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Bilingualism

The situation in Norway

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Preface

This thesis concludes my Master in English at The Norwegian University of Science and Technology (NTNU). It is divided into two parts.

The first part is a theoretical survey of bilingual advantages and disadvantages in cognitive and linguistic development. This review of recent research was conducted from a scholarship provided by Språkrådet. The main aim of this project was to increase awareness of the bilingual effects on cognitive and linguistic achievements and discuss the bilingual nature of the linguistic situation in Norway.

The second part is an experimental study on potential advantages for bilingual young adults. The bilingual effects on speech perception were explored in the Norwegian context.

I wish to express my gratitude to Språkrådet for initiating this project and granting me the scholarship.

I wish to express my sincere appreciation to my supervisor, Mila Vulchanova, for all her support, encouragement and good advice.

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Last but not least, I want to thank all the participants who took part in this study.

Part 1:

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1 Globalization

Bilingualism is a field of continuous growth. Bilingual numbers have increased significantly during the last decade and the majority of the world's population today knows more than one language (Shin, 2004). Increased social mobility and co-existence have diminished language barriers. Globalization has thus created a demand for bilingualism as a means of communication, as well as a growing interest in this field of experimental research. Yet, many theoretical accounts and most research on language acquisition and language processing have focused on monolingual speakers. We know little about what it means to be bilingual.

2 The bilingual characteristics

The characteristics of bilingualism are controversial. Researchers disagree on how to define bilingualism as a term and apply different sets of characteristics to their experimental studies. How do we decide who is bilingual? Bilingualism can be defined in terms of level of competence, age of learning onset and sequence of acquisition. All these factors contribute to the bilingual characteristics.

The Collins Cobuild Advanced Dictionary (2009, p.3) defines bilingualism as "the ability to speak two languages equally well." However, bilinguals rarely develop balanced competence in their two languages (Shin, 2004). A bilingual speaker does not represent two monolinguals in one (Bialystok, 2001; Shin, 2004). Different sets of needs and circumstances foster different responses from bilingual individuals (Bialystok, 2001; Grosjean, 2008). Bilinguals therefore acquire different levels of language competence in their two languages. Level of bilingual proficiency depends on age of learning onset and type of bilingualism, among other factors.

According to Lenneberg (1967), language acquisition is linked to age. The timing of language exposure is thus an important aspect of defining the bilingual characteristics. Modern research confirms Lenneberg's (1967) claim. Simultaneous acquisition of two (or more) languages entails a different set of characteristics than what an early sequential acquisition or a late sequential acquisition process does (Bialystok, 2001). Different social situations and social backgrounds thus affect the level of language proficiency attained by bilingual individuals.

Furthermore, the nature of language exposure and context of acquisition is significant in terms of defining the bilingual characteristics. A formal context enhances different skills than what an informal context does (Bialystok, 2001). The language acquisition process is influenced by

socioeconomic status, language status and opportunity for formal study, among other factors (Bialystok, 2001). Modern research shows that different language backgrounds (language combinations) foster different language outcomes (Werker, & Byers-Heinlein, 2008). Individual differences and numerous bilingual variants therefore make it difficult to define bilingualism as a term.

The fact that bilingual language acquisition includes two specific variants of human language is widely agreed upon. However, bilingualism does not necessarily apply to the acquisition of two spoken languages or even the acquisition of two qualitatively different languages (Bialystok, 2001). The process of becoming bilingual does not presuppose being able to speak in two languages. Thus, a child can become bilingual by learning, for example, two or more sign languages (Bialystok, 2001).

Although bilinguals share some characteristics, they are very different in other aspects. As Bialystok (2001, p. 19) points out: "Bilingualism is not a categorical variable." Experiments and discussion revolving around the nature of bilingualism should therefore be context and purpose specific (Meisel, 2004). Language background, age of onset learning, context of acquisition and social background must be carefully assessed and taken into account when conducting experiments in which bilinguals are compared to monolinguals.

3 The Norwegian language situation

In Norway, it is normal for people to learn both a standard language and at least one dialect. Many people grow up with several different dialects and thus acquire multiple language variants. This process is another instance of bilingual acquisition of language. The Norwegian dialects represent different linguistic systems, many of which are very different from the official language. This makes the acquisition of dialects a whole new learning process.

Additionally, the Norwegian language embraces two official written norms (Nynorsk and Bokmål). This standard language diglossia ensures bilingual language exposure in Norway. Although Bokmål is the dominating norm, used in writing by 85-90% of the Norwegian population, both norms are parts of the instruction in school (Vikør, 2005). Growing up in Norway thus entails simultaneous exposure to different sets of grammar rules and linguistic data.

4 Why is it important to study bilingualism?

Bilingualism is a relatively new area of research and many aspects remain unexplored. Little is known about what it means to be bilingual. It is therefore important to study bilingualism as a means of understanding the mind and the bilingual "self"; to reveal the true value of knowing more than one language. Exploring how bilinguals manage multiple languages; whether or not the course of cognitive and linguistic development in bilingual children is different from that of monolingual children; and whether or not there are specific advantages and disadvantages of being bilingual, experimental studies on bilingualism hold the answers to many important questions revolving around how languages work in general. Research-based knowledge concerning bilingual children is important in order to enhance the awareness of the bilingual situation and develop high-quality bilingual education programs in step with the globalization of today.

5 Approaches to bilingualism

The growing interest in the bilingual field of research has raised a number of important questions. How can we study bilingualism? How can we rightfully compare bilinguals to monolinguals?

Up until recently, the monolingual (or fractional) view of bilingualism has dominated the study of bilingual acquisition of language (Grosjean, 2008). Traditional monolingual tests of speech and language have been applied to the study of bilingualism. Grosjean (2008, p. 10) points out that "strong monolingual biases have influenced bilingual research."

Bilinguals have been tested and evaluated according to the monolingual standard (Grosjean, 2008) However, the bilingual does not represent two monolinguals in one (Bialystok, 2001; Grosjean, 2008). Monolingual tests do not take into account the fact that bilinguals acquire their two languages under different social conditions and with different opportunities for formal study. These tests are therefore inappropriate for the study of bilingual language development.

Contrasting the monolingual view, the bilingual (or wholistic) view of bilingualism acknowledge the fact that "the bilingual is an integrated whole which cannot easily be decomposed in two separate parts" (Grosjean, 2008, p. 13). Taking on a wholistic approach to bilingualism, Grosjean (2008) argues that the many "specificities" of the bilingual must be taken into account when comparing bilinguals to monolinguals in the course of language

development. Grosjean (2008) argues that it is inappropriate to compare bilinguals to monolinguals based on their performance in traditional monolingual tests. The structure and organization of the bilingual's language competence; the nature of language development; and the context of acquisition; these are all important aspects of bilingualism and should be accounted for in future research.

Grosjean (1996, p. 22) points out that "bilinguals normally use their languages for different purposes, with different people, in different domains in life." Bilinguals are in fact different from monolinguals in many aspects. This makes the monolingual approach inappropriate. Rather than comparing bilinguals to monolinguals in monolingual terms, future research should take on a wholistic approach, thus making sure that all bilingual "specificities" are considered and valued as important aspects of this study (Grosjean, 1996; Grosjean, 2008).

6 State of the art

A major question raised in the study of bilingualism is whether or not the course of cognitive and linguistic development in bilingual children is different from that of monolingual children (Bialystok, 2001; Genesee, & Nicoladis, 2006). Various experiments have been conducted in order to find out if bilingual children's ability to learn language and develop cognitive skills is hindered by the acquisition of two languages at the same time.

In the beginning of the 20th century, early bilingualism was assumed to confuse and slow down children's cognitive and linguistic development (Bialystok, 2008). Bilingualism was therefore discouraged. The monolingual society feared that two competing language systems would delay children's cognitive and linguistic development. However, in a series of experiments conducted in 1962, Peal & Lambert (1962) found evidence challenging these assumptions. Their results revealed that bilingual participants outperformed same-age monolingual participants in a wide range of tests, including different aspects of intelligence (Peal, & Lambert, 1962).

Recent research has been more balanced in focusing on all aspects of bilingual development and functioning. Yet, it provides divergent results. The bilingual effect on cognitive and linguistic development is still a hotly debated topic.

On one hand, evidence from recent research suggests that the acquisition of more than one language entails advantages in several cognitive areas of development. As opposed to confusing children, it appears that bilingualism enhances the development of many cognitive

skills, including children's attentional networks, executive control and linguistic creativity. Bilingual acquisition of language appears to entail a wider understanding of language than what monolingual language acquisition does. Bilingual children are able to establish connections and control their attention in a manner which is unique to bilinguals.

On the other hand, some studies suggest that bilingualism has negative effects on linguistic development. Language delay and linguistic fusion are assumed to be among the bilingual effects on linguistic development. Nevertheless, this is a controversial issue. There is increasing evidence that bilingual children differentiate their two languages early on and share the same developmental path as their monolingual peers. Despite a slower rate in the development of vocabulary and grammar skills, bilingual children suffer no lasting disadvantages (Bialystok, 2001).

7 Bilingual effects on cognitive development

For a long time, parents and teachers worried that early-age bilingual exposure would impair and delay children's cognitive development (Bialystok, 2008). Bilingualism was considered disadvantageous. However, modern research documents cognitive advantages for bilingual children. Studies show that enhanced cognitive flexibility, stronger attentional and executive control, greater metalinguistic awareness and enhanced creative skills are among the bilingual effects on cognitive development. These studies maintain the value of knowing more than one language and propose a turn in the study of bilingualism.

