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Reading skills among students with intellectual disabilities



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ABSTRACT

Students with intellectual disabilities (ID) display an extremely wide variety of skills in the field of literacy, and the ability to read and write are central learning aims in the education of students with ID. It is vital to gain detailed knowledge on the literacy skills of students with ID in order to plan instruction, create learning environments, implement educational policies or funding models and specify future fields of research. However, there has been little research into the prevalence and variation of their reading skills. The present study assessed the reading stages of 1629 school-aged students with ID regardless of aetiology (age 6–21) in Bavaria, one of the largest regions in Germany within a randomly chosen and representative sample. Teachers described the reading and writing stages of their students in a questionnaire following the developmental model of Frith. Results indicate that 29.3% do not read at all, 6.8% read at a logographic stage, 31.9% at an alphabetic and 32% at an orthographic level. Writing achievements are lower on average. We analyze and discuss the determinants of literacy in this sample with regard to the sociocultural background of students with ID and draw conclusions for teaching and school policies.

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1. Introduction

Although literacy as an aim in education for students with intellectual disabilities (ID) is non-optional, imponderable questions are related to this subject such as ‘How many students with ID learn to read and write?’ and ‘How well do they read and write?’. Initially, when educational efforts were beginning to be made for these students, literacy was not on the agenda, it was considered too challenging for them (Katims, 2000). Over the last decades more and more brief reports were published and some studies were also conducted describing prevalences in small-scale research (Katims, 2001; Koch, 2008). Broader studies, however, giving reliable and representative answers are still missing.

And still, even the published studies report simplistically on the proportion of students who read and write, and the description is not theoretically framed: To date it is unclear, which developmental stage they attain or how many students read or write at all. The research question of this paper is linked to the developmental model of reading (Frith, 1985) and the three stages for reading which she has described, the logographic, alphabetic and orthographic stages (Table 1). This model is the most common one and therefore may serve well for international discussion.

Frith’s model comprises three stages of reading and writing development. The first stage, “logographic”, is primarily visually, rather than analytically, oriented. Words are learned by rote memory and any visual cue to a word is used and more or less associated with the graphic representation of the word as in well-known logos of large companies. The second stage, “alphabetic”, is much more analytical. During this stage, the phonemes and graphemes are identified in a word element by element so that the children learn to sound out words. The alphabetic stage is often called the

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Table 1

The six-step model of reading and writing acquisition (Frith, 1985, 311) (original formatting).

Step	Reading		Writing
1a	Logographic ₁	→	(Symbolic)
1b	Logographic ₂		Logographic ₂
2a	Logographic ₃	←	Alphabetic ₁
2b	Alphabetic ₂		Alphabetic ₂
3a	Orthographic ₁	→	Alphabetic ₃
3b	Orthographic ₂		Orthographic ₂

'phonological route' (e.g. Roch & Jarrold, 2008). The third and final stage in Frith's model is the "orthographic" stage, where readers have learnt to analyze words from larger units. Letter groupings and word structure become more important for increasingly fluid reading, and therefore it is called the 'visual route'. Table 1 shows the bidirectional relationship between reading and writing.

Frith's model has been subject to discussion. The alphabetic stage represents the core of reading, the allocation of phonemes and graphemes. The role of the logographic stage for this achievement is still under discussion. Masonheimer, Drum, and Ehri (1984) have described the logographic stage as "environmental print"; their research is concerned with the question whether extensive experience with this stage evolves into context-free word reading skills. They showed that children reading on a logographic level had difficulties without cues on the context, especially when logos were not offered. In this case their logographic reading performance dropped dramatically. They argued that extracting information from environmental print is not nearly as complicated, as decoding and interpreting graphemes. Ehri and Wilce (1985) compared prereaders, novices and veterans in kindergarten age and showed that novices and veterans differ substantially from prereaders as they use phonetic cues rather than visual cues. Phonetic cue processing therefore seemed a more important learning mechanism than processing sight words. Alongside this discussion and in response to the German sample of this study it should also be taken into account that the orthography of the German language is far more shallow than the English language. German students spend far less time in the logographic stage as English or American students (Seymour, Aro, & Erskine, 2003).

