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Effects of anxiety, language skills, and cultural adaptation on the development of selective mutism

Anja Starke

Department of Language and Communication, School of Rehabilitation Sciences, TU Dortmund University, Germany

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ABSTRACT

Although bilingual children are thought to be at higher risk for selective mutism (SM), little is known about the development of SM in this population. This study investigates the effects of children's anxiety and language skills and parents' cultural adaptation on the development of SM. 15 bilingual (11 mute, 4 speaking at the beginning of the study) and 15 monolingual children (7 mute, 8 speaking at the beginning of the study) between the ages of 3 years and 5 years 8 months were assessed longitudinally over a 9-month period. Children's anxiety and parents' cultural adaptation were examined via parent questionnaires. Receptive language skills were assessed with a standardized test. Every 3 months, parents and preschool teachers reported on the children's speaking behavior via questionnaires. Anxiety best predicted the development of mute behavior. There was no effect of bilingual status on its own. The effect of language skills did not reach significance but was considerably higher in preschool settings in comparison with family and public situations. Results also indicated an association between parents' orientation to the mainstream culture and children's speaking behavior in preschool. Level of anxiety might function as an early indicator of SM, especially in bilingual children, when information on language proficiency is scarce. There is still a need for intensive research in order to further the understanding of the development of SM in bilingual children.

1. Introduction

Selective mutism (SM) is a rare anxiety disorder that typically begins between the ages of 3 and 4 (Ford, Sladeczeck, Carlson, & Kratochwill, 1998; Steinhausen & Juzi, 1996). It is characterized by a failure to speak in specific social situations while speaking in others: Children with SM usually speak at home but refuse to do so in school or in the presence of adults or strangers (Dummit et al., 1997). Prevalence rates range from 0.18% (Kopp & Gilberg, 1997) to 1.9% (Kumpulainen, Räsänen, Raaska, & Somppi, 1998) and tend to vary according to diagnostic criteria and recruitment strategies. Current research has suggested a prevalence rate of around 0.7% (Bergman, Piacentini, & McCracken, 2002; Elizur & Perednik, 2003).

There is some evidence that immigrants and bilinguals are overrepresented among children with SM (Bradley & Sloman, 1975; Dummit et al., 1997; Steinhausen & Juzi, 1996; Toppelberg, Tabors, Coggins, Lum, & Burger, 2005). Descriptive studies of children with SM have reported a relatively high proportion of immigrant or bilingual children (Dummit et al., 1997; Steinhausen & Juzi, 1996). In their community-based study, Elizur and Perednik (2003) found a prevalence rate four times higher in immigrant, bilingual children (2.2%) compared with native, monolingual children (0.47%) in Israel. Although many studies have suggested a high risk for immigrant children, little is known about the association between immigration status or bilingualism and the development of SM.

In addition, there is a second construct describing silence in children who are learning a second language: the silent or nonverbal

E-mail address: anja.starke@tu-dortmund.de.

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period (Roberts, 2014; Tabors, 2008; Toppelberg et al., 2005). The silence is thought to be a result of limited language proficiency in the beginning of second-language acquisition. It is often described as shorter than 3 months and is most frequently found in 3- to 8-year-olds (Le Pichon & de Jonge, 2015). So far, it is unclear which factors distinguish a typical silent period in second-language acquisition from SM.

Bradley and Sloman (1975) argued that immigrant families experience a "cultural shock" due to the lack of familiar cues in the new environment, and this may lead to stress and emotional maladjustment. In line with this idea, Elizur and Perednik (2003) found higher levels of social anxiety in immigrant children with SM compared with native children with SM and controls despite the fact that the immigrant children showed similar levels of social competencies and did not exhibit excessive signs of neurodevelopmental delays compared with the immigrant children and native controls. Therefore, they proposed that SM develops along different pathways in immigrant and native children and that both groups have a predisposition for social anxiety. Elizur and Perednik (2003) suggested that second-language acquisition is a leading stressor for immigrant children. Linguistic insecurity due to second-language acquisition combined with a predisposition for social anxiety may lead to SM.

1.1. Social anxiety

Social anxiety is one of the most common comorbid disorders in children with SM (e.g., Black & Uhde, 1995; Cohan et al., 2008; Kristensen, 2000). So far, it is not clear whether social anxiety is a causal factor or a condition that results from SM, or perhaps the two phenomena are simply comorbid. A social anxiety disorder is defined as persistent anxiety about one or more social situations in which a person is exposed to possible scrutiny by others. The person explicitly fears possible negative reactions to his or her behavior, and if the person is a child, this child might react with crying, trantrums, or a failure to speak. Social anxiety disorder is usually first diagnosed around the ages of 8–15 (American Psychiatric Association, 2013).

There are mixed findings regarding the extent of social anxiety in selectively mute children. In a study by Vecchio and Kearney (2005), all children with SM had an additional diagnosis of social anxiety disorder. A considerably lower proportion of comorbid social anxiety disorder was found by Kristensen (2000). In her study, 67.9% of the children with SM fulfilled all diagnostic criteria for social anxiety disorder. Yeganeh and colleagues conducted two studies to examine the association between SM and social anxiety. In both studies, they did not find any significant differences between children with SM and children with isolated social anxiety disorder on self-report measures (Yeganeh, Beidel, Turner, Pina, & Silverman, 2003; Yeganeh, Beidel, & Turner, 2006; see also Manassis et al., 2003). Significant differences were found only for parent and clinician ratings. Parents and clinicians rated children with SM as significantly more anxious than children with isolated social anxiety disorder. By contrast, significantly higher levels of social anxiety in children with an isolated social anxiety disorder compared with children with SM were found in a study by Melfsen, Walitza, and Warnke (2006). All studies suggested that most of the children with SM showed some kind of social anxiety.

In contrast to previous suggestions that SM is an extreme form of a social anxiety disorder (e.g., Black & Uhde, 1995; Dummit et al., 1997; Ford et al., 1998), recent results have indicated that SM is a distinct anxiety-related disorder (Sharp, Sherman, & Gross, 2007). Cohan et al. (2008) identified three subgroups of SM that share some kind of anxiety but differ in additional problems: (a) anxious-mildly oppositional, (b) anxious-communication delayed, and (c) exclusively anxious. This finding emphasizes the high comorbidity of SM with other—especially developmental—disorders (Kristensen, 2000; Manassis et al., 2003, 2007; Sharp et al., 2007; Steinhausen & Juzi, 1996).

1.2. Speech and language disorders

Speech and language disorders are relatively common in selectively mute children. Roughly 30%–50% have been found to show different speech and/or language disorders (Andersson & Thomsen, 1998; Kristensen, 2000; Kumpulainen et al., 1998; Manassis et al., 2003; Steinhausen & Juzi, 1996) with expressive language disorders and speech sound disorders as the most frequent (Andersson & Thomsen, 1998; Kristensen, 2000; Steinhausen & Juzi, 1996). Therefore, besides genetic factors and a predisposition for social anxiety, speech and language disorders are considered important risk factors in the development of SM (Cohan, Chavira, & Stein, 2006; Sharp et al., 2007).

1.3. Bilingualism and second-language acquisition

Bilingualism can emerge through different developmental pathways. Timing and amount of exposure are two main factors that influence language proficiency in bilinguals. Children with relatively equal exposure to two languages before 3 years of age are referred to as simultaneous bilinguals (Baker, 2006) and demonstrate age-appropriate language development in both languages that is nearly on par with that of monolingual children (see DeHouwer, 2009, for review). Sequential bilingualism is identified when a child's exposure to a second language (L2) occurs at age 3 or later, after the child's first language (L1) is already well established (Paradis, Genesee, & Crago, 2010). Children's abilities in a language depend to a large extent on the amount of exposure in the respective language as well as the minority status of the language (see Kay-Raining Bird, Genesee, & Verhoeven, 2016, for a review). Especially in sequential bilinguals, the minority L1 can be at risk once children start to learn a majority L2.