7.1 Mental reorganization and flexibility

Confirming the cognitive value of knowing more than one language, Peal & Lambert's (1962) research changed the study of bilingualism. They compared monolinguals and French/English-speaking bilinguals in both nonverbal and verbal intelligence and found that bilinguals outperformed monolinguals in both areas. Mental reorganization and flexibility were among the bilingual advantages, recorded by Peal & Lambert (1962). The French/English-speaking subjects demonstrated a more "diversified pattern of abilities" than the monolingual subjects (Hakuta, & Diaz, 1985, p. 322). From their results, Peal & Lambert (1962) concluded that bilinguals hold a language asset rather than a language handicap.

Peal & Lambert (1962) managed to turn bilingualism into a positive term. Thus, their experiments have had great impact on the study of bilingualism. Since 1962, a variety of studies have confirmed the positive bilingual effect displayed in greater mental and symbolic

flexibility. Further evidence is provided by Balkan, whose study showed that bilingual participants demonstrated a significantly higher level of mental flexibility than monolingual participants (as cited in Hakuta, & Diaz, 1985). Developmental research has confirmed that the acquisition of two languages at the same time entails "greater awareness and flexibility with respect to the use of language" (Hakuta, & Diaz, 1985, p. 327).

Bilinguals are better able to "think without style" than what monolinguals are (Lehrer, 2012). In an experimental study executed by a team of psychologists at the University of Chicago, bilingual participants were faced with a moral dilemma, presented in their second language (as cited in Lehrer, 2012). The main purpose of this study was to test whether or not bilingualism affects decision-making.

English-speaking subjects were asked to respond to the following scenario, presented in Japanese:

> The US is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows: if program A is adopted, 200 people will be saved. If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. Which of the two programs would you favor? (as cited in Lehrer, 2012)

The team of psychologists had previously engaged a sample of physicians in the same experiment, only in English, in which nearly 72 per cent chose option A, namely, the safer option. Yet, when the same scenario was described in terms of deaths instead of survivors, only 22 per cent chose the safer option. Their answers were inconsistent (as cited in Lehrer, 2012).

Interestingly, when native English speakers were presented with this dilemma in Japanese, the inconsistency disappeared (as cited in Lehrer, 2012). These participants did not change their answers when the scenario was described in terms of deaths (as cited in Lehrer, 2012). This study thus suggests that bilingualism makes it easier to resist the "tug of loss aversion" as the words are "less weighted with feeling" (Lehrer, 2012). You are a better decision maker in your L2. The fact that bilinguals are in possession of two active language systems at all times, enables them to make decisions which reflect metalinguistic awareness and cognitive flexibility.

Confirming this positive bilingual effect on cognitive achievement, Ben-Zeev compared Hebrew-English bilingual children with monolingual children in terms of their awareness of referential arbitrariness and found that bilingual participants performed better than monolingual participants in symbol substitution and verbal transformation tasks (as cited in Hakuta, & Diaz, 1985).

In a number of symbol substitution tasks, the participants were given instructions such as: "Replace the word *I* with the word *spaghetti*" (Hakuta, & Diaz, 1985, p. 328). Ben-Zeev found that bilingual children were significantly more comfortable in this situation than monolingual children were (as cited in Hakuta, & Diaz, 1985). This study showed that "bilingual children seemed to approach the cognitive tasks in a truly analytic way. They also seemed more attentive to both structure and details of the tasks administered" (Hakuta, & Diaz, 1985, p. 328). Evidence from recent research suggests that bilinguals are more willing to accept the arbitrariness of words and language as a whole.

7.2 Cognitive control

Language acquisition involves different cognitive processes (Bialystok, 2001). The acquisition of two competing language systems thus creates a particularly strong demand for attentional and executive control (Costa, Hernández, & Sebastián-Gallés, 2008). This need to control attention to the target system influences bilingual children both cognitively and linguistically. The study of cognitive styles, namely, styles of learning and thinking suggests that bilingualism alters the way that individuals conceptually structure information (Bialystok, 2001).

According to Bialystok (2001, 2007), selective attention is one of the primary cognitive benefits of bilingualism. Results from experiments conducted to capture the nature of cognitive processes in bilinguals compared to monolinguals, illustrate that selective attention develops faster in the bilingual mind (Bialystok, 2001; Bialystok, 2007). Bilingual children are less prone to suffer from a context of misleading information and complexity than what monolinguals are.

Unique to bilinguals, the ability to focus on relevant information is practiced every single day in the handling of two languages at the same time. This attentional control is thus developed further in the bilingual mind than in the monolingual one. Assessing cognitive complexity and control in bilingual children compared to same-age monolingual children, Bialystok (1999)

observed that bilingual subjects were more advanced than monolingual subjects in tasks challenging their executive control. Early childhood bilingualism modifies childhood development of attentional control and provides children with an advantage in terms of problem-solving and inhibition or irrelevant information (Bialystok, 1999).

According to Costa, Hernádez & Sebastián-Gallés (2008), bilingualism aids conflict resolution. In an attention network test, Costa et al. (2008) explored the bilingual effects on the development of namely attentional control and found that bilinguals suffered less switching costs and less interference from misleading information than monolinguals. In this study, bilingual and monolingual children were tested in orienting, alerting and executive control. The results show that bilinguals were faster in performing all tasks. Also, their alerting and executive control networks proved more efficient (Costa et al., 2008).

Illustrating that bilingualism is a positive force in the development of attentional networks, this study constitutes an important argument in the debate on whether or not bilingualism hinders children's cognitive development. Costa et al. (2008) suggest that bilingualism enhances cognitive effectiveness and aids conflict resolution. As bilingual participants suffered less from the complexity of this task than monolingual participants, the results from Costa et al.'s (2008, p. 59) study indicate that bilinguals are better at "resolving conflict information" than monolinguals. Costa et al. (2008) claim that bilingualism increases alertness and the efficiency of conflict resolution.

Further evidence is provided by Bialystok, Craik, & Luk (2008a) who compared bilingual participants with monolingual participants in a study of short-term recall. The bilingual participants in this study demonstrated better working memory than their monolingual peers (Bialystok et al., 2008a). Bialystok et al. (2008a) observed that monolingual and bilingual participants performed equally well in the forward spatial span task. However, the bilingual participants outperformed the monolingual participants in the backward span task, which is a demanding task for working memory (Bialystok et al., 2008a). From this experiment, Bialystok et al. (2008a) concluded that bilingualism has positive effect on the development of executive control.

Comparing monolingual and bilingual individuals in tasks requiring interference suppression and response inhibition, Bialystok, Craik & Luk (2008b) furthermore confirmed the positive effect of bilingualism on executive control mechanisms. In this study the participants were tested in the Simon Arrow task, the Stroop Color-Naming task and the Sustained Attention to

Response task, in which they were faced with both congruent and incongruent trials (Bialystok et al., 2008b). The results showed that bilingual and monolingual participants performed equally well on the reverse Simon condition and the Sustained Attention to Response task, requiring response inhibition. However, bilinguals performed better than monolinguals in both the Simon task and the Stroop task, challenging interference suppression (Bialystok et al., 2008b). The bilingual subjects outperformed the monolingual subjects in terms of executive control.

Modern research, thus, suggests that bilinguals experience less interference from incongruent trials than monolinguals, and that they thrive in conflict situations. Bialystok and colleagues (2008a, 2008b) demonstrated that bilingualism enhances selective attention. This is a consistent finding (Bialystok, 2001; Lauchlan, Parisi, & Fadda, 2012). Problems requiring high executive control are better solved by bilinguals than monolinguals.

7.3 Creativity and metalinguistic awareness

Experimental research on cognitive development in bilingual children shows that bilingual language acquisition entails greater linguistic creativity and greater awareness of the arbitrary nature of naming than monolingual language acquisition. Language studies demonstrate that bilinguals outperform monolinguals in tasks assessing both word awareness and syntactic awareness (Bialystok, 2001).

Exploring creativity and scientific problem-solving among monolingual and bilingual children, Kessler & Quinn asked the participants in their study to write as many hypotheses as possible within a limited time, to solve a physical science problem (as cited in Bialystok, 2001). The results from this study confirmed Kessler & Quinn's hypothesis which projected a connection between bilingualism and the development of these cognitive functions (as cited in Bialystok, 2001). The hypotheses written by bilingual children were "more structurally complex and (…) sophisticated" than the hypotheses written by monolingual children (Bialystok, 2001, p. 204). Kessler & Quinn attributed these results to the bilingual participants' creative nature and their metalinguistic awareness (Bialystok, 2001).

A second study confirming the positive bilingual effect on creativity is Ricciardelli's comparison of monolingual and bilingual six-year-olds (as cited in Bialystok, 2001). Ricciardelli divided the bilingual children into two groups according to their level of bilingual proficiency. Then, all participants were tested in terms of creativity and geometric design.

Although Ricciardelli did not detect any differences between low-proficient bilinguals and monolinguals, the results from this study showed that high-proficient bilinguals outperformed the other groups of participants (as cited in Bialystok, 2001).

Similarly, Saxe compared bilingual and monolingual children's creativity and cognitive flexibility, and found than bilingual children shared a greater understanding of the arbitrary nature of number symbols that what monolingual children did (as cited in Bialystok, 2001). The participants in this study were presented with different kinds of counting, respectively numbers and letters, and asked to take notice of errors in chains of counting: "to decide who counted the right way, did they both count correctly, or did they both count incorrectly" (as cited in Bialystok, 2001, p. 198). Confirming the evidence from the above-mentioned studies, the bilingual participants in this study demonstrated a better understanding of the arbitrariness of numbers and gave more correct answers than their monolingual peers (as cited in Bialystok, 2001).