1.1. Prevalence of reading and writing amongst students with ID

Studies on the reading and writing achievements of students with ID have been sparse and not representative. Present studies tend to focus on reading instruction rather than on prevalences (i.e. Baylis & Snowling, 2012; Browder, Courtade-Little, Wakeman & Rickelman, 2006; Browder, Gibbs, Ahlgrim-Dezell, Mraz, & Flowers, 2009; Goetz, Hulme, Brigstocke, Carroll, Nasir, & Snowling, 2008). Katims (2001) examined a sample of 132 students in Texas and found 22% of them showing the full criteria of "minimal literacy". Byrne, Buckley, MacDonald, and Bird (1995) found an extremely broad variety of reading abilities in 24 students with Down's syndrome, and mention that as many as half of students with DS read at least 50 words (Buckley, Bird, & Byrne, 1996). Koch (2008) also reports extreme differences between two schools for students with ID in Germany. In one school 42% of the students were found to be reading at an alphabetical level, in the other only 7% read at the same stage. Due to the high variation in the reported data within the studies, an overall picture of the reading and writing abilities of students with ID is still missing. Neither the range nor the distribution of reading skills is visible, and different diagnoses for ID have not been taken into account in these studies.

1.2. Methodological issues in the assessment of reading and writing of students with ID

A possible reason for the lack of empirical data may be due to the methodological difficulties, associated with this research question. Assessing skills of students with ID is a difficult task. Intelligence and language range from virtually normal to severe disabilities, and many of the students cannot express themselves. Some of them may take part in standardized test routines, but it is hardly possible to describe a border beneath which students cannot take part in a reliable way. This foggy line is the first methodological problem; the second is the broad heterogeneity of students with ID, combined with all sorts of other variables influencing their learning and development, such as extremely varied sociocultural family backgrounds or further medical diagnoses (Dworschak, Kannevischer, Ratz, & Wagner, 2012).

Individual and qualitative methods could help to solve this problem, but they are extremely laborious and not suitable for creating large samples. On the other hand, teachers of special education often have a high level of diagnostic skills and are used to applying standardized tests and interpreting the results from psychometric testing. They may serve as a more reliable source of information than teachers of regular schools. They work with their students all day and in very small groups, and because of multiple communication problems they know far more about the private life and details of the skills of their students than regular teachers do. All of them are trained in conducting intelligence tests and have mostly assessed the intelligence of their students themselves. In Germany, special education teachers are required to hold a university degree and they are familiar with theories of learning to read and write as referred to in this study.

Finding out how many students with ID learn to read and write is essential for planning the educational process and it becomes even more interesting when these skills are correlated with other variables of learning. Thus, research into the role of gender, and research into the age at which relevant progress in reading and writing is being made, offers vital information for educational concepts at different school ages. Above all, questions arise as to the influence of ID intensity and family affluence. The present study is seeking a comprehensive and representative view on reading and writing skills of students in Bavaria, one of the largest regions in Germany. It asks how many students with ID are able to read and write, and at which reading stage they do this. The aim is to express differentiated statements about the structure of the heterogeneity of students with ID and to determine how gender, age, intensity of ID and family affluence influence the development of literacy.

2. Methods

2.1. Participants and enrolment

The study was conducted in Bavaria, one of the German federal states. With 12.5 million inhabitants Bavaria is one of the largest regions in Germany and contains rural as well as urbanized and metropolitan areas (i.e. Munich) (BBR, 2011). It is further subdivided into seven local districts in Bavaria, differing slightly in their school policies. Bavarian students with ID are able to visit five different types of special education schools: schools for ID, schools for the physically disabled, schools for the blind, and, more seldom, schools for profound ID and schools for mild ID but challenging behaviour. In total, there were 11,074 students with ID in Bavaria in 2012 (Statistisches Bundesamt, 2011). At the time of the investigation (January 2010), the Bavarian school system in the field of special education was highly non-inclusive: nearly all (over 99%) of the students with ID in Bavaria visited one of these special education schools. Inclusive settings could therefore not be involved in this sample. At present, these are gradually being set up in Bavaria, and these changes may be of interest in a follow-up study.