Speech and language disorders are not more common in bilingual children (Korkman et al., 2012; Paradis, 2007), but deviations from formal language use are typical over the course of sequential second-language acquisition. Learning a second language is a challenging task, especially for shy children. Their skills in their second language tend to be poorer, and their second-language acquisition tends to be slower in comparison with their nonshy peers (Keller, Troesch, & Grob, 2013; Strand, Pula, Parks, & Cerna,

2011; Tong, Ting, & McBride-Chang, 2011). Strand et al. (2011) found a negative relation between shyness and receptive language development in preschoolers. Keller et al. (2013) found lower receptive and expressive language skills in the L2 in shy compared with nonshy age-matched preschool children. The longitudinal data showed a lag of over half a year between the shy and nonshy children at the first assessment and an increased gap at the next assessment point 16 months later. Therefore, shyness is an important risk factor in second-language acquisition.

In addition, there is some evidence that second-language learners show more withdrawal and anxious behavior in the L2 context than their monolingual peers do (Ash, Rice, & Redmond, 2014; Spomer & Cowen, 2001). Spomer and Cowen (2001) argued that the "exposure to a new language, culture, peers, and other school unknowns predisposes (.. .) [second-language learners] to anxious, withdrawn behaviors" (p. 79). Withdrawal and shyness have been found to lead to fewer interactions with peers (Asendorpf & Meier, 1993; Coplan, Prakash, O'Neil, & Armer, 2004; Gazelle & Ladd, 2003) and thus to fewer opportunities for second-language learning.

Many authors have described a silent or nonverbal period over the course of second-language acquisition (see Roberts, 2014, for a review). Tabors (2008) suggested four periods in second-language acquisition: First, children try to use their L1 in the L2 context. Once they realize that their L1 is not suitable in their interactions with L2 speakers, most of the children enter a *nonverbal period*. Comparable to first-language acquisition, children first acquire receptive language skills and speak only a few words in the L2. Many children develop a nonverbal communication system (e.g., use of gestures), which thereby allows for social interaction. Social interactions with peers are crucial for second-language acquisition. On the one hand, it provides a certain input in the L2, and on the other hand, it may increase a child's motivation to speak (Paradis et al., 2010). The nonverbal period lasts a few weeks to several months and tends to persist even longer in young children. The third period, *formulaic language use*, is characterized by words and short utterances often with an imitative quality or standard phrases with increasing flexible attachments. In the last period, *productive language use*, children use a broad range of words and phrases.

Although many authors have suggested the presence of a nonverbal or silent period in second-language acquisition, information about its presence, duration, and causal factors is scarce (Le Pichon & de Jonge, 2015; Roberts, 2014). Many studies have failed to clearly define the silence, and thus, research has yet to determine the extent to which children can or cannot speak in the L2 or whether silence means an absence of spoken language. Similarly, there is little information on the nature of SM in bilingual children. Children with SM most commonly refuse to speak in unfamiliar settings (e.g., preschool; Dummit et al., 1997; Ford et al., 1998), the context in which sequential bilingual children learn their L2. Hence, refusal to speak in the L2 context may be a sign of SM, or else it may be a typical developmental stage in second-language acquisition.

An additional problem in diagnosing SM in sequential bilingual children and differentiating it from typical phenomena in second-language acquisition is the ambiguous DSM criterion D. According to this criterion, failure to speak cannot be attributed to a lack of knowledge of or comfort with the spoken language required in the social situation (American Psychiatric Association, 2013). But again, a clear definition of the extent to which language proficiency is needed to fulfill the criterion and how to interpret or assess a child's comfort with the language have yet to be provided. Toppelberg et al. (2005) argued that many sequential bilingual children usually do not feel fully comfortable in the L2 after 6 months or more. However, this lack of comfort does not warrant silence. The authors highlighted that true SM in bilinguals is characterized by a failure to speak in both languages, in several social situations, and for more than 6 months. They recommended a detailed assessment of both languages to exclude language disorders that have the potential to have large deleterious effects on second-language acquisition.

1.4. Culture

Besides second-language acquisition and social anxiety, a third factor has to be kept in mind when discussing SM in bilingual children. Not all, but the bulk of bilingual children, live in two or more different cultures. Culture shapes people's realities, and its influence can be seen in, for instance, behavior, beliefs, and social structures. Parents strive to encourage behavior and beliefs in their children, thus enabling them to participate in the society of the family (Deater-Deckard et al., 2011). For immigrant families, child-rearing beliefs and behavior depend considerably on the parents' orientations to the two or more cultures they are living in.

Cultural adaptation describes the process that is triggered by immigration. It consists of two parallel processes: (a) adapting to the mainstream culture (acculturation) and (b) maintaining the culture of origin (enculturation; Calzada, Brotman, Huang, Bat-Chava, & Kingston, 2009). Cultural adaptation is considered an important factor in parenting (Huang, Calzada, Cheng, Barajas-Gonzalez, & Brotman, 2016; Ispa et al., 2004; Xu & Krieg, 2014). The parents' cultural adaptation strategy frames the cultural content of the learning environment at home (Becker, Klein, & Biedinger, 2013) and therefore plays a significant role in child development.

In his theoretical model, Berry (1997) proposed four different cultural adaptation strategies that result from the interaction between the different levels of orientation to the mainstream culture and culture of origin: biculturalism, assimilation, separation, and marginalization (see Fig. 1 for more information). Biculturalism and assimilation are both characterized by a strong orientation to the mainstream culture while simultaneously managing to hold on to the culture of origin. Therefore, biculturalism reflects a high level of cultural adaptation and is thought to be a protective factor in child development (Calzada et al., 2009). In one study, children of bicultural parents showed less internalizing behavior and higher levels of adaptive behavior compared with children of non-bicultural parents (Huang et al., 2016). The assimilation of the parents has been found to contribute to higher levels of social competence (Pawliuk et al., 1996) and greater language proficiency (Becker et al., 2013; Oades-Sese & Li, 2011) in children. The familial environment in assimilated families is characterized to a large extent by the mainstream culture.

Language proficiency, especially vocabulary size, greatly depends on the extent of input in a certain language (Duursma et al., 2007). In assimilated families, the use of the mainstream language is probably very high, leading to greater—if not only—input from the mainstream language and thus resulting in monolingualism. Similar developmental pathways are possible for social behavior.

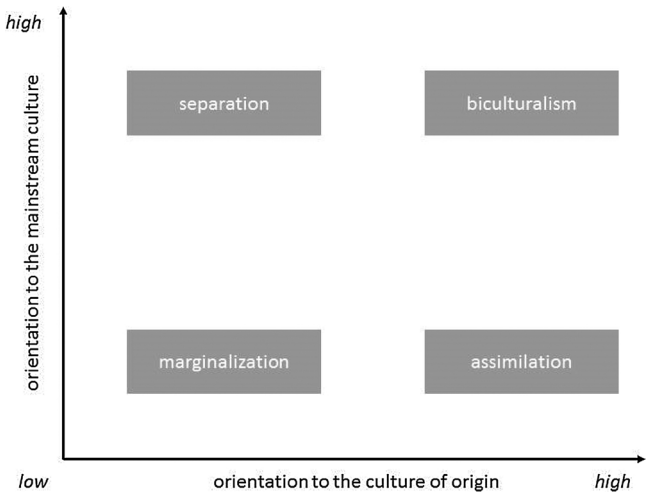

Fig. 1. The four different cultural adaptation strategies.