Bilingual language acquisition entails two sets of linguistic structures and linguistic labels. Bilingualism thus reflects this arbitrariness. Bilingualism appears to help children to acknowledge that one problem has several acceptable solutions. Monolingual children, on the other hand, are not familiarized with the arbitrariness of language in the same manner. Sheng et al. (2006, p.574) suggest that "because bilingual children constantly have to register two labels for the same concept, they may be likely to seek information about how words relate to each other."

By metalinguistic awareness, we mean the ability "to look at language rather than through it to the intended meaning" (Hakuta, & Diaz, 1985, p. 326). Modern research implies that bilingualism enhances this skill. Challenged in tasks revolving around the structural properties of language, bilingual participants in various studies on metalinguistic awareness have demonstrated high levels of focus and analytical behavior.

In 1972, Ianco-Worral conducted an experiment in which two groups of children, one monolingual group and one bilingual group, were tested in, namely, metalinguistic awareness (as cited in Hakuta, & Diaz, 1985). The participants were asked to explain why a flower is called "flower", why a boat is called "boat". Also, they were asked to decide "whether or not the names of things could be arbitrarily interchanged" (as cited in Hakuta, & Diaz, 1985, p.325).

The results from Ianco-Worral's study confirm that bilinguals share a higher level of metalinguistic awareness that monolinguals. Whereas the monolingual children denied the possibility, the bilingual children agreed that the names of things could be interchanged (as cited in Hakuta, & Diaz, 1985, p. 325). As suggested by Vygotsky, it appears that bilinguals are better able to accept this arbitrariness, as they are well aware that there exists more than one language; an idea which is embodied in their bilingualism (as cited in Hakuta, & Diaz, 1985). Bilinguals demonstrate a unique ability to acknowledge and accept the arbitrariness of language.

7.4 Lasting benefits?

Recent research suggests that bilingual children outperform monolingual children in both problem-solving tasks and tasks requiring cognitive flexibility and metalinguistic awareness. However, little is known about how adults are affected by bilingualism. Are bilingual adults better able to control their attention that monolingual adults? Based on evidence from modern research, Bialystok (2007, p. 219) argues that "the experience of lifelong bilingualism in which these processes are used regularly to control attention to two language systems bolsters those functions and reduces the speed or severity of their decline."

Bialystok, Klein, Craik, & Viswanathan's (2004) study indeed suggests that this positive bilingual effect on cognitive control persists into adulthood. Bialystok et al. (2004) compared monolingual and bilingual adults between 30 and 80 years old in the Simon task, and found that monolinguals were slower to respond than bilinguals. Their comparison, thus, confirmed that this advantage pertains into adulthood.

Compared to studies on bilingual children's performance in tasks requiring high attentional and executive control, the results from Bialystok et al.'s (2004) study show that older participants in both groups were slower to respond that young participants (Bialystok et al., 2004, Bialystok, 2007). Nevertheless, Bialystok et al. (2004) found evidence suggesting that the gap between older and younger participants was bigger among monolingual participants. Bilingual participants between 60 and 80 years old responded faster than same-age monolinguals, and suffered less from the disruptions of incongruent trials (Bialystok, 2004).

Bialystok et al. (2004, p.219) conclude that: "for bilinguals, control over the executive functions develops earlier in childhood and declines later in adulthood." It appears that bilinguals are protected from the decline of executive functions. The cognitive advantages

enjoyed by bilingual children are not diminished by time. As the matter of fact, it has been suggested that bilingualism serves as a protection against early dementia (Bialystok, 2001; Bialystok, 2009). Nevertheless, in order to draw valid conclusions from this area of research, further investigation and more experimental research is required.

7.5 Bilingual effects on cognitive development: A summary

The literature reviewed in this paper suggests that the acquisition of more than one language entails advantages in several cognitive areas. As opposed to confusing children, it appears that bilingualism enhances the development of many cognitive skills, including children's attentional and executive control, cognitive flexibility and linguistic creativity.

Bilingual language acquisition entails a wider understanding and linguistic flexibility than what monolingual language acquisition does. Bilingual children are thus better able to establish connections and control their attention. Lauchlan, Parisi & Fadda's (2012) study, in which bilingual children were compared to monolingual children in terms of cognitive control, problem-solving skills, metalinguistic awareness and working memory, sums up the discussion around bilingual effects on cognitive development. It confirms that bilingual children outperform monolingual children in each of these cognitive tests. Modern language studies suggest that bilingualism is a positive force in the development of cognitive skills.

8 Bilingual effects on linguistic development

The bilingual effects on linguistic development is a controversial issue. Up until recently, bilingualism was assumed to delay children's linguistic development and cause linguistic fusion (Bialystok, 2001; Bialystok 2008; Bialystok, 2009). Bilingualism deviated from the monolingual norm and was therefore considered harmful. Society feared that bilingual language acquisition would strain children's language capacity and impair their linguistic development (Bialystok, 2001; Genesee, & Nicoladis, 2006).

According to Volterra & Taeschner, bilingual children go through an initial stage in which their two languages are inseparable (as cited in Genesee, & Nicoladis, 2006). The unitary language hypothesis proposes that this initial state confuses children and delays their linguistic development (as cited in Genesee, & Nicoladis, 2006). Based on evidence suggesting that bilinguals are slower than monolinguals on lexical retrieval tasks and hold smaller vocabularies than same-age monolinguals, Volterra & Taeschner argue that

bilingualism harms children's linguistic development and reduces their language capacity (as cited in Genesee, & Nicoladis, 2006).

Nevertheless, recent research suggests that bilingual children differentiate and acquire language-specific properties early in development. Experimental studies show that bilingual children follow the same developmental path as monolingual children.

8.1 Speech perception and language discrimination

The process of language acquisition begins in the pre-verbal stage of human development (Werker, & Byers-Heinlein, 2008). Infant speech perception is very sensitive to facial movements accompanying speech (Weikum, Vouloumanos, Navarra, Soto-Faraco, Sebastián-Gallés, & Werker, 2007; Werker, & Byers-Heinlein, 2008). However, it has been suggested that bilingualism hinders infants' development of speech perception and language discrimination skills.

Previous research suggests that bilingual infants follow a different developmental time course than monolingual infants in terms of learning to discriminate native phonetic contrasts (Sundara, Pola, & Molnar, 2007; Werker, & Byers-Heinlein, 2008). These results confirm the unitary language hypothesis. However, there is increasing evidence that bilingual infants identify and discriminate languages as early as their monolingual peers. In fact, bilingualism appears to confer specific strengths in this area of language acquisition in keeping the perceptual window open for longer. Bilingualism prolongs the phonological sensitive period (Weikum et al., 2007; Werker, & Byers-Heinlein, 2008).

The ability to discriminate languages is particularly important for bilingual infants. They must separate speech into two languages rather than one (Werker, & Byers-Heinlein, 2008). Invalidating Volterra & Taeschner's claim, recent studies on speech perception and language discrimination indicate that bilingual infants are able to separate their two languages based on information about the surface phonetic characteristics of each language (Werker, & Byers-Heinlein, 2008). Research confirms that rhythm is an important characteristic to language (Werker, & Byers-Heinlein, 2008). It helps newborn infants to discriminate languages.

Experimental research shows that newborn infants are able to discriminate languages from different rhythmical classes (Werker, & Byers-Heinlein, 2008). However, they fail to discriminate languages from the same rhythmical class. It thus appears that the ability to distinguish two languages from within the same rhythmical class derives from being familiar

with one language, and unfamiliar with the other (Werker, & Byers-Heinlein, 2008). Nevertheless, it seems likely that bilingual infants use a different strategy than monolingual infants in the process of language discrimination. For bilingual infants both of the native languages are familiar; neither language is "different" (Werker, & Byers-Heinlein, 2008). Testing monolingual and bilingual infants in orientation latency, Sebastián-Gallés & Bosch observed that monolingual infants discriminate languages by orienting to the native language, whereas bilingual infants orientate towards the unfamiliar language (as cited in Werker, & Byers-Heinlein, 2008).

The bilingual participants in this study demonstrated increased latency of response in comparison to the monolingual participants. However, the authors argue that this is a result of the bilingual infants' "attempt to identify which of their two languages is being spoken before orienting" (Werker, & Byers-Heinlein, 2008, p.146). Although bilingual infants were slower to respond than monolingual infants, this does not necessarily mean that bilingualism equals linguistic fusion.

Experimental research has found that infants as young as 4 months are able to discriminate two languages from different rhythmical classes from visual clues (Werker, & Byers-Heinlein, 2008). However, whereas bilingual infants are still able to discriminate languages from visual clues at 8 months, monolingual children at this age fail to do so (Weikum et al., 2007). In an experiment in which monolingual English infants were compared to French-English bilingual infants at 6 and 8 months of age, Weikum et al. (2007) found that bilingual participants were better able to discriminate and separate languages than monolingual participants. It appears that early bilingual experience prolongs the ability to discriminate languages based on phonological properties and visual clues. Bilingual infants maintain sensitivity to language differences; they easily distinguish languages and categorize linguistic information (Werker, & Byers-Heinlein, 2008).