In order to draw a representative sample, we took the three layers *settlement structure, region and school type* into account and combined them as a stratified sampling for complete schools (clusters). From these layers, 20 schools were randomly chosen in all of which a complete assessment took place. Regarding the return rate of 56%, the sample was then weighted to be proportional to the basic ID-student-population in these layers (Statistisches Bundesamt, 2011). 1629 questionnaires in total were finally included in the analysis, representing some 15% of all students with ID in Bavaria.

To avoid reporting trivial effects that only become significant because of the large sample size, we set the level of significance to $p = .01$. Of the total number of participants (Table 2) of which age and gender answers were given ($n = 1612$), 37.7% were female and 62.3% were male – a proportion which is typical for all types of special education schools in Germany (Statistisches Bundesamt, 2011). In the context of ID, this fact is probably due to the higher vulnerability of males to genetic syndromes. The age ranged between 6 and 21 and was 13.0 years ($SD = 3.78$) on average. The female students were slightly older ($M = 13.4$, $SD = 3.76$) than the male students ($M = 12.8$, $SD = 3.78$; $t(1602) = 2.72$, $p < .01$). The teachers were asked to rank the severity of ID of each student according to ICD10. They labelled one third (33.2%) as mild ID, the largest group (36.4%) as moderate ID, 16.3% as severe ID and 13.2% as profound ID. According to the teachers 1% of students had no ID and

Table 2
Participating students with ID ($N = 1629$).

	<i>n</i>	%	Age $\bar{\theta}$	SD
<i>Gender (n = 1612)</i>				
Male	1004	62.3	12.8	3.78
Female	608	37.7	13.4	3.76
<i>Age (n = 1596)</i>				
Age 6–10	548	34.3	8.9	1.50
Age 11–15	631	39.5	13.6	1.78
Age ≥ 16	417	26.1	17.7	1.46
<i>ID (n = 1593)</i>				
No ID	16	1.0	11.3	4.47
Mild ID	529	33.2	12.1	3.74
Moderate ID	579	36.4	13.5	3.60
Severe ID	259	16.3	13.3	3.77
Profound ID	210	13.2	13.9	3.91
<i>FAS (n = 864)</i>				
FAS1	349	40.4	12.5	3.71
FAS2	361	41.7	13.4	3.64
FAS3	154	17.9	13.0	3.56
Total	1612	100.0	13.0	3.78

ID, intellectual disability according to ICD-10. FAS, Family Affluence Scale (Currie et al., 2008).

we assume that there were other reasons for their attendance of special education schools for ID, such as autism, extremely challenging behaviour or severe psychiatric problems. The intensity of ID in male and female students was similar. There was a tendency for students from socio-economic disadvantaged families to have less severe ID (Spearman $r = .134$; $p < .01$).

School placement politics in Germany differs from international psychiatric standards such as the DSM IV. According to [Irblich and Stahl \(2003, 13\)](#) in the understanding of the DSM IV, 85% of the individuals with ID have a 'mild ID', whereas in German schools for ID this group represents only 43%. This difference continues with regard to 'moderate ID' (10% in DSM IV versus 26% in German schools), and yet again with regard to 'severe' and 'profound ID', which taken together represent 5% in the terms of the DSM IV, but 31% in German schools for ID.

The age of the students was grouped according to German school stages, which are roughly similar to elementary, secondary and high school ("Grundschulstufe", "Hauptschulstufe" and "Berufsschulstufe"). The quota of students in these age groups is not consistent as each stage has a different length: the youngest group 4 years (6–10), the middle group five years (11–15) and the eldest group usually only three years (16–18), though sometimes up to 21 years as some students are granted extra time in school. 34.3% of the sample attended the elementary school stage, 39.5% the secondary stage and 26.1% the high school classes.

In comparison with regular schools, there is a very different variety of socio-economic background among students with ID with 40.4% of these growing up in the lowest group (FAS1), compared to 7.8% in regular schools ([Dworschak & Ratz, 2012, 45](#)).