Thus, a high orientation to the mainstream culture with or without maintaining the culture of origin seems to have a positive influence on children's social behavior as measured by the mainstream culture. A low orientation to the mainstream culture is associated with more internalizing behavior, lower language proficiency, and lower levels of social competence. Therefore, it may be an important risk factor in the development of SM.

1.5. Aim of the study

In this first longitudinal study, my aim was to investigate the development of SM in mono- and bilingual preschool children. Therefore, mute children were assessed in their first year of preschool or after transitioning from one school to another. I assumed that over the course of this year, sequential bilingual children, who show mute behavior as a sign of a typical nonverbal period in second-language acquisition, should begin to talk in various settings in preschool. By contrast, bilingual children with SM should remain mute in specific social situations in preschool. I focused on the influence of anxiety, language skills, and parents' cultural adaptation on the development of speaking behavior in family and preschool settings. Bilingual as well as monolingual children were included to analyze general or differentiated effects of anxiety and language skills in both groups. In line with the existing findings (see Elizur & Perednik, 2003), I hypothesized that anxiety would be the primary factor of influence in the development of SM in mono- as well as in bilingual children (H1). I further hypothesized that the highest levels of anxiety would be found in children with SM at the end of the study and considerably lower levels would be found in positively developing children and controls (H2).

Language proficiency is thought to be the second most important risk factor in the development of SM. Elizur and Perednik (2003) supposed that speech insecurity in selectively mute immigrant children combined with a predisposition for social anxiety contributes to the development of mute behavior. In line with this idea, I hypothesized that language skills in the mainstream language would influence children's speaking behavior, especially in the preschool setting (H3). Children with greater language proficiency were expected to show less mute behavior and to develop positively over the documented period. The effect of language proficiency in the mainstream language is assumed to be greater in preschool settings because of the necessity to use this language in this context. In addition, it is possible for the children to compare their language skills with each other. At home, shy and sensitive children might not worry about mistakes. But in their peer groups, proficiency matters.

In line with existing findings on the effects of parents' cultural adaptation on child development (Becker et al., 2013; Calzada et al., 2009; Oades-Sese & Li, 2011; Pawliuk et al., 1996). I hypothesized that a low orientation to the mainstream culture would be associated with higher levels of mute behavior, and by contrast, a high level of orientation to the mainstream culture would be associated with higher levels of speaking behavior (H4). I expected this to be more evident in preschool settings where the mainstream culture shapes a child's daily environment.

2. Method

2.1. Procedure

To evaluate the development of SM, mono- and bilingual children were recruited early in their first year in preschool or after transitioning from one school to another. About 300 preschools in the urban Ruhr area in Germany were first informed about the study via mail. Approximately 2–3 weeks later, schools were contacted via phone to ask about potential children. The inclusion criteria for mute children were (a) not speaking in preschool settings and (b) speaking at home with parents and siblings. Children with a known mental or developmental disorder or disability were excluded. If there was a mute child in the institution, teachers

were asked to select a control child who matched the mute child on gender, age, and bilingualism. Appropriate numbers of written forms were then sent to the schools to inform potential families about the study. If the parents were interested in participating in the study, the author contacted the families by phone to make a first appointment with the parents. If the parents of a control child refused to participate in the study, teachers were asked to select another control child. Despite a great deal of effort put forth by the teachers, it was not possible to find as many bilingual control children as there were bilingual mute children.

The assessment was composed of three steps: (a) interview with the parents to collect information about the families and children, (b) direct assessment of the child, and (c) administration of the teacher questionnaire. At the first appointment parents were informed orally and in writing about all aspects of the study procedure, privacy, as well as the potential risks and benefits of participating, and signed an informed consent form in accordance with the Declaration of Helsinki (World Medical Association, 2014). After giving their written consent, they filled out several questionnaires on their family's sociodemographic background and their child's development, anxiety, and speaking behavior. For bilingual parents, the author helped them understand the written questionnaires if necessary. To evaluate the bilingual background of the child, the interviews with the parents were based on the ICOM (Input contexts in multilingualism; Ritterfeld, Lüke, & Schnöring, 2015). In addition, immigrant families filled out the Frankfurt Acculturation scale (Bongard, n.d.; Bongard, Kelava, Sabic, Aazami-Gilan, & Kim, 2007) as a measure of their cultural adaptation.

The direct assessment was composed of two parts: (a) a standardized play session and (b) an evaluation of the children's language skills. The standardized play session was conducted to analyze the interactional behavior of the child and was part of another study.

Parent and teacher questionnaires were administered four times spaced 3 months apart to assess the children's speaking behavior in their families and in the preschool setting. DSM-V (American Psychiatric Association, 2013) criteria were assessed directly at the beginning and end of the study to determine whether or not an SM diagnosis was present. The DSM-V includes the following criteria for the diagnosis of SM: (a) consistent failure to speak in specific social situations in which there is an expectation of speaking despite speaking in other situations, (b) the disturbance interferes with educational or occupational achievement or with social communication, (c) duration of at least 1 month (not limited to the first month of school), (d) failure to speak is not attributable to a lack of knowledge of or comfort with the spoken language required in the social situation, and (e) disturbance is not better explained by a communication disorder and does not occur exclusively during the course of an autism spectrum disorder, schizophrenia, or another psychotic disorder (American Psychiatric Association, 2013, p. 195).

To address the specific problem of differentiating SM from a typical silent period, I followed Toppelberg et al.'s (2005) suggestions. According to them, silence needs to last for at least 6 months and should be present in unfamiliar settings in L1 and L2. With regard to duration, I added 3 months (longitudinal data over 9 months) to avoid the overestimation of SM. Data from the parent interviews, the parent and teacher questionnaires, and the children's behavior in the play session with the author and results from language testing were considered for the diagnosis. In line with the study design, a diagnosis of SM could not be confirmed for all children who showed mute behavior at the beginning of the study. In some cases, their German language skills were simply not sufficient. Others had just started learning German or had just started preschool so that mute behavior could also be interpreted as a transitional phenomenon. Thus, some of the children were identified as "mute" but not as "selectively mute" at the beginning of the study. At the end of the study, children were assigned to one of three groups: (a) children with SM, (b) positively developing children (i.e., they started to talk in various settings in preschool), and (c) control children. At the end of the study, the parents of all children were informed about the development of their children in the documented 9-month period and were advised about further assessments and treatments if necessary.

To ensure confidentially of the data all written information (e.g. questionnaires) pseudonymization was used before archiving. Video data was saved as well saved as pseudonyms on an external storage. Written and video data was stored in a lockable closet at the university and was only accessable for project staff.

2.2. Sample

The sample consisted of 30 children between the ages of 3 years and 5 years 8 months in 14 preschools. Seventeen children had an immigration background with parents from 10 different countries; 35.3% of the families had a Turkish background, and 29.4% came from another Arabic country. Four families came from Southern Europe, one from Eastern Europe, and one from West Africa. Fifteen of the 17 immigrant children were bilingual, with Turkish and Arabic as the most often spoken non-German languages. The nine sequential bilingual children had been learning their L2 for $Mdn = 16$ months (Range 2–19 months). At the beginning of the study, 18 children showed mute behavior in preschool settings. The remaining 12 children formed the control group. Gender, age, type of second-language acquisition, and immigration status are presented in Table 1. At the first assessment point, six bilingual and two monolingual children met all of the DSM-V criteria for SM.