Similarly, in a study in which three groups of infants were compared in terms of discrimination of dental (French) and alveolar (English) place variants of /d/, Sundara et al. (2007) found that bilingual infants were able to discriminate languages at 10-12 months of age. Whereas monolingual French infants failed to distinguish this contrast, monolingual English and bilingual infants succeeded (Sundara et al., 2007). As opposed to previous studies on language delay, this study revealed no bilingual disadvantage in speech perception.

Sundara et al. (2007) observed that bilingual participants performed better than monolingual French participants.

There is growing evidence that bilingualism keeps the perceptional window open for longer and provides infants with a unique sensitivity towards language differences. According to Werker & Byers-Heinlein (2008, p. 144), "infants growing up bilingual use surface acoustic information to separate, categorize and begin to learn their two languages." Although bilingual infants do not share the monolingual characteristics of development or apply monolingual strategies to their language acquisition process, they are able to discriminate languages by the age of 1;0 (Werker, & Byers-Heinlein, 2008). Evidence from experimental research on speech perception invalidates the unitary language hypothesis.

8.2 Vocabulary

Recent research confirms that "bilinguals generally control a smaller vocabulary in each language than monolinguals" (Bialystok, 2009, p. 4). Ben-Zeev's research from 1977 revealed a 10-point deficit on the Peabody Picture Vocabulary Test for bilinguals compared to same-age monolinguals (as cited in Pearson, Fernández, & Oller, 1993). Similarly, Rosenblum & Pinker and Doyle, Champagne & Segalowitz found evidence suggesting that bilingualism constrains children's vocabulary development (as cited in Pearson et al., 1993). Bilinguals tend to attain lower scores on receptive vocabulary tests.

In a study in which 40 children were tested in the Peabody Vocabulary Test, Bialystok & Feng (2009) further confirmed the above-mentioned results. The participants were divided into two groups, one bilingual group and one monolingual group, and later compared in terms of vocabulary size. The same pattern of results emerged in this study. Bilinguals share an overall smaller average vocabulary in each language than their monolingual peers (Bialystok, & Feng, 2009; Bialystok, 2009).

However, modern researchers have put these results into question. As opposed to Rosenblum & Pinker and Doyle et al., Pearson, Fernández & Oller (1993) argue that bilingual children share the same variety of vocabulary sizes as monolingual children. Pearson et al. (1993) argue that both languages must be taken into account when evaluating the development of vocabulary in bilingual children. They take on a wholistic approach to the study of bilingualism and argue that it is inappropriate to evaluate bilingual individuals' linguistic

skills based on single-language performances, as a bilingual speaker by no means equals two monolingual speakers in one (Pearson et al., 1993).

Rather than comparing monolingual and bilingual children in terms of vocabulary in each language, Pearson et al. (1993) compared monolingual and bilingual children in both total vocabulary and total conceptual vocabulary and found that the overall bilingual vocabulary was comparable to the monolingual one. Although each individual language included fewer words than what is found in the vocabulary of monolingual children, monolinguals did not outperform bilinguals in terms of total vocabulary size (Pearson et al., 1993).

Pearson et al. (1993) argue that it is important to study bilingual children's abilities in both languages in order to appropriately make notes on the bilingual effect on linguistic development. Taking both total vocabulary and total conceptual vocabulary into account, their research demonstrates that bilingual vocabulary development reflects the monolingual rate of development in children between 8 and 30 months of age (Pearson et al., 1993). Frequency of language exposure affects linguistic development. It is therefore unfair to judge bilingual children's language abilities based on performance in only one of the two languages.

Although bilingual children acquire translation equivalents for most words, the exposure to some words is "circumstance-specific" which makes translation equivalents superfluous (Oller, Pearson, & Cobo-Lewis, 2007, p. 195). Bialystok (2008) suggests that the weaker scores on lexical retrieval tasks and vocabulary tests are related and closely linked to the fact that previous research has failed to take into account that bilingual acquisition of language is qualitatively different from monolingual acquisition of language. Researchers dismiss these differences and label them bilingual deficits (Bialystok, 2008).

Oller (2005) claims that vocabulary differences among monolinguals and bilinguals are attributable to the "distributed characteristic" of bilingualism (p. 1744). She argues that it is unfair to assess bilingual's vocabulary in terms of monolingual norms, as bilinguals acquire singlets in both languages (Oller, 2005). Oller (2005, p. 1746) points out that "words in different languages do not always cover the same semantic domains." It thus seems likely that differences in vocabulary size in each language are attributable to monolingual and bilingual differences in terms of frequency of language exposure (Genesee, & Nicoladis, 2005).

Frequency and amount of language exposure are important factors in language development, especially in the building of vocabulary. Similarly, context of acquisition influences the

process of language development. In a study comparing monolingual and bilingual children in terms of lexical development, Pearson & Fernández (1994) found that both groups shared the same pace and pattern of development. Besides, they discovered that bilinguals do not develop their two languages in parallels (Pearson, & Fernandez, 1994). Complementing Oller's (2005) claims, these results make it clear that both total vocabulary size and total conceptual vocabulary must be taken into account when comparing the lexical development of bilinguals to the same development in monolinguals.

8.3 Grammar

According to Macnamara, "bilinguals have a weaker grasp of language than monoglots" (as cited in Bialystok, 2001). In 1966, Macnamara reviewed seventy-seven studies on linguistic development in bilingual children, and found evidence suggesting that bilingualism delays the acquisition of linguistic skills, including grammatical awareness (as cited in Bialystok, 2001). Results from studies comparing linguistic development in bilingual and monolingual children suggest that bilinguals acquire the same set of skills as monolinguals, but at a later stage. The pattern of bilingual development of linguistic skills is thus different from the monolingual norm (Werker, & Byers-Heinlein, 2008). Werker & Byers-Heinlein (2008, p.148) report that bilingual children does not "succeed in learning similar-sounding words until around 20 months of age." They acquire this skill somewhat later than their monolingual peers (Werker, & Byers-Heinlein, 2008).

It is a common belief that L2 learners lag behind L1 learners in acquiring grammatical competence (Meisel, 2004). However, Jürgen Meisel (2004) argues that bilingual children follow the same developmental path and acquire the same level of grammatical competence as monolingual children. Although some studies have demonstrated that bilinguals are slower to develop linguistic skills than monolinguals, Meisel (2004) argues that these delays do not exceed the normal rate of language development.

Modern research confirms Meisel's (2004) claim and indicate that bilingual development of linguistic skills reflects monolingual development of the same set of skills. In 1996, Paradis & Genesee (1996) compared bilingual children to monolingual children in terms of the acquisition and use of grammatical concepts and found similar patterns of performance in both groups. Furthermore, Paradis, Crago, Genesee & Rice's (2003) research suggests that bilingual children with SLI share the same developmental path as monolingual children with SLI.

Challenging early ideas, Genesee & Nicoladis (2006, p.4) argue that bilinguals "acquire language-specific properties of the target language early in development and (that) these correspond, for the most part, to those exhibited by same-age monolingual children."

Meisel (2004) argues that there is no reason to assume that the pace of linguistic development in bilingual children deviates from the monolingual norm. Experimental research demonstrates that bilingual children eventually acquire the same linguistic abilities as monolingual children (Meisel, 2004). Holowka, Brosseau-Lapré & Petitto's study shows that bilingual children achieve linguistic milestones in the same pattern and pace as their monolingual peers (as cited in Petitto, & Dunbar, 2004). Although some studies suggest that linguistic delay are among the bilingual effects on language development, this negative effect does not persist into adulthood.

8.4 Code-mixing

Whereas *code-switching* among adults is regarded as a useful language device reflecting metalinguistic awareness, *code-mixing* among bilingual children is considered an argument in favor of the unitary language hypothesis (Genesee, 2002). Code-mixing in early stages of bilingualism has been considered an indication of linguistic confusion (Genesee, & Nicoladis, 2006). However, modern researchers have called these assumptions into question and provided evidence further invalidating the unitary language hypothesis. Recent research suggests that bilingual children differentiate and isolate their two languages early in development (Genesee, 2002).

According to Köppe & Meisel, bilingual children differentiate their two languages and use code-mixing deliberately, already by the age of 2;0 (as cited in Meisel, 2004). Their ability to adapt to their surroundings and the context in which they use language, indicates that code-mixing among bilingual children reflects the development of linguistic and socio-linguistic awareness (Meisel, 2004).

Exploring the nature of code-mixing, Genesee et al. studied English-French bilingual children's communication and interaction with their parents (as cited in Genesee, 2002). These children were exposed to two different languages at home. Whereas one parent spoke French, the other parent spoke English.

The results from this study show that already by the age of 22 and 26 months, these children were able to separate and appropriately select linguistic structures from their two languages in

a “context-sensitive manner” (as cited in Genesee, 2002, p. 173). Genesee et al. observed that these bilingual children adapted to the linguistic environment in interaction with their parents and switched between languages according to whom they were interacting with (as cited in Genesee, 2002).

In order to further generalize, Genesee et al. exposed a group of bilingual children to interaction with monolingual strangers and found that three out of four participants adapted to the socio-linguistic surroundings and adjusted their use of language in interaction with these strangers (as cited in Genesee, 2002). Explaining why the fourth child did not adapt like the others, Genesee et al. points to individual differences (as coted in Genesee, 2002).

From these two experiments, the experimenters concluded that code-mixing is a result of the development of socio-linguistic awareness rather than linguistic fusion (as cited in Genesee, 2002). Bilingual children adapt to the linguistic behavior of the environment and demonstrate sensitivity towards different interlocutors (Genesee, 2002). Challenging early ideas, recent research shows that language transfer is intentional rather than accidental. Not only do they separate their two languages, bilingual children demonstrate better metalinguistic awareness than their monolingual peers.