2.2. Measures and procedure

The publication of [Frith's \(1985\)](#) developmental model of reading has sparked the development of other, more differentiated and enhanced models, both in English and in German. In general, more stages have been added, though these can still be traced back to the original three as has been done in this study (see [Table 3](#)). As an assessment tool for reading development, we used [Valtin's model \(2000\)](#), which highly corresponds with [Frith's model \(1985\)](#) and divides reading development into six stages. We chose this model because of its high familiarity among German teachers and its ease of operationalizing reading development.

In order to attain information about the students, a questionnaire was designed addressed to the teachers, one for each student. This questionnaire asked the teachers to label each student in many relevant educational aspects (see below), for reading they were asked to mark which stage according to [Valtin \(2000, see Table 3\)](#) describes their reading and writing best. Additionally, we asked for diagnostic and socio-demographic information such as family affluence, intensity of ID, diagnosis, and behaviour.

Family affluence was measured using the family affluence scale (FAS), which was developed for the 'health behaviour in school-aged children study' (HBSC) of the WHO ([Currie et al., 2008](#)). FAS has originally been devised to be answered by the students themselves and asks for the number of cars in the family, the number of family holidays in the last twelve months, whether children have their own room, and the number of computers in the family. The answers are added up to a maximum of seven, and the score is then converted into an ordinal scale (1, 2 and 3, higher numbers showing more wealth in the family). In contrast to the original use of FAS, these questions were answered by the teachers, who used their background knowledge of the child or asked students and parents.

The questionnaire further contained questions about medical diagnoses. 129 different diagnoses were mentioned by the teachers, concerning 62.1% of the students involved in the study, thus leaving 37.9% without a diagnosis for ID known to the teachers. 82.1% of these diagnoses were prenatal, 10.4% perinatal und 7.5% postnatal. The largest group was Down syndrome with 189 individuals and shall be of interest in further studies. Other diagnoses were quoted too rarely for further analysis, such as Fragile-X-syndrome (17 individuals), Angelman syndrome (12) or Williams syndrome (6).

2.3. Gatekeeper approval and parental consent

The questionnaire and the whole procedure were approved of by the Bavarian federal ministry for school politics. The parents of each participating student had confirmed their consent to the questionnaire.

Table 3
Synopsis of reading and writing stages in [Frith's \(1985\)](#) and [Valtin's \(2000\)](#) model.

Frith	Valtin reading	Valtin writing
	(Student does not read at all)	(Student does not write at all)
	1. Pretends to read	1. Scribbles
1. Logographic	2. Guesses words	2. Draws columns of letters
2. Alphabetic	3. Names phonemes	3. Writes phonemes
	4. Reads letter by letter	4. Phonetic way of writing
3. Orthographic	5. Shows advanced reading abilities	5. Uses orthographic patterns
	6. Automatically identifies words	6. Good orthographic skills

Table 4
Prevalence rates of reading and writing skills of students with ID.

	Not at all (%)	Logographic (%)	Alphabetic (%)	Orthographic (%)	Not at all (%)	Logographic (%)	Alphabetic (%)	Orthographic (%)
<i>Gender (n = 1591)</i>								
Male	29.9	6.7	32.5	30.8	33.2	17.9	36.2	12.7
Female	27.3	7	31.1	34.7	32	15.3	37.7	15.1
<i>Age (n = 1596)</i>								
6–10	30.4	6.3	45.4	17.9	38	20.8	37	4.2
11–15	26.7	5	29.8	38.5	29.4	14.3	40	16.4
≥16	30	10.3	18.6	41.1	31.1	16.5	31.2	21.3
<i>ID (n = 1593)</i>								
None	0	0	30.8	69.2	5.2	0	37.6	57.3
Mild	1.6	3.6	35.8	59	4.4	12.7	54.1	28.8
Moderate	14.6	9.7	45.5	30.2	19.3	26.3	45.7	8.8
Severe	66.5	12.4	16.5	4.6	76.6	15.3	8.1	0
Profound	99.6	0.4	0	0	99.1	0.9	0	0
<i>FAS (n = 864)</i>								
1 (0–3)	20	4	35.2	40.8	23.2	16.8	44.3	15.7
2 (4; 5)	28	6	29.6	36.4	27.8	15.4	37.9	18.9
3 (6; 7)	28.3	5.8	35.8	30.1	33.5	16.9	34.1	15.6
Total (n = 1608)	29.3	6.8	31.9	32	33.1	16.9	36.5	13.5

ID, intellectual disability according to ICD-10. FAS, family affluence scale (Currie et al., 2008).