The four groups did not differ significantly on age ($H(3) = 1.78$, *ns*), or gender ($\chi^2(3) = 1.95$, *ns*). The groups showed a significant difference in cultural capital ($H(3) = 11.54$, $p = .009$). Post hoc tests revealed that the only significant difference in cultural capital was between mute bilingual children and monolingual controls ($p = .029$, $r = -0.65$).

2.3. Measures

The sociodemographic parameters of the participants were evaluated with a parental questionnaire (including cultural capital and a part for assessing speaking behavior as described below) developed by the author. The children's anxiety was measured with the BAV 3-11 (Das Bochumer Angstverfahren für Kinder im Vorschul- und Grundschualter [Bochum Anxiety Measure for Preschool- and School-Age Children]; Mackowiak & Lengning, 2010), receptive language skills with the TROG-D (Test zur Überprüfung des

Table 1
Age, Gender, and Second-Language Acquisition.

	Mute children		Control	
	Bilingual $n = 11$	Monolingual $n = 7$	Bilingual $n = 4$	Monolingual $n = 8$
Gender	8 f (72.7%)	5 f (71.4%)	2 f (50.0%)	7 f (87.5%)
	3m (27.3%)	2m (28.6%)	2m (50.0%)	1m (12.5%)
Age in months	51.00	41.00	52.50	37.25
(*Mdn*)	(*IQR* = 10.00)	(*IQR* = 13.00)	(*IQR* = 19.50)	(*IQR* = 16.50)
Type of second-language acquisition	3 simultaneous (27.3%)		2 simultaneous (50.0%)	
	8 sequential (72.7%)		2 sequential (50.0%)	
Immigration background	11 (100%)	1 (14.3%)	4 (100%)	1 (12.5%)
Immigrant generation				
First	1 (9.1%)	0 (0%)	0 (0%)	0 (0%)
Second	7 (63.6%)	1 (14.3%)	3 (75.0%)	1 (12.5%)
Third	3 (27.3%)	0 (0%)	0 (0%)	0 (0%)
Main input in German	6 (54.5%)		3 (75.0%)	
Another language	5 (45.5%)		1 (25.0%)	

Note: f = female, m = male, Mdn = median, IQR = Interquartile range.

Grammatikverständnisses [Test for Reception of Grammar]; Fox, 2007), parental cultural adaption with the Frankfurt acculturation scale (FRAKK20; Bongard, n.d.); and speaking behavior in preschool situations with the DortMuS-Kita (Dortmunder Mutismus-Screening für Kindertageseinrichtungen [Dortmund Mutism-Screening for Preschools]; Starke & Subellok, 2018).

2.3.1. Cultural capital

The number of books in the household was used as an indicator of a family's sociodemographic background. Parents rated the number of books on a 5-point scale ranging from 0 (*zero or a few books*) to 4 (*over 200 books*) supported by pictures of shelves filled with books (Paulus, 2009).

2.3.2. BAV 3-11

The BAV 3-11 (Mackowiak & Lengning, 2010) parent questionnaire was used to measure the children's anxiety. The instrument consists of 26 items describing typical anxiety-provoking situations on four subscales: (a) social fears, (b) cognitive fears and sorrows, (c) fear of injury and physical impairment, and (c) phobias. Parents were asked to rate the child's anxiety on a 5-point rating scale ranging from 1 (*positive*) to 5 (*very anxious*). To evaluate the children's anxiety, the parents' ratings had to be recoded—the levels *positive* and *neutral* were coded 0, and the anxiety-related levels were coded so that they ranged from 1 to 3 (1 = *a little anxious*, 2 = *somewhat anxious*, 3 = *very anxious*). Age-standardized scores (*t* scores and percentile ranks) are provided for different age groups and gender, and thus, the children's scores were also converted to *t* scores for this study. Scores between 40 and 60 are classified as falling within the normal range. Scores above 60 reflect an elevated level of anxiety compared with age-matched children. Because the subscales did not demonstrate satisfactory reliabilities, the BAV 3-11 total score was the only anxiety measure that was used in further analyses. The total scale was previously shown to have satisfactory internal consistency ($\alpha = 0.80$; Mackowiak & Lengning, 2010) and sufficient convergent and discriminant validity.

2.3.3. TROG-D

The TROG-D (Fox, 2007) is the German version of the TROG-2 (Bishop, 2003). The TROG-D is a norm-referenced standardized test for assessing receptive grammar skills in children between the ages of 3 and 10. It consists of 84 items in 21 blocks. Each block is used to evaluate one particular grammatical structure that depends on function words, inflection, or word order. Items are provided auditorily. The child is asked to choose the appropriate one out of four pictures. The grammatical or lexical forms of the distractors differ minimally from the target item. The test provides age-standardized scores (*t* scores). Scores between 40 and 60 are classified as falling within the normal range. Scores below 40 are classified as falling in the clinical range. Although the TROG-D was standardized for monolingual children, age-standardized scores were also used for the bilingual children in this study. However, the scores in the clinical range were not interpreted pathologically.

2.3.4. FRAKK20

The FRAKK20 (Bongard, n.d.) consists of 20 items on the two subscales orientation to the culture of origin (e.g., "I generally live according to the traditions of my native country") and orientation to the mainstream culture (e.g., "I feel accepted by my German fellows"). Parents rated themselves on a 7-point Likert scale ranging from 0 (*does not apply at all*) to 6 (*fully applies*). Negative items are recoded before subscale scores are summed and before scores are summed to form the acculturation index. Scores on the subscales reflect the significance of the respective culture in the person's daily life. Higher scores on the subscales indicate that the respective culture is very important in the person's life. The acculturation index as the total score of the FRAKK20 reflects that extent to which the person has exhibtied cultural changes. According to Bongard (n.d.), the internal consistency of the subscales and the total scale are good (α ranges from 0.85 to 0.89). The FRAKK20 provides translations in eight languages. If possible, parents received a version in their L1.

2.3.5. Parent questionnaire

Parents rated the speaking behavior of their child for 18 items that were rated on a 5-point Likert scale ranging from 0 (*completely disagree*) to 4 (*completely agree*). The items covered different social situations in the context of family (e.g., "My child refuses to speak with adult relatives"), the neighborhood (e.g., "My child greets neighbors without my request"), and in public (e.g., "My child whispers to me in the presence of strangers") and were constructed as positive and negative items (see the Appendix for a list of all items). The answers to the negative items were recoded. The scores on all items were summed for further analyses. Higher scores on the parent questionnaire were considered to reflect frequent mute behavior. Internal consistency was good to excellent at all four time points ($\alpha_{t1} = 0.945$ $\alpha_{t2} = 0.89$, $\alpha_{t3} = 0.93$, $\alpha_{t4} = 0.94$).

2.3.6. DortMuS-Kita

The DortMuS-Kita is a German teacher report form that is used to assess children's speaking behavior in preschool settings. It consists of 17 positive and negative items on the two subscales (a) mute behavior and expression of needs (e.g., "The child talks to other children while playing" or "The child talks to the teachers of other classes") and (b) group situations (e.g., "The child withdraws from games in big groups"). The preschool teachers were asked to rate the children's behavior on a 5-point Likert scale ranging from 0 (*completely disagree*) to 4 (*completely agree*). The negative items were recoded before summing across the answers to obtain scores on the two subscales and a total score for further analyses. Higher scores on the DortMuS reflect less talking in preschool situations. Internal consistency was good to excellent for both subscales at all four time points (Subscale 1: $\alpha_{t1} = 0.94$, $\alpha_{t2} = 0.92$, $\alpha_{t3} = 0.95$, $\alpha_{t4} = 0.94$; Subscale 2: $\alpha_{t1} = 0.89$, $\alpha_{t2} = 0.90$, $\alpha_{t3} = 0.84$, $\alpha_{t4} = 0.88$).