8.5 Language processing and lexical retrieval

Interference from the other language is commonly assumed to slow down the course of lexical retrieval in bilingual speakers, suggesting that reduced efficiency in lexical access is a result of two active language systems competing at all times (Bialystok, 2009).

Recent research suggests that bilinguals are slower to retrieve lexical information than monolinguals (Bialystok, Craik, & Luk, 2008a; Bialystok, 2009). Comparing monolingual and bilingual children in a lexical decision task, Randell & Fischler’s study confirmed this bilingual disadvantage (as cited in Bialystok et al., 2008a). Although monolingual and bilingual participants were equally accurate, bilinguals were slower to respond to the task requirements than monolingual participants (Bialystok et al., 2008a). Bilinguals struggle with tasks requiring rapid lexical retrieval; object naming and word retrieval.

From an experiment in which Swedish monolinguals and German-Swedish bilinguals were compared, Mägiste reported that bilinguals were slower to name objects, words and numbers than monolinguals (as cited in Bialystok et al., 2008a). This bilingual disadvantage is well documented in today’s research and it is often attributed to the bilingual situation in which

two different language systems are active at all times. Researchers have concluded that two competing language systems and two sets of vocabularies confuse bilingual children and slow down their linguistic development.

However, Bialystok et al.'s (2008a) research challenges these assumptions. Interested to find out whether or not vocabulary has anything to do with bilingual performance in lexical retrieval tasks, Bialystok et al. (2008a) engaged monolingual and bilingual children in a series of word retrieval tasks. Their study confirmed that bilinguals attain lower scores on tasks requiring rapid lexical retrieval (the Peabody Picture Vocabulary task and the Boston Naming task). However, Bialystok et al. (2008a) observed that the differences between the monolingual and bilingual participants disappeared when vocabulary was controlled for.

Despite the fact that bilinguals hold an altogether greater vocabulary than monolinguals, evidence from experimental research confirms that bilinguals hold smaller vocabularies in each language than monolinguals (Bialystok, 2009). Bialystok (2009, p. 4) argues that the fact that bilinguals use their two languages less often than their monolingual peers use their language entails "weaker links among the relevant connections required for rapid and fluent speech production." It is therefore plausible to assume that vocabulary and nature of vocabulary acquisition influence the process of lexical retrieval.

Bialystok et al. (2008a) argue that these results invalidate the claim that bilingual children suffer from linguistic fusion. Although bilingual speakers keep both languages active at all times, evidence from recent research suggests that bilinguals differentiate their two languages early on and do not suffer from linguistic fusion. Fernández (2003, p. 70) points out that "communicating in a unilingual mode is for the most part an effortless task for bilinguals, requiring no conscious suppression of the other language."

8.6 Bilingual effects on linguistic development: A summary

This review of recent research on bilingual effects on linguistic development suggests that bilingual children differentiate their two languages early on and share the same developmental path as their monolingual peers. Bilingual children do not suffer from language delay or linguistic fusion. Modern researchers have called results from previous studies into question and found evidence confirming the value of knowing more than one language.

Bilingual children are different from monolingual children in many aspects. These differences should therefore be taken into account when comparing these two groups in various cognitive

and linguistic settings. It is inappropriate to evaluate bilingual performance according to the monolingual standard. Modern research documents advanced linguistic, metalinguistic and sociolinguistic skills in bilingual human beings.

9 Implications for language education

For a long time, bilingualism was considered harmful and was therefore discouraged in educational practice. Parents and educators argued that children should be allowed to concentrate on one language and establish this firmly before they were exposed to a second language (Petitto, & Dunbar, 2004). However, modern research suggests that bilingualism should be promoted in school. L2-acquisition does not hinder L1-development (Petitto, & Dunbar, 2004).

Studying (monolingual and bilingual) children who enrolled in bilingual schools in the United States, Petitto & Dunbar (2004) discovered that these children shared a high level of bilingual language competence. They found that "children from monolingual homes in bilingual schools were better readers than language/age-matched monolingual children in monolingual schools" (Petitto, & Dunbar, 2004, p. 7). Contrasting early ideas, Petitto & Dunbar's (2004) research confirmed the value of dual language exposure.

Evidence from recent research thus explains why bilingual education should be encouraged rather than discouraged. It serves as an answer to "why bother?" Students are looking for answers. It is therefore important to increase awareness of the bilingual effects among young people. Educators should teach their students how bilingualism puts them in an advantageous position. I will further discuss this issue in what follows as I turn to how we effectively can include Nynorsk in today's education programs in Norway.

The Norwegian language embraces two official written norms, both which are attended to in school. Bokmål and Nynorsk are equal by law. However, Bokmål is the dominating norm. During the last decade, the number of students who exercise Nynorsk on a daily basis has decreased significantly (Språkstatus, 2012). Whereas 34 per cent of Norwegian students used Nynorsk in 1944, only 14 per cent of Norwegian students used Nynorsk in writing in 2012 (Språkstatus, 2012).

In 1885, Stortinget decided that Nynorsk and Bokmål were to be equal. This decision marked the beginning of a long debate. The role of Nynorsk in school is still a hotly debated topic. Based on the premise that Bokmål is the dominating norm, it has been argued that Nynorsk

should be excluded from obligatory teaching programs. Students who write in Bokmål argue that learning Nynorsk is a waste of time. However, the evidence reviewed in this report suggests that bilingualism equals an asset rather than a handicap for students are enrolled in bilingual education programs.

Exposed to both Nynorsk and Bokmål in school, Norwegian students acquire two sets of grammar and linguistic data. This bilingual exposure puts Norwegian students in a privileged position. Dual language competence helps the bilingual to be a better "multi-tasker" than monolinguals (Petitto, & Dunbar, 2004). Bilingualism enhances creativity and metalinguistic skills. Bilingualism increases executive and attentional control. Bilinguals are more flexible than monolinguals, both cognitively and linguistically. The linguistic situation in Norway is unique and it is, in fact, bilingual. Including Nynorsk in today's education programs is thus an important aspect of promoting bilingualism in school.

Norwegian students have questioned the role of Nynorsk in today's education programs. Why is it important to learn Nynorsk? When will they ever need it? Educators should offer their students an explanation.

Nynorsk is closely related to Norwegian dialects. Students are thus familiar with many aspects of Nynorsk, and use these aspects more often that they are aware of. Increasing their awareness of this connection might make it easier to engage students in learning Nynorsk. Modern research validates the developmental interdependence hypothesis which proposes that "the development of competence in a second language (L2) is partially a function of type of competence already developed in L1" (Cummins, 1979, p.222). It might be easier for students to acquire and appreciate Nynorsk if they are aware of how it is linked to their previous language experience. As a means of promoting bilingualism and making students aware of how different aspects of the Norwegian language relate to each other, educators should make room for dialects in their teaching programs. Language history (including Scandinavian languages) might make it easier for students to understand why it is important to keep Nynorsk in school.

Language is our main tool for communication and language structure is an important aspect of understanding and developing language. In order for students to develop and appreciate knowledge of Nynorsk, they need to learn how this language variant is structured. Grammar-teaching is an important aspect of language studies as grammar provides students with answers. Grammar terminology provides tools for speaking about languages, thus increasing

metalinguistic skills. Sentence structure and grammatical terms are important aspects of every language. Making students aware of how Nynorsk, Bokmål and dialects are similar in some aspects whereas they are different in others might ease their acquisition of Nynorsk.

Norwegian children grow up with two written languages and a number of dialects. In Norway, there are laws to protect both written norms and dialects are used in every aspect of public life. The Norwegian situation is thus unique and it is important to communicate clearly to students the value of bilingualism and cultural history. Focusing on language paradigms and language structure, educators might be able to engage their students in learning Nynorsk, as they become aware of how languages relate to each other. Whether or not Nynorsk should be obligatory has yet to be answered but learning Nynorsk is definitely not a waste of time. However, recent research shows that simultaneous bilingual exposure is more beneficial than sequential bilingual exposure (Bialystok, 2001). Maybe Nynorsk-teaching, in fact, should be introduced at an earlier stage?

10 Challenges and future research

Modern research on cognitive and linguistic development in bilingual children has turned bilingualism into a positive term. Yet, many aspects of bilingualism are still unexplored. This field of study has not yet reached its final conclusion. In the following sections I will therefore address the challenges of future research.

Hakuta & Diaz (1985, p. 321) point out that "the majority of early studies in this area (…) suffered from a variety of methodological problems." Researchers failed to exercise control over sample selection and did not control for differences in age, socioeconomic background or language experience. Many early studies failed to define the characteristics of bilingualism and they are therefore considered unreliable today. In order to further generalize and assume connections between bilingualism and specific aspects of cognitive and linguistic development, future research should be conducted in a specific context and for specific purposes.

Although they share some characteristics, bilingual individuals are very different in other aspects. It is thus important for researchers to make sure that their participants share the same characteristics: the same level of language proficiency and language background. They should make sure that their generalizations and conclusions are drawn from studies that build on the same characterization of bilingualism.