2.4. Data analysis

We used analyses of variance to determine group differences according to age and school stage and controlled for ID. To contrast intraindividual differences of reading and writing skills, repeated measures were applied. Due to the large sample size, the significance level was set to $p = .01$.

3. Results

3.1. Prevalence of reading and writing skills

According to the teachers, about one third of the students did not read at all (see Table 4; Fig. 1). Roughly the same amount either had a severe or profound ID. With regard to reading, the logographic stage did not play a vital role (6.8%), whereas the alphabetic and orthographic stages each represented about a third (alphabetic = 31.9%; orthographic = 32.0%). 29.3% of the students did not read at all. This proportion was even larger in regard to writing skills (33.1%). The number of students writing at a logographic stage is larger (16.9%) compared to 13.5% on orthographic stage. Reading and writing development is

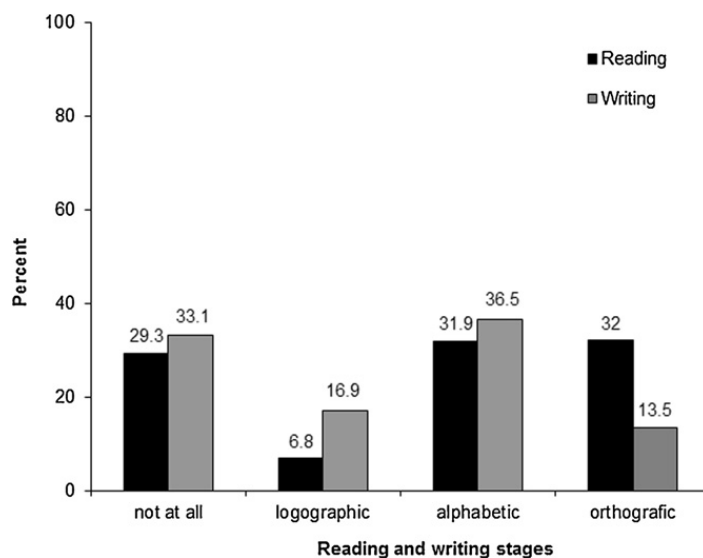


Fig. 1. Prevalence of reading and writing skills amongst students with ID (aged 6–21).

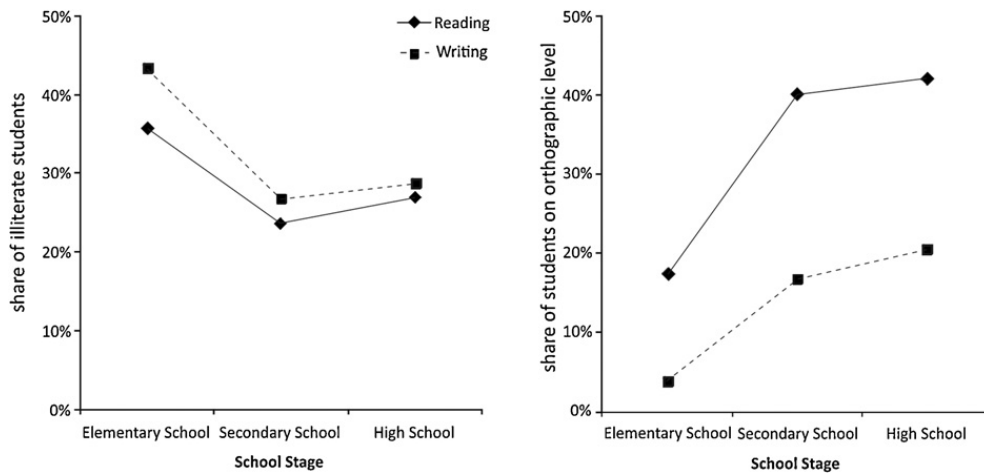


Fig. 2. Share of illiterate students and students on orthographic level across school stages.

highly correlated ($r = .839$; $p < .001$) and the correlation is essentially preserved when controlling for age, gender, ID and family affluence ($r_{\text{part}} = .755$, $p < .001$).