2.4. Statistical analyses

Because of the small sample size and the uneven group sizes, and because some variables were not normally distributed, the median and interquartile ranges were used to report the center and dispersion of the distributions. Nonparametric tests were used to make group comparisons (Mann-Whitney *U* and Kruskal-Wallis), to test for trends in the data (Jonckheere-Terpstra), and to compute correlations (Kendall's tau). Effect sizes for the nonparametric group comparison tests were calculated as r in accordance with Rosenthal (1991), with $r < 0.30$ indicating a small effect, $0.30 \leq r < 0.50$ a medium effect, and $r \geq 0.50$ a large effect. Multilevel modeling was used to analyze the longitudinal data. Therefore, time was entered as a predictor on Level 1. Predictors on the individual level were entered on Level 2. The predictor variables anxiety and receptive language skills were centered on the median for better interpretation of effects. In accordance with Raudenbush and Bryk (2002), model specification was carried out in two steps. First, fixed and random effects on Level 1 were tested. Second, effects of Level 2 predictors on the Level 1 variance were analyzed. An empty model was specified for comparison with enriched models. A chi-square test was used to compare the deviances of two consecutive models to determine the better fitting model. All models were estimated with full maximum likelihood. The proportion of variance in the outcome variable was estimated for each level of the model and was indicated as an R^2 value (Snijders & Bosker, 1994). The statistical analyses were conducted in SPSS v. 22.0. All *p*-values in this study are two-tailed, and *p*-values less than .05 are reported as significant.

3. Results

At the beginning of the study, eight (two mono- and six bilingual children) of the 18 children who were in the mute group met all DSM-V criteria for SM. The two monolingual children remained silent across the entire 9-month period. Two of the six bilingual children showed positive development and began to talk in a wide range of settings during the 9 months. They were not classified as selectively mute at the end of the study. The remaining four children still met all of the diagnostic criteria for SM. Only one child from the mute group who could not be classified as selectively mute at the beginning of the study developed SM during the 9-month period. In sum, seven of the 18 children from the mute group met all diagnostic criteria for SM at the end of the study. Three of the five bilingual children with SM were simultaneous bilinguals; the other two children were sequential bilinguals. Table 2 presents an overview of the scores for the predictor and outcome variables for the three groups: children with SM, positively developing children, and the control group.

3.1. Anxiety, language skills, and the development of speaking behavior

The groups differed significantly in amount of anxiety at the beginning of the study ($p = .029$). Pairwise comparisons with adjusted *p*-values showed that there were no significant differences between children with SM and positively developing children ($p = .229$, $r = 0.43$) or between the positively developing children and the control group ($p = .878$, $r = 0.22$). Children with SM were significantly more anxious than the control children ($p = .024$, $r = 0.64$). No difference was found between the groups with regard to their language skills ($p = .091$). However, the Jonckheere-Terpstra test revealed a significant trend in the data ($J = 179.50$, $z = 2.18$, $p = .029$, $r = 0.41$). Positively developing children showed the lowest language skills, followed by children with SM and controls (see also Table 2).

As shown in Table 2, the children differed significantly in their mute behavior as rated by their parents as well as by their teachers at all four time points. Pairwise comparisons showed significant differences primarily between the SM group and the control group (see Figs. 2 and 3). The positively developing children and the control group differed significantly in parent ratings at the beginning of the study as well as at the first, second, and fourth time points in the preschool settings. No significant differences were found between children with SM and positively developing children.

Table 2
Proportions, Means, and Interquartile Range for Children with selective mutism (SM), Positively Developing Children (PD), and Controls for the Predictor and Outcome Variables.

	SM	PD	Controls	Kruskal-Wallis	
	$n = 7$	$n = 11$	$n = 12$	H^a	p
Bilingual	5 (71.4%)	6 (54.5%)	4 (33.3%)		
BAV *t* scores t1	60.0 (*IQR* = 26.0)	50.0 (*IQR* = 20.0)	43.0 (*IQR* = 15.0)	7.07	.029
TROG-D *t* scores t1	45.0 (*IQR* = 19.0)	35.0 (*IQR* = 22.0)	50.0 (*IQR* = 14.0)	4.79	.091
Parent rating mute behavior t1	46.0 (*IQR* = 12.0)	33.0 (*IQR* = 12.0)	10.5 (*IQR* = 14.25)	15.88	< .001
Parent rating mute behavior t2	44.0 (*IQR* = 15.0)	26.0 (*IQR* = 18.5)	17.0 (*IQR* = 15.5)	20.97	.008
Parent rating mute behavior t3	43.0 (*IQR* = 21.0)	24.0 (*IQR* = 15.0)	12.0 (*IQR* = 13.75)	9.74	.007
Parent rating mute behavior t4	35.0 (*IQR* = 19.0)	23.5 (*IQR* = 14.0)	12.0 (*IQR* = 10.0)	10.03	< .001
DortMuS – mute behavior t1	43.0 (*IQR* = 13.0)	32.5 (*IQR* = 12.75)	6.5 (*IQR* = 13.5)	9.42	< .001
DortMuS – mute behavior t2	34.0 (*IQR* = 25.0)	24.0 (*IQR* = 9.25)	4.0 (*IQR* = 7.0)	16.94	.001
DortMuS – mute behavior t3	28.0 (*IQR* = 24.0)	19.0 (*IQR* = 16.0)	3.5 (*IQR* = 6.0)	14.01	.007
DortMuS – mute behavior t4	15.5 (*IQR* = 18.25)	15.5 (*IQR* = 5.25)	1.5 (*IQR* = 3.0)	10.02	.009

Note: [a]$df = 2$, BAV = Bochumer Angstverfahren für Kinder im Vorschul- und Grundschulalter (Bochum Anxiety Measure for Preschool- and School-Age Children, Mackowiak & Lengning, 2010), TROG-D = Test zur Überprüfung des Grammatikverständnisses (TROG-D) (Test for reception of grammar – German version, Fox, 2007), DortMuS = Dortmunder Mutismus-Screening für Kindertageseinrichtungen (DortMuS-Kita: Dortmund Mutism Screening for preschools, Starke & Subellok, 2018).

As hypothesized, there was a significant relation between the children's anxiety and their mute behavior at all four time points, primarily in family and public settings. For the preschool setting, a significant relation was found only at the fourth time point. No significant relation was found between receptive language skills and mute behavior in the family, in public, or in preschool. Parent and teacher ratings were significantly related at different time points (see Table 3).

3.2. Effects of anxiety and language skills

To address the specific research question concerning the extent to which anxiety and language skills contribute to the development of SM, multilevel models were specified with the subscale scores from the parent and teacher ratings of mute behavior as the outcome variables. In each analysis, time was the predictor on Level 1, whereas bilingual status, the cultural capital of the families (number of books in the household), anxiety, and receptive language skills were entered on Level 2. The analyses were based on a subgroup of 25 children with complete data on the predictor variables.

The results from the multilevel models with the parent ratings as the outcome are reported first. The variances of the intercept and slopes were first analyzed on Level 1. The development of speaking behavior across time varied significantly across participants (Var(u_{0j}) = 164.24, $X^2(1) = 5.22$, $p < .05$). No significant variance was found in the slopes (Var(u_{1j}) = 0.37, $X^2(1) = 0.03$, $p > .05$).