Peal & Lambert (1962) argued the importance of appropriate sample selection. They drew a distinction between "balanced bilinguals" and "pseudo-bilinguals" and described these groups in terms of different levels of language proficiency (Peal, & Lambert, 1962). As confirmed in Ricciardelli's research, high-proficient bilinguals and low-proficient bilingual do not necessarily share the same cognitive and linguistic benefits (as cited in Bialystok, 2001). Similarly, testing 90 bilingual students in terms of creativity, Kharkurin (2011) found that high-proficient bilingual students demonstrated greater linguistic creative performance than less proficient bilingual students.

It is important to exercise control over sample selection in order to ensure the appropriateness of future experiments. According to Bialystok (2009) developmental differences between monolinguals and bilinguals are closely related to the bilingual level of competence and context of acquisition. Simultaneous bilingual exposure entails advantages that sequential bilingual exposure does not (Werker, & Byers-Heinlein, 2008).

Recent research confirms that level of bilingual proficiency is determined by age at onset of L2 learning (Stevens, 1999). In an analysis based on a large national sample of immigrants from a variety of countries, Gilligan Stevens (1999) found that age of immigration had great impact on the level of proficiency demonstrated by the participants in this study.

Similarly, context of acquisition and language background are important factors in determining the bilingual characteristics. While some bilingual children exercise both their languages at home, others employ only their first language in home settings. According to Grosjean (2008, p. 23) "different aspects of life often require different languages." Thus, bilinguals rarely develop total fluency in their two languages. Their languages are domain specific (Grosjean, 2008). They require different levels of competence.

Existing evidence suggests that whether the child's home language is in a majority or a minority situation, and whether or not it is used as a medium for literacy tasks affects the child's linguistic and cognitive outcomes (Bialystok, 2001). Language status should therefore be accounted for in future research. Also, the significance of different language combinations should be further analyzed. According to Bialystok (2008), bilingual children who acquire two languages that share the same writing system enjoy linguistic and cognitive benefits that children who acquire two different writing systems do not. Werker & Byers-Heinlein (2008, p. 147) argue that "each pair of languages poses a unique learning problem" and should be tackled separately in experimental research.

Language background, socioeconomic status and language context are important factors in the building of bilingual characteristics (Werker, & Byers-Heinlein, 2008). As previously noted, the bilingual is not the sum of two monolinguals. All bilingual specificities should therefore be considered and taken into account when conducting comparative studies in the future. According to Grosjean (2008, p. 14), "the bilingual's communicative competence cannot be evaluated correctly through only one language." He argues that the bilingual level of language proficiency cannot be evaluated according to monolingual standards.

Comparison of bilingual and monolingual speakers must be conducted in a setting in which age of onset, socioeconomic status and language background are properly mapped out and accounted for. In the course of further investigation of the nature of bilingualism, researchers should make sure that their studies are replicable. They should open up for the possibility of going back and rebuilding the experiment in order to check for misinterpretations and explore the initial results even further.

11 Conclusion

Based on the literature reviewed in this paper, it is plausible to argue that bilingualism is a positive force in the development of cognitive and linguistic skills. Modern research confirms the positive bilingual effects on cognitive and linguistic development.

Enhanced cognitive control, better metalinguistic awareness, improved mental flexibility and greater creative skills are among the bilingual effects on cognitive development. Also, it appears that bilinguals are protected from the decline of executive processes. Individuals whose language competence is restricted to only one language are not.

Recent research suggests that bilingualism should be encouraged rather than discouraged. With command over more than one language and access to more information sources, bilingual children are advantageous in both domains, cognitively and linguistically. Bilingualism should therefore be encouraged and implemented in today's education practice. It is important to raise awareness of the value of knowing more than one language.

Research on bilingual effects on cognitive and linguistic development has reached far. However, the debate revolving around the nature of bilingual development has yet to be resolved. In order to explore and clarify new and interesting aspects of bilingual development, future research should make sure that experiments are conducted in a specific context and for specific purposes.

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Part 2:

Bilingual effects on speech perception in young adults: An experimental study conducted in the Norwegian context

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1 Abstract

The present study explored the bilingual effects on speech perception in young adults. I tested two groups of Norwegian speakers, one monolingual group and one bilingual group, and compared them in terms of how well they were able to understand Norwegian dialects and foreign accents in Norwegian. This study demonstrates the bilingual value of the Norwegian language situation and suggests that exposure to and experience with more than one language has positive effect on speech perception. I attribute these results to enhanced cognitive skills and the diverse linguistic input to which Norwegian speakers are exposed.

2 Introduction

In the past decade, the amount of research investigating the bilingual effects on cognitive and linguistic development has increased significantly (Bialystok, 2001). Bilingualism is a field of continuous growth and it covers a broad range of cognitive and linguistic achievements. Does bilingualism enhance the development of cognitive and linguistic skills? Research has produced inconsistent results (Bialystok, 2001).

Through most of the 20th century, bilingualism was assumed to threaten normal language development and impair cognitive achievement (Bialystok, 2001; Bialystok, 2007). Experimental research demonstrated a correlation between bilingualism and low scores on tests measuring cognitive and linguistic abilities (Oller, & Eilers, 2002). However, many of these early studies were later found to lack control over sample selection and is therefore considered unreliable today (Bialystok, 1988; Hakuta, & Diaz, 1985).

Studying bilingual development is challenging in many aspects. Bilingualism is not a definite variable and it is therefore difficult to define the bilingual characteristics (Bialystok, 2001). Bialystok, Luk, & McBride-Chang (2005, p.581) point out that "the degree to which a child is bilingual is crucial in determining the cognitive and linguistic consequences of bilingualism." Level of language proficiency should therefore be accounted for in experimental research. Is bilingualism a positive force in the development of cognitive and linguistic skills? Recent research suggests that the answer to this question depends upon different contextual aspects (Bialystok, Luk, & McBride-Chang, 2005; Oller, & Eilers, 2002). Vulchanova, Vulchanov, Sarzhanova, & Eshuis (2012) argue that "some of the controversies among findings can be attributed to the heterogeneity of groups studied and the unbalanced level of proficiency in the two languages in the groups where disadvantages have been documented" (p.191).

There are multiple ways to assess bilingualism. Yet, demonstrating a bilingual advantage/disadvantage in cognitive and linguistic development requires the generality of the claim. In what follows, I will therefore discuss the bilingual characteristics: Who is bilingual? I will then present results from studies of the bilingual effect on one specific aspect of linguistic development, namely, speech perception. Finally, I will present a study exploring the bilingual effects on speech perception in young adult speakers of Norwegian.

3 Background

3.1 Who is bilingual?

Werker & Byers-Heinlein (2008) describe heterogeneity as a methodological challenge facing researchers within the field of bilingualism. Bilingualism is very different from the typical variables we use to classify subjects in experimental research (Bialystok, 2001). Unlike gender or age, it is difficult to define bilingualism as a term. Bialystok (2001, p. 8) describes bilingualism as a scale "moving from virtually no awareness that other languages exist to complete fluency in two languages." Thus, one must consider the extent to which a child knows a second language before predictions about its effects on cognitive and linguistic development can be made. Werker & Byers-Heinlein (2008, p. 147) argue that "differences among bilinguals (…) must be taken into account (…) before results from a single bilingual population can be generalized to other groups."

Experimental research has found that the cognitive and linguistic consequences of bilingualism depend on level of bilingual language competence (Bialystok, 1988; Bialystok, 2001; Bialystok, Luk, & McBride-Chang, 2005). According to Cummins (1979, p.222), there are "threshold levels of linguistic competence which a bilingual child must attain both in order to avoid cognitive disadvantages and allow the potentially beneficial aspects of bilingualism to influence his cognitive and academic functioning." High-proficient bilingual children benefit more from their bilingual status than partially bilingual children (Bialystok, 2001; Bialystok, Luk, & McBride-Chang, 2005;Werker, & Byers-Heinlein, 2008). This suggests that the bilingual level of competence must be taken into account when comparing monolingual and bilingual subjects in terms of cognitive and linguistic development (Bialystok, 2001). Level of bilingualism determines the effects that bilingualism has on other achievements (Bialystok, Luk, & McBride-Chang, 2005).

There are multiple factors that may influence second language acquisition. Experimental research on bilingual development suggests that degree of bilingualism depends on onset age, language exposure and context of acquisition, among other factors.

According to Lenneberg (1967) and the critical period hypothesis, success and failure in second language acquisition is influenced by maturational aspects of the brain. Level of language proficiency is thus dependent on the timing of language exposure. We know that simultaneous bilingual acquisition entails a different set of characteristics than what an early

sequential or a late sequential acquisition process does (Bialystok, 2001). According to Werker & Byers-Heinlein (2008), "individuals who learned two languages in childhood generally show better proficiency than those who learned their second language in adolescence or adulthood" (p.147). The bilingual consequences for cognitive and linguistic development depend on type of bilingualism.

Grosjean (2008) points out that different languages are used in different social settings. The nature of language exposure and context of acquisition are thus significant factors in determining the bilingual characteristics: the level of bilingualism. Because the needs and uses of each language are different in different social situations, level of bilingual competence depends on language background and context of acquisition (Grosjean, 2008).

Evidence from recent research suggests that different language combinations have different effects on the bilingual's linguistic and cognitive outcomes (Bialystok, 2001; Werker, & Byers-Heinlein, 2008) Language status and opportunity for formal study are important factors in determining the bilingual individual's level of competence in each language (Bialystok, 2001; Werker, & Byers-Heinlein, 2008). We know that a formal context enhances different skills that what an informal context does (Bialystok, 2001).

