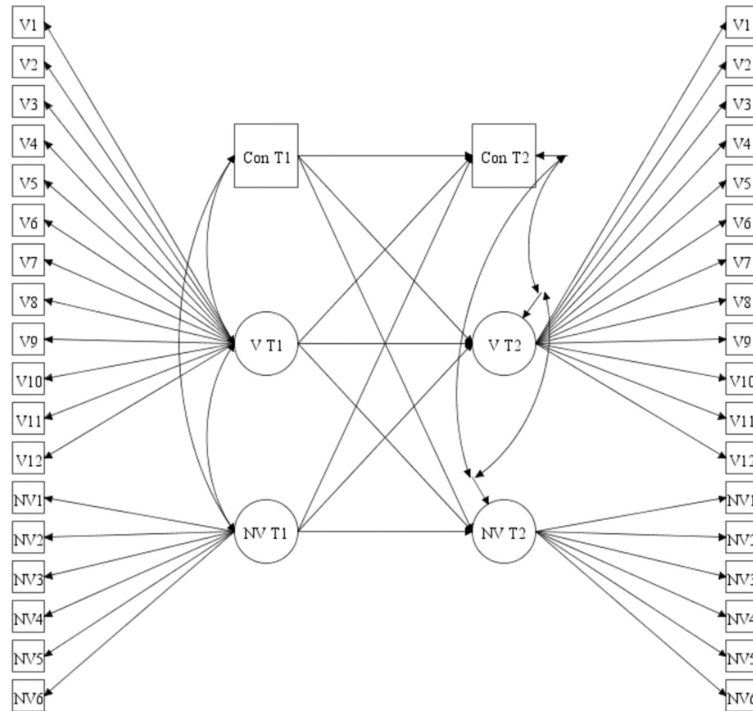


Fig. 1. Cross-lagged autoregressive model of social contact (Con), verbal language skills (V), and non-verbal language skills (NV).

Table 1
Descriptive statistics of social contact, verbal language skills, and non-verbal language skills.

	M	SD	Min	Max
Social contact T1	3.74	2.53	0	15
Social contact T2	4.19	2.83	0	14
Verbal skills T1	1.34	0.87	0	3
Verbal skills T2	1.41	1.41	0	3
Non-verbal skills T1	2.04	0.75	0	3
Non-verbal skills T2	2.07	0.74	0	3

3.2. Main analyses

Correlational analyses between social contact and the two latent factors of verbal and non-verbal competences at T1 revealed that baseline verbal and non-verbal language skills were moderately related to the number of social contact nominations ($r = 0.301, p < .001$; $r = 0.322, p < .001$). Hence, the more linguistically competent students were, the more social contacts they had. Furthermore, the two language factors correlated highly with each other ($r = 0.783, p < .001$), indicating that the more competent students were in one language domain, the more competent they were in the other.

In the longitudinal model (see Table 2), autoregressive paths indicated a rather high within-construct stability: T1 measures of social contact and language skills were highly significant predictors of the respective T2 measures ($p < .001$). Controlling for this stability, there were still significant cross-lagged effects between social contact and language skills. Social contact at T1 was a significant predictor of verbal and non-verbal language skills at T2 ($p < .01$), even after controlling for T1 language skills. That is, the more social contact nominations students received at T1, the more their language skills increased from T1 to T2. We could therefore accept Hypothesis 1. However, no reciprocal effect of verbal or non-verbal language skills on social contact nominations at T2 was found. This means that better language skills at the beginning of the school year did not predict a higher number of social contacts later on. Hence, Hypothesis 2 was rejected.

We further found a significant negative cross-lagged effect of verbal skills at T1 predicting non-verbal skills at T2 ($p < .001$). Although T1 correlations between the two language factors were positive, higher verbal competences at T1 seemed to diminish an increase in non-verbal competences. On the other hand, non-verbal competences at T1 had no influence on the development of verbal competences. The entire autoregressive cross-lagged model revealed an acceptable model fit ($\chi^2(1334) = 3469.22, p < .001$; RMSEA = 0.037; CFI = 0.95; TLI = 0.95).

4. Discussion

The present study sought to shed light on the reciprocal relation between social contact with peers and language skills development among children and adolescents with ID in special needs schools. We found that the larger the number of social contacts reported at T1, the greater the increase in verbal and non-verbal competences (Hypothesis 1). Hence, frequent social contact with peers from school appears to be an important predictor of positive language development in this student population. This result is in line with the theoretical assumption that social interaction is essential for language learning (e.g., Vygotsky & Kozulin, 2012) and extends earlier findings on this subject from studies among typically developing children (e.g., Mashburn et al., 2009; Pellegrini et al., 2002).

Also in line with earlier evidence from cross-sectional studies among individuals without ID (Black & Hazen, 1990; Fujiki et al., 1996; Hazen & Black, 1989; Nilsen & Bacso, 2017; Raghavendra et al., 2012; Thirumanickam et al., 2011), we found positive associations between language skills and social contact, but only when considering the beginning of the school year. However, contradicting the assumption of reciprocal influences between social contact and language skills (Argyle, 2007; Hatton, 1998), no impact of language skills at the beginning of the school year on the number of social contacts at the end of the school year was observed (Hypothesis 2). Taken together, this means that students with poorer language skills are initially disadvantaged in terms of social contacts, but these lower skills are not accompanied by a decline in social contacts throughout the school year. One reason for this finding might be that teachers in special needs schools can, to some extent, compensate for students' language problems by actively

Table 2
Cross-lagged and autoregressive effects of social contact, verbal language skills, and non-verbal language skills.