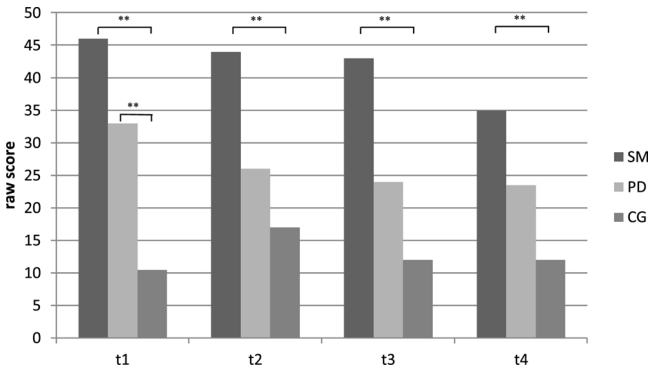

Fig. 2. Raw scores on the mute behavior subscale from the parent questionnaire at all four time points. SM = children with selective mutism, PD = positively developing children, * $p < .05$. ** $p < .01$.

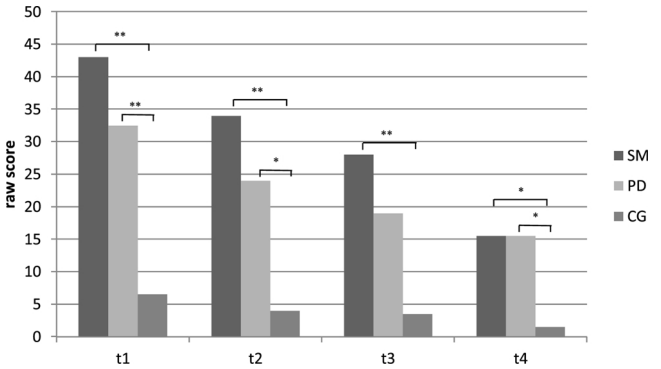

Fig. 3. Raw scores on the mute behavior subscale from the DortMuS (Dortmunder Mutismus-Screening für Kindertageseinrichtungen (DortMuS-Kita: Dortmund Mutism Screening for preschools, Starke & Subellok, 2018) at all four time points. SM = children with selective mutism, PD = positively developing children, * $p < .05$. ** $p < .01$.

Table 3
Correlations between the Predictor and Outcome Variables.

	1	2	3	4	5	6	7	8	9	10
1. BAV t1		.10	.51***	.44**	.52***	.50**	.21	.20	.17	.32*
2. TROG-D t1			-.01	.13	.09	.02	-.19	-.11	-.17	-.16
3. Parent rating mute behavior t1				.65***	.68***	.75***	.62***	.48**	.56**	.40**
4. Parent rating mute behavior t2					.84***	.66***	.41*	.34*	.28	.25
5. Parent rating mute behavior t3						.77***	.46**	.40*	.29	.34*
6. Parent rating mute behavior t4							.56***	.47**	.52**	.56***
7. DortMuS – mute behavior t1								.77***	.65**	.41*
8. DortMuS – mute behavior t2									.55**	.48**
9. DortMuS – mute behavior t3										.72***
10. DortMuS – mute behavior t4										

Note. BAV = Bochumer Angstverfahren für Kinder im Vorschul- und Grundschulalter (Bochum Anxiety Measure for Preschool- and School-Age Children, Mackowiak & Lengning, 2010), TROG-D = Test zur Überprüfung des Grammatikverständnisses (TROG-D) (Test for reception of grammar – German version, Fox, 2007), DortMuS = Dortmunder Mutismus-Screening für Kindertageseinrichtungen (DortMuS-Kita: Dortmund Mutism Screening for preschools, Starke & Subellok, 2018).

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Therefore, all of the following models were specified as random-intercept models with fixed slopes. The results for the best-fitting model with predictors on Level 2 are shown in Table 4. Time had a significant negative effect on the mute behavior of the children ($p = .020$). Their speaking increased over time (see also Fig. 2). No significant effect was found for bilingual status ($p = .832$), SES ($p = .210$), or receptive language skills ($p = .967$). There was a significant positive effect of anxiety on the development of mute behavior ($p < .001$). The more anxious the child was at the beginning of the study, the less he or she spoke at the end.

The statistical approach for the multilevel modeling was the same for the teacher ratings. The variances of the intercept and slopes were first analyzed on Level 1. The development of speaking behavior across time varied significantly across participants (Var(u_{0j}) = 108.67, $X^2(1) = 21.62$, $p < .01$). No significant variance was found in the slopes (Var(u_{1j}) = 8.86, $X^2(1) = 2.89$, $p > .05$).

Table 4
Model Parameters for the Best-Fitting Model with the Parent Ratings as the Outcome.

	b	*SE*	*df*	*t*	*p*
Constant	29.70	3.87	27.10	7.68	< .001
Time	−1.19	0.50	62.90	−2.38	.020
Cultural capital	−1.83	1.42	25.07	−1.29	.210
Bilingual status	−0.74	3.48	25.85	−0.21	.832
Anxiety	0.69	0.11	25.08	6.36	< .001
Receptive language skills	0.01	0.15	25.63	0.04	.967
σ^2	28.23			τ_{00}	44.20
R^2	Level 1	.62		Level 2	.69

Note: AIC = 599.62, BIC = 619.35, Deviance = 583.62.

Table 5
Model Parameters for the Best-Fitting Model with the Teacher Ratings as the Outcome.

	b	*SE*	*df*	*T*	*p*
Constant	31.47	4.27	27.78	7.37	< .001
Time	−3.77	0.68	55.01	−5.55	< .001
Cultural capital	−3.35	1.56	24.93	−2.15	.041
Bilingual status	−4.52	3.86	26.96	−1.17	.252
Anxiety	0.33	0.12	25.48	2.72	.011
Receptive language skills	−0.34	0.12	26.86	−1.98	.058
σ^2	42.95			τ_{00}	48.03
R^2	Level 1	.46		Level 2	.49

Note: AIC = 553.64, BIC = 572.29, Deviance = 537.64.

Table 6
Means, Interquartile Range, and Group Differences for the Bilingual Children with selective mutism (SM), Positively Developing Children (PD), and Controls.

		SM	PD	Controls	Kruskal-Wallis	
		n = 4	*n* = 6	*n* = 4	H^a	*p*
Orientation to	Mainstream culture	48.5 (*IQR* = 14.5)	50.0 (*IQR* = 9.5)	53.5 (*IQR* = 16.0)	1.07	.586
	Culture of origin	32.5 (*IQR* = 5.25)	31.0 (*IQR* = 9.25)	38.5 (*IQR* = 27.0)	1.00	.606
Acculturation index		77.0 (*IQR* = 17.0)	76.5 (*IQR* = 16.5)	75.5 (*IQR* = 48.75)	0.03	.986

Note: IQR = Interquartile range.

Therefore, all of the following models were specified as random-intercept models with fixed slopes. The results of the best-fitting model with predictors on Level 2 are shown in Table 5. Similar to the family and public settings, time had a significant negative effect on the mute behavior of the children in preschool settings ($p < .001$) (i.e., speaking increased over time; see also Fig. 3). Again, there was no significant effect of bilingual status ($p = .252$). Unlike for the parent ratings, there was a significant negative effect of cultural capital on the development of the children's mute behavior ($p = .041$) (i.e., children from families with lower cultural capital tended to speak less). Anxiety also best predicted the children's development in preschool settings ($p = .011$), but the effect was considerably weaker than in the family settings. Although the effect of receptive language skills was stronger, it was not statistically significant ($p = .058$).

3.3. Cultural adaptation

There were no significant differences between the three groups with respect to the cultural adaptation of the parents (see Table 6). Due to the small sample size for the bilingual children, the analysis of the effect of parental cultural adaptation on the development of children's mute behavior was not possible with multilevel modeling. Therefore, semipartial correlations were used to examine the association between cultural adaptation and mute behavior while controlling for the effect of anxiety on mute behavior. The results of the analyses are shown in Table 7. As hypothesized, no significant relation was found for the parent ratings. However, a significant negative relation between the parents' orientation to the mainstream culture and the mute behavior of the children was found at three of the four timepoints in the preschool settings. The more oriented the parents were to the mainstream culture, the less mute behavior their children showed in preschool settings.