Evidence from recent research thus confirms that there is no one definition of bilingualism. Different levels of bilingualism entail different linguistic and cognitive outcomes for bilingual individuals (Bialystok, 2001). This suggests that different levels of proficiency should be tackled separately in experimental research (Werker, & Byers-Heinlein, 2008). The bilingual consequences for cognitive and linguistic development are not a fixed set of advantages/disadvantages.

3.2 Bilingual effects on speech perception

For a long time, it was widely believed that bilingual newborn infants are unable to discriminate their two languages in the initial stage of bilingualism (Genesee, & Nicoladis, 2006; Werker, & Byers-Heinlein, 2008). Bilingual children were assumed to go through an initial stage in which their two languages are inseparable (Genesee, & Nicoladis, 2006). However, there is increasing evidence that bilingual infants are able to separate their two languages from birth (Werker, & Byers-Heinlein, 2008). Studies conducted in Canada convincingly show that bilingualism has positive effect on the development of speech perception and language discrimination skills (Weikum, Vouloumanos, Navarra, Soto-Faraco,

Sebastián-Gallés, & Werker, 2007; Werker, & Byers-Heinlein, 2008). Weikum et al. (2007) found that bilingualism prolongs the phonological sensitive period.

Research on speech perception during the pre-verbal stage of development has shown that (monolingual and bilingual) infants can discriminate two languages from different rhythmical classes (by watching facial movements) already at 4 months (Weikum et al., 2007; Werker, & Byers-Heinlein, 2008). Yet, comparing monolingual and bilingual infants at 6 and 8 months of age, the experimenters observed that "monolingual English infants fail to discriminate the languages at 8 months, whereas bilingual French-English infants continue to succeed at this age" (Werker, & Byers-Heinlein, 2008, p. 146). It appears that early bilingual experience keeps the perceptual window open for longer. Based on phonological properties and visual clues, bilingual infants are able to discriminate languages from different rhythmical classes at 8 months of age (Werker, & Byers-Heinlein, 2008).

From their experiment, Weikum et al. (2007, p. 1159) notes that "bilingual infants advantageously maintain the discrimination abilities needed for separating and learning multiple languages." The authors concluded that bilingualism enhances infant speech perception (Weikum et al., 2007). Moreover, Bialystok, Craik, & Luk (2012) suggest that "the experience of building two distinct representational systems endows bilingual infants with greater perceptual and attentional resources than their monolingual peers" (p.245). Weikum et al.'s (2007) study proposes that the bilingual executive control system eases linguistic processing.

Indeed, many studies clearly demonstrate a cognitive advantage for bilinguals displayed in attentional and executive control (Bialystok, 2001; Bialystok, 2007; Costa, Hernández, & Sebastían-Gallés, 2008). Bilinguals keep two languages active at all times. Attentional control is thus practiced every single day. According to Bialystok & Craik (2010) "the necessity to use this conflict management system continuously enhances its function, with consequent benefits to control in both language and nonlanguage tasks" (p.22). The joint activation of the two languages for bilinguals and the diverse linguistic input to which bilinguals are exposed is widely assumed to strengthen the executive control system. Weikum et al. (2007) suggest that the bilingual executive control system enhances bilingual language discrimination skills and sensitivity towards different languages.

4 The present study

4.1 Purpose and hypotheses

Evidence from experimental research suggests that bilingual infants are better able to perceive differences in speech than monolingual infants. However, little is known about what happens beyond this point. The main purpose of the present study was thus to test whether or not the bilingual advantage in speech perception pertains into adulthood.

Except from a few case-studies, no experimental research on speech perception has been conducted in the Norwegian context. The second aim of this study was therefore to establish the bilingual effects on the processing of Norwegian dialects/accents. Norway has become a multicultural/multidialectal society and therefore offers an exceptional ground for experimental research on the development of language discrimination skills. In the present study, monolingual and bilingual young adult speakers of Norwegian were compared in terms of how well they were able to understand Norwegian dialects and foreign accents in Norwegian.

Recent research suggests that bilingualism is advantageous in the development of speech perception skills because bilinguals are better able to control their attention and they are more experienced with different linguistic systems (Weikum et al., 2007).

Given the expectation that bilingualism is beneficial in the long term (Bialystok, 2007), my original hypothesis was that bilingual participants would be better able to understand the different dialects and foreign accents than monolingual participants. I expected that the bilingual participants would benefit from their sensitivity towards language differences; their unique ability to control their attention and their well-defined capacity to ignore irrelevant information, and outperform the monolingual participants in the two tasks of this study.

However, the coding of background information (post testing) revealed that the bilingual group was very heterogeneous. Acknowledging this heterogeneity and the complexity of the Norwegian language situation, I adjusted my hypothesis and predicted that the assumed bilingual advantage would be less prominent than first expected. The monolingual participants' multidialectal literacy and experience with English suggested that the supposedly monolingual group was in fact a bilingual group.

4.2 The situation in Norway

The linguistic situation in Norway is unique. Growing up in Norway, Norwegian people acquire both a standard language and at least one dialect. Both written norms (Bokmål and Nynorsk) are taught in school. Also, English training has a prominent role in the Norwegian educational program. Bilingual language exposure is thus implemented into everyday life. Norwegian people experience simultaneous exposure to different sets of grammar rules and linguistic data, suggesting that the Norwegian language situation is in fact a bilingual one. Confirming the bilingual nature of the linguistic situation in Norway, the results from Vulchanova, Åfarli & Vulchanov's (in preparation) study show that words from Nynorsk and Bokmål are strongly associated in the brain, judging by the strong bi-directional priming effect. This suggests that the linguistic diversity to which Norwegians are exposed equals bilingual language acquisition. Multidialectal experience affects cognitive and linguistic development.

5 Method

5.1 Participants

Altogether 56 young adults participated in the present study. The project was reported to The Norwegian Data Protection Authority (NSD) and all participants orally agreed to participate prior to the testing. Parental consents were collected on behalf of participants under the age of 18.

The participants were divided into two groups: 28 potential bilingual participants and 28 monolingual participants. Four potential bilingual participants with apparent language disorders and/or who did not fit the bilingual definition I had chosen for this study were excluded post-hoc. Both monolingual and bilingual participants were recruited among students at NTNU and the surrounding community. All participants had normal hearing and shared a background in Norwegian.

The bilingual group included 24 bilingual participants with mean age (MA) of 25.67 (age range from 17 to 44). All bilingual participants shared a background in Norwegian and were active users of both their languages. In addition, all bilingual participants reported high levels of English proficiency (mean = 3.13). In a scale ranging from 1-4, participants graded their level of total English proficiency.

Yet, the bilingual group was a fairly heterogeneous group. The bilingual participants were chosen from an ecological perspective. This selection of bilingual participants thus represented the variation in society. 16 different language pairs were included in this study, ranging from well-known European languages to Kurdish, Berber and Lulesamisk. Also, the bilingual participants differed in terms of onset time. Whereas 8 participants were born and raised in Norway, the remaining 16 participants acquired Norwegian as their L2. The mean number of years spent in Norway was 14.52. The mean age of Norwegian onset was 11 (age range from 0 to 32). This heterogeneity presents a methodological disadvantage.

Selected participant information is presented in Table 1.

Table 1: Selected participant information, bilingual group

Bilingual	YES
Number	24
Participants born in Norway	8
Mean age at testing	25.67
Age at testing range	17-45
Years in Norway (mean)	14.52
Years in Norway (range)	2-24
Norwegian onset (mean age)	11
Norwegian onset (range)	0-32
English Proficiency (mean)	3.13
Trøndsk	8
Vestnorsk	1
Østnorsk	11
Nordnorsk	4

The monolingual group consisted of 28 monolingual participants (mean age = 22.93). This group was originally planned as a control group. However, experimental research has shown that the linguistic situation in Norway is a good example of a bilingual environment. Hence, practically every Norwegian is bilingual. The supposedly monolingual participants were born and raised in Norway and had acquired both Bokmål and Nynorsk in school. Also, their multidialectal proficiency was high. These participants' mean level of English proficiency was 3.18. This group was thus, in fact, also bilingual. All participants shared the same language background. This was a homogeneous group.

Selected participant information is presented in Table 2.

Table 2: Selected participant information, monolingual group

Bilingual	NO
Number	28
Mean age at testing	22.93
Age at testing range	17-27
English proficiency (mean)	3.18
Trøndsk	8
Vestnorsk	1
Østnorsk	17
Nordnorsk	2

5.2 Materials and stimuli

The experiment was constructed in E-prime. The speech stimuli were produced by 6 female speakers. Whereas four of them were speakers of Norwegian dialects, the remaining two were Norwegian speakers with foreign accents.

The four dialects represented four different Norwegian area codes: Nord-Trøndelag, Telemark, Sogn og Fjordane and Hedmark. These four dialects were chosen on the basis of their distinct features which make them fairly difficult to understand. For the four different dialects, I used the same text. The different variants were counterbalanced in four lists.

For the two foreign accents, I used two different texts. However, they were very similar in terms of content and length. I therefore chose not to counterbalance the accents and the texts. The two foreign accents represented were French and American. These two accents were chosen on the same basis as the four different dialects. They are distinct and challenging for the listeners to comprehend.

For the lexical decision task, 60 words were chosen. 30 appeared in the texts whereas 30 did not. I included an equal number of high-frequency and low-frequency words. All items were presented in a randomized order.

5.3 Procedure

5.3.1 Auditory perception and short term memory

The participants were tested on auditory perception and the comprehension of and memory for recently heard texts in two listening/comprehension tasks. All participants were tested individually in a quiet room.