3.2. Gender, age and level of ID

Descriptively, more female students reached the orthographic level in reading (34.7% versus 30.8%) and writing (15.1% versus 12.7%, see Figs. 2 and 3). We computed a multivariate analysis of covariance in order to assess gender differences in reading and writing, with chronological age and level of ID entering as covariates. The covariates turned out to account for the biggest share of variance in reading (level of ID: $F(1, 1562) = 1660.6$, $p = .000$, $\eta^2 = .52$; age: $F(1, 1562) = 118.7$, $p = .000$, $\eta^2 = .07$) and writing (level of ID: $F(1, 1562) = 1870.8$, $p = .000$, $\eta^2 = .55$; age: $F(1, 1562) = 202.5$, $p = .000$, $\eta^2 = .12$). While especially the level of ID exerted a profound influence, there was virtually no gender effect. As a consequence, we excluded gender from further analyses.

3.3. Differential effects of age and ID

There was a significant, albeit low correlation between age and reading ($r = .123$, $p < .001$) as well as age and writing development ($r = .138$, $p < .001$). In order to determine changes in the proportion of illiterate students, we recoded the reading and writing status to contrast complete illiteracy and at least basic reading and writing skill. Within subject differences in reading and writing were analyzed via repeated measures with the inability to read versus the inability to write as the dependent within subject variable, school stage as independent factor and ID as a covariate. Differences in the

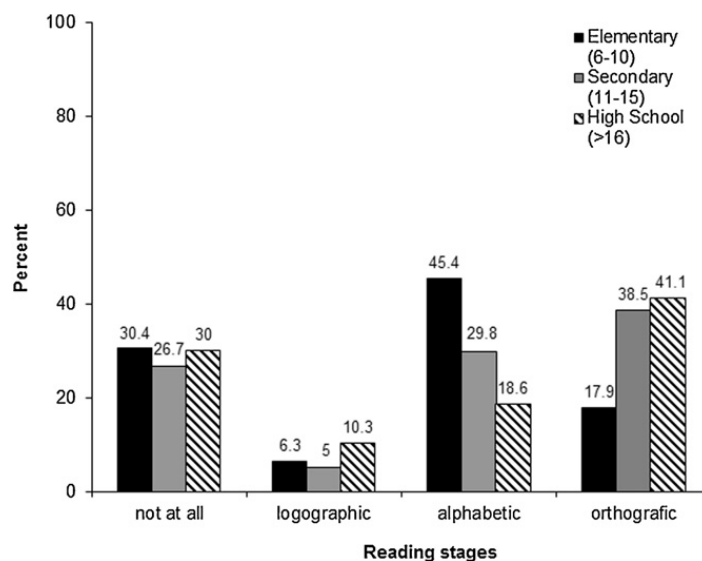


Fig. 3. Reading skills according to age groups amongst student with ID.

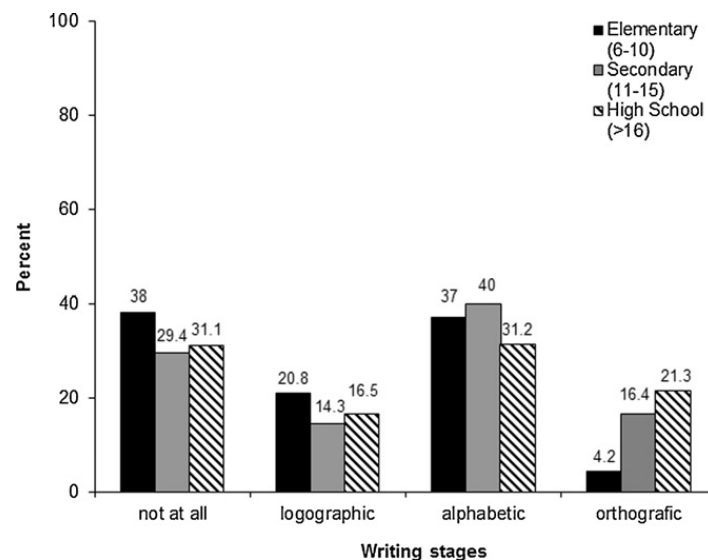


Fig. 4. Writing skills according to age groups amongst student with ID.

share of illiteracy between the different school stages were analyzed via contrasts. In accordance with the expectations, the share of illiterate students was highest in elementary school and students obviously did find it harder to acquire writing skills as compared to reading. Intraindividual differences between the inability to read versus the inability to write failed to reach significance, however.