Predictor variables	Dependent variables					
	Verbal skills T2		Non-verbal skills T2		Social contact T2	
	B (SE)	p	B (SE)	p	B (SE)	p
Social contact T1	0.064 (0.023)	.006	0.154 (0.057)	.007	0.435 (0.016)	<.001
Verbal skills T1	1.141 (0.166)	<.001	-1.390 (0.362)	<.001	-0.050 (0.258)	.846
Non-verbal skills T1	-0.208 (0.117)	.075	1.817 (0.266)	<.001	0.150 (0.178)	.397

creating peer interaction opportunities for these students (see also Farmer et al., 2018; Schoop-Kasteler & Müller, 2020). However, this potential explanation could not be tested in the current study.

In addition to shedding light on the relationship between social contact and language skills, our results provide insights into the association between verbal and non-verbal language abilities in children and adolescents with ID. Correlations at the beginning of the school year revealed that students with better verbal abilities also exhibited better non-verbal skills. However, in the longitudinal analyses, higher verbal skills at the beginning of the school year were associated with a slight decrease (or a smaller increase) in non-verbal skills. As the correlation between the two domains was positive at T1, one explanation for this result might be that students with generally good language skills had little room for improvement in the more basic non-verbal skills reported on in the measurement instrument (i.e., using gestures and facial expressions for communicative purposes, listening attentively, and understanding instructions). Another reason could be that basic non-verbal forms of communication become less important when a student exhibits high levels of verbal skills.

5. Implications of the study

The present study supports the assumption that more social contacts among students in special needs schools are beneficial to language development. This generally indicates that even in students with congenital or acquired ID, language skills can be positively influenced if a conducive context exists. We did not directly test the mechanism behind this relationship, as we only had data on the number of social contacts but not about how exactly such contacts proceeded and what their quality was. However, interactional models of language acquisition (Vygotsky & Kozulin, 2012) suggest that having more social contacts allows for more opportunities for social interactions with positive peer models and more opportunities to practice linguistic-communicative skills in interactive situations. It therefore appears essential to actively promote social contact between students in special needs schools, both inside and outside the classroom. Special needs teachers have various possibilities for establishing social contacts and fostering interactions between students, for example by providing opportunities for dyadic or group work in class, using specific peer-based interventions, or organizing social games and exchanges during breaks (e.g., Farmer et al., 2018). In addition, for students who lack verbal language augmented and alternative communication (AAC) systems could help facilitate social exchanges with peers (for a systematic review, see Therrien et al., 2016). However, the use of AAC in students with ID is complex and is best implemented by highly experienced teachers. As no data on AAC were collected in the present study, no recommendations can be made in this respect.

Contrary to our assumption, language skills at the beginning of the school year were not related to subsequent development of social contact during the school year. Hence, our data do not speak for a negative cycle in which the social contacts of linguistically weak students progressively diminish, resulting in decreasing opportunities for language learning and increasing social isolation. However, it must be noted that our analyses were based on just one school year and cannot rule out the possibility that over longer time periods, students with low language skills face risk of isolation, with negative social and developmental consequences. It is therefore important that special needs schools have sufficient resources to offer the teacher-student ratios and teacher training necessary to provide adequate opportunities for peer interaction among students with ID with low language skills.

6. Strengths, limitations, and future directions

To our knowledge, this study was the first to examine longitudinal reciprocal influences between social contact and language skills among students with ID in special needs schools. Given the field's major challenges in assessing large enough samples that do not exclude students with profound disabilities in the analyses, a clear strength of this study is the substantial sample size and the inclusion of students with different levels of intellectual abilities. The high participation rate allowed for adequate representation of students from the whole spectrum of ID. This was possible in part because we assessed information on language skills and social contacts using staff reports (teachers and other professionals). While it is a common procedure to assess the language abilities of individuals with ID using staff reports, our approach of also assessing social contacts that way is less common. Most studies that examined samples of typically developing children and adolescents used self-reported data from students, given their clear advantages in providing insights on peer relations (e.g., Cillessen & Marks, 2017). However, use of self-reports was not possible here as many students with a more severe ID cannot report adequate information about their social contacts, which would have reduced our insights to students with mild ID. While there are several promising evaluation studies on teacher reports on peer relations (for an overview, see Hamm & Hoffman, 2016), this rather new procedure, especially as applied to relationships among students with ID, will benefit from further evaluation (e.g., comparison of professionals' nominations with nominations made by students with mild ID). In addition, due to different forms of interaction depending on the students' ability levels, our definition of social contact was rather broad. In order to analyze the nature of social contact as a precondition of social interaction (Sztompka, 2002) in more detail, future studies might additionally assess the duration and quality of peer contacts. The mechanism by which social contact positively influences language development also needs to be examined more closely. Here, direct observation of interactions between students would be desirable. Furthermore, analyses on this subject should be extended to samples from other school settings (e.g., inclusive classrooms) and out-of-school peer relationships.

The present study on the relations between social contact and language development in students with ID provides important perspectives for supporting a student group clearly disadvantaged in terms of language skills and social inclusion. Hence, in addition to extending these findings, future studies should also evaluate school-based interventions that help students with ID have positive peer interactions that contribute to their language development and social inclusion.

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Declaration of competing interest

None.

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