4. Discussion

The main purpose of the study was to examine the development of SM in bilingual children and to identify factors that could explain the supposed higher vulnerability of such children. One major finding of the study is that there is no isolated effect of bilingual status on the development of SM. Bilingual status on its own could not explain the development of SM over the documented 9 months.

4.1. Major effect of anxiety

Anxiety had the greatest effect in both settings—family/public and preschool—confirming the first hypothesis, which had proposed that anxiety would be the largest factor of influence in the development of SM in all children. This finding is in line with current research on the association between anxiety and SM (e.g., Cohan et al., 2008; Elizur & Perednik, 2003; Yeganeh et al., 2006, 2003). Also, as hypothesized in H2, the highest level of anxiety was found for children with SM at the end of the study, followed by initially

Table 7
Semipartial Correlations between Cultural Adaptation and Mute Behavior.

	t1	t2	t3	t4
	Parent ratings			
Orientation to culture of origin	−.03	−.06	.05	.17
Orientation to mainstream culture	−.21	−.09	−.32	−.19
	Teacher ratings			
Orientation to culture of origin	.11	−.09	.20	.07
Orientation to mainstream culture	−.57*	−.56*	−.68*	−.40

* $p < .05$.

mute children with positive development and speaking controls. The distinct relation between anxiety level and severity of SM was also found by Black and Uhde (1995) as well as Manassis et al. (2007). Children with high levels of anxiety also showed the most severe SM in the current study, that is, they spoke the least in different social situations. The association between anxiety and speaking behavior was most apparent and consistent in family and public situations. In preschool settings, the relation between anxiety level and speaking behavior was significant at only one of the four time points.

Correspondingly, the effect of anxiety on the development of SM was considerably lower in the preschool setting than in family and public settings. This indicates different developmental pathways in various situations. The items from the parent-rating form were focused on speaking with relatives, neighbors, and strangers in public situations. Outside of the school setting, the situations that have been found to be affected the most by SM include talking to strangers, new social situations, and family gatherings (Ford et al., 1998). New situations, social interactions with strangers, or rarely seen relatives require pragmatic and social-emotional skills. Katz-Bernstein (2013) posited that children with SM do not possess the conversational rules (e.g., set phrases) that are needed to master the ability to have a conversation with a stranger. In addition, children need to regulate their emotions to encounter stress in such situations. There is some evidence of an increase in the use of avoidant strategies in children with SM (Sharkey & McNicholas, 2006). Moldan (2005) suggested that SM itself functions as a regulation strategy. A considerably higher use of maladaptive regulation strategies was also reported for children with social anxiety compared with peers without social anxiety (Lange & Tröster, 2014). Thus, if a shy child possesses only low levels of pragmatic skills, new situations or interactions with strangers may evoke stress. If there is also a lack of a variety in the child's regulation strategies, the child may resort to avoidance, which may lead to SM in the long run.

4.2. Differentiated effects in the preschool setting

The preschool setting differs from the aforementioned situations in that preschool is a daily life setting for children. They get used to the different social situations and the people. The preschool setting in Germany is characterized by a playful atmosphere and rather informal learning situations. The core schedule for the day determines only the meal, sleeping, or group times. For most of the day, the children can play freely and decide for themselves what and with whom they want to interact and play. Daily life in preschool is therefore characterized by peer interactions. Teacher-child interactions are rare and often function to regulate behavior (Albers, 2009). The lower association between anxiety and mute behavior in preschool settings in the current study can be explained by an increase in the familiarity of the setting. This idea was supported in the current study by a considerably larger decrease in mute behavior in preschool settings compared with family and public situations. Inhibited children tend to be especially withdrawn in unfamiliar settings, whereas they act in ways that are comparable to their noninhibited peers in familiar settings (Laptook et al., 2008). Therefore, mute behavior in the preschool setting cannot be explained by only anxiety. In this study, there was an additional negative effect of the educational level and literacy of the families, measured by the number of books in the household, on the maintenance of mute behavior. A small number of books was positively associated with mute behavior. Educational level and literacy were previously found to be associated with early home literacy (Haak, Downer, & Reeve, 2012), which has been found to have a positive effect on young children's language skills (Frijters, Barron, & Brunello, 2000; Haak et al., 2012; Schmitt, Simpson, & Friend, 2011; Sénéchal & LeFevre, 2014). The effect of receptive language skills did not reach the level of significance in this study but was considerably higher in preschool settings than in family/public settings. Taking both findings into account, as hypothesized in H3, there was some evidence for an influence of language skills on mute behavior in preschool settings. A recent longitudinal study showed, that early language skills can predict the development of social skills (Aro, Eklund, Nurmi, & Poikkeus, 2012). There is also growing evidence that children with specific language impairment have considerable difficulties in social interactions (Gerber, Brice, Cabone, Fujiki, & Timler, 2012). These difficulties in social interactions comprise for example engaging less in pretend play (Stich, 2010), entering ongoing social interactions (Liiva & Cleave, 2005) or participating in cooperative groups (Brinton, Fujiki, & Higbee, 1998). In addition, children with specific language impairment are chosen less as play partners and are more often rejected by their peers (Conti-Ramsden & Botting, 2004; McCabe, 2005). Therefore, language skills play a crucial role in social interactions in preschool. In addition to the underlying shyness of children with SM, insecurity in language, whether arising from an underlying language impairment, second langauge acquisition or mild pragmatic language difficulties, may reinforce withdrawal—both individually and interindividually in the form of rejection by peers—and contribute to the severity of SM in the preschool setting.

4.3. Association between cultural adaptation and SM

Because of the small sample size, the effect of parental cultural adaptation on the development of SM could not be analyzed. However, there is some evidence for an association between acculturation variables and mute behavior. Again, in family and public situations, there was no significant relation between parental cultural adaptation and mute behavior. As hypothesized in H4, the relation between cultural adaptation and mute behavior was more evident in preschool. There was a significant negative relation between the parents' orientation to the mainstream culture and the children's mute behavior at three of the four timepoints. The more the parents were adapted to the mainstream culture, the more the children spoke in preschool settings. This finding is in line with previous research: A bicultural or assimilated adaptation strategy—both of which are characterized by a considerable amount of adaptation to the mainstream culture—is associated with less internalizing behavior (Calzada et al., 2009; Huang et al., 2016) and better language and social skills (Oades-Sese & Li, 2011; Pawliuk et al., 1996). There are two possible explanations for this association. On the one hand parents' orientation to the mainstream culture may influence children's behavior in preschool setting, which is greatly influenced by the mainstream culture. Children need the language and social skills of the mainstream culture to participate in social interactions. In line with this idea, better social and language skills have a positive effect on peer interactions in mono- as well as in bilingual children (von Grünigen, Kochenderfer-Ladd, Perren, & Alsaker, 2012), and this effect should be apparent in a larger amount of speaking behavior in preschool. On the other hand, children's behavior in preschool may also influence parents' perceived integration into the mainstream culture. Good behavior of the child and resultant good integration into the school setting may have an effect on parents' integration into the mainstream culture. They may affiliate themselves more to the school society and as a result may engage more in school activities which in the long run lead to an increasing orientation to the mainstream culture.