The covariate *level of ID* accounted for a substantial part of reading and writing illiteracy variance ($F(1, 1592) = 1528.2$, $p < .001$, $\eta^2 = .49$) and the school stage also had an effect ($F(2, 1592) = 33.8$, $p < .001$, $\eta^2 = .04$). The interaction between the within and the between subject factor was small but significant, suggesting a differential development of reading and writing disabilities with time ($F(2, 1592) = 4.7$, $p < .01$, $\eta^2 = .006$). Descriptively, at first the proportion of writing illiteracy was largest in elementary school but it dropped faster than the inability to read and both abilities were on an equal level in secondary school and beyond. The contrasts indicated a significantly lower proportion of reading and writing disabilities in secondary and high school compared to elementary school ($p < .001$), but no differences between secondary and high school.

Repeating this analysis with the proportion of students reaching the highest level of reading and writing yielded even more pronounced effects. Again there is a significant effect of ID and school stage. A considerably larger number of students reached a high level of reading abilities compared to writing ($F(1, 1592) = 247.1$, $p < .001$, $\eta^2 = .14$) and the interaction indicated a widening gap ($F(2, 1592) = 14.5$, $p < .001$, $\eta^2 = .018$): Many more students reached an automatized level of reading but still wrote at an alphabetic or logographic stage and this difference even increased with school stage. The contrasts indicated that these effects were due to the differences between elementary school and secondary school ($p < .001$) (Fig. 4).

3.4. Intellectual disability

As expected and underlined by the effects of the covariate in the previous analyses, the severity of ID is closely related to achievements in reading and writing. Over two thirds (69.2%) of the small group of students without any ID attending these schools read orthographically. The majority of students with mild ID also read orthographically (59.1%), and 35.8% of these read alphabetically. In the group with moderate ID there was a strong tendency towards alphabetic reading (45.4%), whereas most of the students with severe and profound ID were completely illiterate.

3.5. Family affluence

Finally, we analyzed the effect of family affluence on reading and writing. FAS differed with respect to the degree of ID ($\chi^2(4) = 18.2$, $p < .001$): Students with mild mental retardation were overrepresented in families with very poor background. Therefore we applied a multivariate analysis of variance with reading and writing as dependent, FAS as the independent variable and ID as the covariate. After controlling for ID, the family background did not have an effect on reading and writing.

4. Discussion

The aim of the present study was to describe the level of reading and writing skills of students with ID throughout their school years (6–21 years). Different developmental models of reading were used; first, teachers were asked to rate their

students according to a German derivation of Frith's model with six stages of reading and writing (Valtin, 2000), these data were then transformed to Frith's model.

The percentage of students with severe or profound ID is very stable in all age and gender groupings. The vast majority of these students do not read or write at all, a finding which is reflected throughout all groups. Exceptions in these two groups may represent individual developmental disabilities such as autism, maybe also in some cases very optimistic and "pedagogical" views of several teachers.

The aspect of gender was marked by the fact that there are nearly twice as many male students in schools for ID. This quota is nearly exactly the same as in all types of special education schools in the whole of Germany (Statistisches Bundesamt, 2011). No significant differences exist between the male and female students regarding their development of reading and writing when controlling for age.

In this study reading and writing abilities grow from elementary school to secondary school and hardly progress from this level later on. This cross sectional finding suggests a steady progress in reading and writing from elementary to secondary school. The relative stability of these skills afterwards does not indicate that promoting literacy is not essential in high school. In our view, this is still important into order preserve the attained skills. As expected, the severity of ID had the most pronounced impact on the development of reading and writing. Across all ID groups, older students show higher reading and writing abilities than younger students.