4.4. Limitations

The demands of the longitudinal study design were very high for the families. Therefore, it was not possible to obtain the target sample size of $n = 40$ or to balance the group assignments. The bilingualism factor considerably hindered recruitment and commitment. In addition, the groups were in part very heterogeneous, thus leading to a large amount of variability, which limited the validity of the results in this small sample. But considering the focused population of children with SM and bilingual families, these negative factors are difficult to avoid. With a prevalence rate of around 1% (Bergman et al., 2002; Elizur & Perednik, 2003), SM is quite rare. Larger samples that are balanced with respect to age, socioeconomic background, or aspects of language would be more valid but are hardly feasible due to financial, staff, and time limitations. Notwithstanding, to increase study participation—especially for bilingual families—the demands of the study should be reduced considerably. For bilingual families with low proficiency in the mainstream language, it would be helpful to provide an interpreter.

To get a better understanding of the development of SM in bilingual children, future studies should implement productive language measures. Differences in language skills between shy and nonshy children are evident for both receptive (Crozier & Badawood, 2009; Crozier & Perkins, 2002; Spere, Schmidt, Theall-Honey, & Martin-Chang, 2004) and expressive skills (Crozier & Perkins, 2002; Prior et al., 2008; Smith Watts et al., 2014; Spere et al., 2004). However, for social interactions in preschool, productive language skills may play a more important role. In this study, the effects of receptive language skills did not reach the level of significance, but there was some evidence for an influence of language skills, especially in the preschool setting. The assessment of productive language skills in shy or mute children is challenging and often leads to missing data (e.g., Kristensen, 2000) or underestimation (Crozier & Perkins, 2002; Klein, Armstrong, & Shipon-Blum, 2013). For monolingual families, Klein et al. (2013) showed that parents could deliver the test stimuli as well as professionals could, leading to equal or better performances of the mute children. Due to the heterogeneous German language skills of the parents in the study, this approach was not suitable for this study. To assess productive language skills, parents were asked to produce spontaneous speech samples at home. Although the parents were provided with written and video-based explanations, the quantity and quality of the speech samples differed tremendously, thus leading to unreliable and invalid data. For future studies, a more structured approach comparable to the one used by Klein et al. (2013) should be the goal, even with bilingual parents.

4.5. Conclusions

The most important finding of the study is that bilingual status on its own does not explain the supposedly higher vulnerability to SM of bilingual/immigrant children. In fact, the current results support previous research findings that indicated a close association between anxiety and SM. Anxiety may be one important factor in the differentiation of bilingual children with a risk of SM and children with a typical silent period in second-language acquisition. One major advantage of the variable anxiety is that it is possible to use parent or teacher report forms to assess it without engaging in the comparatively challenging task of directly assessing the child. But researchers should bear in mind that parents and teachers tend to rate children with SM as more anxious than the children perceive themselves to be (Yeganeh et al., 2003). For a valid assessment, researchers should focus on a broad range of anxiety-provoking situations to avoid overestimation due to focusing solely on social anxiety. In addition, self-report measures should be used after the children master the written language. But anxiety on its own cannot explain the development of SM. Although there is a substantial amount of research on the comorbidity of SM and social anxiety (e.g., Cohan et al., 2008; Yeganeh et al., 2006), little is known about developmental effects. It is unclear whether anxiety increases over the course of SM due to cumulative experiences of failure in various situations or whether mute behavior increases due to an increase in anxiety. Therefore, there is still a need to clarify the prognostic validity of anxiety.

In the assessment of children with SM, especially in bilingual children, language competencies play an important role. A diagnosis of SM must first preclude a lack of knowledge in the required language (American Psychiatric Association, 2013). In this study, the influence of receptive and productive language skills on the development of SM could not be fully sorted out. But the considerably higher effect of receptive language skills on the development of mute behavior in preschool highlights the importance of language in the developmental process. Although bilingual status on its own had no effect in this study, the individual trajectory of second-language acquisition in bilingual children may play an important role in the development of SM. There is clearly a need for further studies on the importance of receptive and especially productive language skills in the development of SM.

The assessment of productive language skills in mute children is a considerable challenge, especially in bilingual children. This alludes to the importance of parents as a source of information in the diagnostic process. Parents with proficiency in the mainstream language can at least estimate how their child's language proficiency compares with age-matched children. Some parents may also be able to assist in the direct assessment of language skills, as Klein et al. (2013) showed with monolingual parents. In bilingual families with low proficiency in the mainstream language, an interpreter or relatives with higher proficiency should be included to assist in answering questionnaires or in counseling interviews.

Besides language, cultural factors should not be neglected. The bidimensional process of acculturation is a tough challenge that immigrant families must deal with. This was the first study to examine cultural adaptation in families of children with SM. There is some evidence for an association between the parents' orientation to the mainstream culture and the children's mute behavior in preschool settings. But due to the abovementioned limitations, the influence of parents' cultural adaptation on the development of SM could not be analyzed reliably. There is a need for a more representative sample of immigrant families in future studies. According to previous research and the evidence provided by the current study, a low level of orientation to the mainstream culture may be a risk factor in the development of SM. In the recruitment of immigrant families with a low orientation to the mainstream culture, there is a need for a high level of cultural knowledge, including language, as well as strategies for decreasing skepticism and increasing motivation to participate in a research study. In addition, cultural adaptation is a complex construct. Ideally, researchers will explore the influence of a particular culture or particular constellations of cultures. But due to the low prevalence of SM, a focus on one particular culture is difficult to implement. Systematic case studies could be one method that can potentially be applied to examine differentiated cultural effects.

Appendix A. Items of the parent questionnaire on mute behavior

My child greets relatives without my request.
My child greets neighbors without my request.
If my child is greeted by relatives or neighbors, he/she greets them back.
At family parties, my child speaks to the other children.
My child refuses to greet friends or relatives.
My child can order food or drinks by him-/herself, for example, at the ice cream parlor.
My child talks to me in public.
My child refuses to speak when a vendor addresses him/her.
My child whispers to me in the presence of strangers.
My child refuses to speak in the presence of his/her grandparents.
My child refuses to speak in the presence of the pediatrician.
Once we step out of the house, my child refuses to speak.
My child talks to young children in our extended family.
My child refuses to speak to adults in our extended family.
My child finds it difficult to speak to children he/she has never met before.
My child refuses to speak to older children in the neighborhood.
My child talks to children of the same age in our extended family.
While refusing to speak, my child freezes completely.

Appendix B. Immigration background and non-German languages

		Mute children (n = 12)	Control (n = 5)
mothers' countries of origin	Turkey	2 (17 %)	2 (40 %)
	Syria	1 (8 %)	0 (0 %)
	Arabic country	4 (33 %)	0 (0 %)
	African country	2 (17 %)	0 (0%)
	Eastern Europe	1 (8%)	0 (0 %)
	Southern Europe	1 (8%)	1 (20 %)
	Germany	0 (0 %)	2 (40 %)

Fathers' countries of origin	Turkey	3 (25 %)	3 (60 %)
	Syria	1 (8 %)	0 (0 %)
	Arabic country	3 (25 %)	0 (0 %)
	African country	1 (8 %)	0 (0 %)
	Eastern Europe	1 (8%)	0 (0 %)
	Southern Europe	2 (17 %)	1 (20 %)
	Germany	1 (8 %)	1 (20 %)
bilingual		11 (92 %)	4 (80 %)
Children's non-German languages	Turkish	3 (27 %)	3 (75 %)
	Arabic	3 (27 %)	0 (0 %)
	Kurdish	1 (9 %)	0 (0 %)
	Polish	1 (9 %)	0 (0 %)
	English	1 (9 %)	0 (0 %)
	Greek	1 (9 %)	0 (0 %)
	Croatian	1 (9 %)	0 (0 %)
	Spanish	0 (0 %)	1 (25 %)

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