The results showed that there is a very distinct distribution of family affluence as measured with FAS (Currie et al., 2008) in schools for students with ID: A much higher proportion of students come from disadvantaged families as compared to regular schools. But this does not influence their reading and writing development and there was no difference between students from diverging family backgrounds.

4.1. The Frith model

One question which arises is whether the findings correspond to the theoretical assumptions of Frith's underlying model of the development of reading and writing. In her model reading and writing develop in turns with each other and therefore seem to develop as a whole.

At the first sight, the results of this study seem to contradict this assumption of the Frith-model. For example in the mild ID-group according to the teachers' judgments far more children read than wrote on an orthographic level. Looking closely at her model it turns out that the path of development which can be seen in Table 1 shows the orthographic reading step before the orthographic writing step, implying writing being more challenging than reading on an orthographic level. According to this view it turns out that these findings do correspond well to Frith's model, however, this could equally well be a result of additional physical disabilities that may negatively affect hand writing and thus lead to a lag in development compared with reading.

Yet another aspect may have an influence on the writing. Teachers may possibly value reading abilities higher than writing and in consequence spend more lesson time on reading than on writing. This may be due to the fact that reading is assumed to be more necessary than writing in everyday life.

4.2. Study limitations

Several methodological limitations of the current study must be mentioned. First, the data was acquired with a cross sectional design. Therefore the differences between the age groups do not represent the development in reading and writing of the same students, rather they show group differences. Although the return rate amounted to 56% this does not affect the proportionality of the sample, as the data have been weighted in accordance to the layers of the stratified sample.

A second question is the comparability of reading and writing in German and English. Wimmer, Hartl, and Moser (1990) have discussed this matter in a study and pointed out that in German the logographic stage plays a less prominent role than in English "because the German writing system in contrast to the English one is phonologically rather transparent" (Wimmer et al., 1990, 164; see also Landerl, Wimmer, & Frith, 1997 and Seymour et al., 2003). This fact has to be considered when comparing our data with samples from other language systems. However, it does not limit our results as we only considered the German language.

The role of the logographic stage as a whole has been discussed above, referring to Masonheimer et al. (1984) and Ehri and Wilce (1985). The environmental background of a child is responsible for giving the opportunity to sight logographic symbols ("environmental reading"), and one can assume that there will be some coincidence with the sociocultural background of students with ID being far more disadvantaging (see also Ricci, 2011). But this aspect cannot be traced. Neither has the phonological awareness been taken into account, which is an important predictor for reading.

The FAS-scale was originally designed to be answered by the children themselves. For various reasons the questions in this study were given to the teachers, assuming them to know their students far more closely than in other school types (see above). Indeed, the amount of missing answers especially on this subscale ($n = 844$) establishes a limitation on the conclusions in connection with family affluence. This may be due to teachers not knowing the answers for many of their students after all. A certain number of teachers also refused to answer these questions for unknown reasons. Nevertheless, no systematic reason could be found to explain these missing answers, therefore it is assumed that they occur randomly.

5. Conclusion

Evidence is found that students improve their abilities in reading and writing with age. Therefore it can be assumed that progress takes place during a large span of school years, concerning two thirds of the students. This information leaves room for optimism: Reading and writing instruction is efficient even in children with ID. This insight is vital for enhancing school concepts for students with ID—either in inclusive or specialized settings. Up to high school age students with ID benefit from an environment which stimulates their reading and writing and also directly fosters these skills and, afterwards, the skills are persevered. Alongside other goals such as self-determination, autonomy and occupational integration, fostering reading and writing therefore remains an essential principle for the entire school years.

Future research may take interest in the question about the difference between reading and writing shown by these students with ID and account for further determinates and dependant measures, such as phonological awareness as well as reading comprehension. This could be of even more interest in subgroups of students with ID, especially in regard to Down syndrome.

As a consequence of the United Nations “Convention on the Rights of Persons with Disabilities” (UN, 2006) that was also ratified in Germany, the school system faces a complete restructuring. It would be fascinating to replicate this study in some years time in order to determine the effects of inclusion on reading and writing skills. These changes can be investigated using the same methodology in the next years.

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