For the auditory perception task (task 1), each participant sat in front of a computer and listened to three texts: two texts read with different foreign accents in Norwegian, one text read in dialect. The texts were presented in a randomized order for each participant. Participants were assigned to the experimental lists in the order of appearance in both tasks. The auditory stimuli were presented through headphones to avoid noise.

Following each text, the participants answered 6 multiple choice questions (pressing alternative A, B, C or D on the button box) related to the text, both content and language. Whereas some questions touched upon short term memory (their ability to remember facts) others tested their ability to comprehend these dialects and accents. Their answers were noted down in E-prime.

In the lexical decision task (task 2), the participants were asked to determine whether or not the words which appeared on the screen had appeared in one or more of the texts in task 1.To give their answers they pressed the green button for “yes” and the red button for “no”. Their answers were noted down in E-prime. Linguistic memory is an important aspect of speech perception/speech processing. In this task, the participants were therefore tested in terms of their ability to process and remember specific words spoken in dialects and foreign accents. Each participant was presented with 60 words, of which 30 had appeared in the previous texts.

5.3.2 Questionnaire

Post testing, all potential participants were asked to fill out a questionnaire to provide me with their background information. Appendix 1 provides the full list of questions asked.

5.4 Coding and analyses

The outcomes of the experiment were organized in six separate datasets:

Dataset 1 included all responses from task 1.

In task 1, participants were tested in both comprehension and short term memory. I therefore divided the questions into two groups and analyzed them separately. Dataset 2 included only responses from the comprehension questions in task 1.

I further divided the comprehension questions into two separate datasets in order to test whether or not the participants' processing of Norwegian dialects was different from the participants' processing of foreign accents.

Dataset 2A included responses to the comprehension questions from the text read in dialect.

Dataset 2B included responses to the comprehension questions from the two texts read in foreign accents.

Dataset 3 included responses from the short term memory section of task 1.

Dataset 4 included responses from task 2 (the lexical decision task).

I analyzed all six datasets using a generalized linear mixed model. Insignificant predictors were removed. I compared the models in R, performing likelihood ratio tests. Simple and precise models were thus obtained.

The full list of predictors is presented in Table 3.

Table 3: List of predictors

Predictor	Explanation
Age	Age at testing
Handedness	Left/right
YearsInNO	Number of years spent in Norway
BornInNorway	YES/NO
NoOnset	Age at onset of Norwegian exposure
Nr_other_lang	Number of languages the participant was familiar with (other than Norwegian and English)
StayInEng	YES/NO, whether or not the participant had stayed in an English speaking country (minimum length of stay: 1 month)
StayInOther	YES/NO, whether or not the participant had stayed in a non-English speaking country (minimum length of stay: 1 month)
Bilingual	YES/NO
Dialect	Østnorsk, Nordnorsk, Vestnorsk, Trøndsk
Nor_Communes	Number of Norwegian communes in which the participant had lived
Eng_reading	Proficiency in English reading (self-report)
Eng_listen	Proficiency in English listening (self-report)
Eng_speak	Proficiency in English speaking (self-report)
Eng_writing	Proficiency in English writing (self-report)
Eng_oral	Eng_listen/Eng_speak
Eng_listen_read	Eng_listen/Eng_read
Eng_listen_speak	Eng_listen/Eng_speak
Eng_write_listen	Eng_writing/Eng_listen
Eng_speak_listen	Eng_speak/Eng_listen

6 Results

6.1 Dataset 1: Group comparison

I started with analyzing the first dataset. This dataset included all the data from task 1.

The initial full model of *accuracy* included the following predictors: Group, age, handedness, years spent in Norway, proficiency in English (reading, writing, listening, speaking), dialect, stay in English speaking country, stay in non-English speaking country, the number of Norwegian communes in which the participants had lived and the number of other languages the participants were familiar with. Table 4A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that were significant in the final model.

Table 4A: Dataset 1, final model of accuracy

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.9454	0.2199	4.299	1.72e-05 ***
BilingualYES	-0.6051	0.2365	-2.558	0.0105 *
StayInEngYES	0.3629	0.1998	1.816	0.0694 .
StayInOtherYES	0.4082	0.2369	1.723	0.0849 .

. p < .1. *p < .05. **p < .01. ***p < .001.

Table 4A illustrates that bilinguals were significantly less accurate than monolinguals ($p < .05$). This was an unexpected finding. It invalidated my original hypothesis. The bilingual group did not outperform the monolingual group. However, this model shows that whether the participants had stayed in a foreign country or not predicted their accuracy, although not significantly ($p < .1$). This suggests that the exposure to/experience with (one or more) additional languages increased their accuracy. Bilingualism did in fact appear to affect the participants' performance on task 1.

Reaction times were analyzed using linear mixed modeling. The initial model included all the above mentioned predictors. The best fitting model is presented in table 4B.

Table 4B: Dataset 1, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.31875	0.04152	-7.676	0.0000
BilingualYES	0.03046	0.01772	1.719	**0.0480**
Eng_oral	0.06751	0.03127	2.159	**0.0154**

The data in table 4B suggests that bilingual participants were slower to respond to the questions in task 1 than monolingual participants ($p < .05$). Also, this data shows that participants with high levels of English proficiency were slower to respond than less proficient participants. Proficiency in English speaking/English listening predicted response times ($p < .05$).

These analyses show that bilingualism predicted both accuracy and response times. The effect, however, was negative. Participants from the monolingual group performed better than participants from the bilingual group.

6.1.1 Dataset 1: Bilingual participants

To get a clearer picture of what affected the participants' performance, I analyzed the two groups separately.

The initial full model of bilingual *accuracy* included the following predictors: Age, handedness, Norwegian onset, born in Norway, years spent in Norway, dialect, stay in English speaking country, stay in non-English speaking country, English proficiency (reading, writing, speaking, listening), the number of Norwegian communes in which the participants had lived and the number of other languages the participants were familiar with. Table 5A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that emerged as significant in the final model.

Table 5A: Dataset 1, final model of accuracy, bilingual participants

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.6030	0.2027	2.974	0.00294 **
StayInEngYES	0.5104	0.2544	2.006	0.04482 *

. p < .1. *p < .05. **p < .01. ***p < .001.

Analyzing the bilingual data from task 1, I found that whether the participants had stayed in an English speaking country or not was the single predictor of accuracy ($p < .05$). Surprisingly, neither Norwegian onset nor number of years spent in Norway predicted the bilingual participants' accuracy. Nevertheless, having spent time in an English speaking country appeared to decrease the number of errors among bilingual participants. This suggests that the bilingual participants were positively affected by language exposure and experience with another language, English. Bilinguals are positively affected by their linguistic surroundings. Judging from these results, bilingual experience does in fact increase accuracy.

However, bilingual participants who had stayed in non-English speaking countries were slower to respond to the questions in task 1 than participants who had not. 'StayInOther' was a significant factor in predicting slower response times ($p < .01$). This is surprising. Nevertheless, I attribute these results to the fact that this predictor was included as a categorical factor rather than a continuous numeric variable. The length of each stay was not taking into account. Table 5B lists the estimated coefficients, their standard errors, t-values and associated p-values for the predictors of bilingual *response times*.

Table 5B: Dataset 1, final model of response times, bilingual participants

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.29348	0.03467	-8.465	0.0000
StayInOtherYES	0.09244	0.03377	2.737	**0.0060**

6.1.2 Dataset 1: Monolingual participants

Analyzing the monolingual data, I found that 'Nor_Communes' ($p < .05$) and 'Eng_oral' ($p < .05$) predicted accuracy amongst this group of participants. The initial full model included the following predictors: Age, handedness, dialect, years spent in Norway, English proficiency (listening, speaking, writing, reading), stay in English speaking country, stay in non-English speaking country, the number of Norwegian communes in which the participants had lived and the number of other languages the participants were familiar with. However, no other factors appeared to predict the monolingual participants' level of accuracy. Table 6A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that emerged as significant in the final model of *accuracy* among monolingual participants.

Table 6A: Dataset 1, final model of accuracy, monolingual participants

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.6727	0.6635	1.014	0.3107
Nor_Communes	-0.2861	0.1373	-2.083	0.0372 *
Eng_oral	1.1517	0.5574	2.066	0.0388 *

. $p < .1$. *$p < .05$. **$p < .01$. ***$p < .001$.

This table suggests that the participants were negatively affected by the number of Norwegian communes they had lived in ($p < .05$). Participants who had lived in many different Norwegian communes gave more wrong answers to the questions in task 1 than participants who had lived in only a few Norwegian communes. This was another unexpected result. Based on evidence from previous research on the effect of diverse linguistic experience, I predicted that this numeric variable would increase accuracy. However, I cannot be certain that 'Nor_Communes' rightfully reflected the number of language variants the participants had been exposed to. To have lived in many different Norwegian communes does not presuppose experience with many different language variants of Norwegian. This factor does not necessarily reflect diverse linguistic experience. Also, taking into account the length of each stay might have changed the results.

Nevertheless, the monolingual participants were affected by their level of English experience and English proficiency. Table 6A suggests that active use of English increased their accuracy ($p < .05$). According to Cummins (1977), the level of bilingualism mediates the effects of bilingualism on other achievements. Surprisingly, the monolingual level of English proficiency, their level of bilingualism, benefitted them in task 1. This suggests that the monolingual participants shared a high level of bilingualism. An interesting question is whether or not their level of proficiency in Bokmål/Nynorsk would have had the same effect. Based on the results from Vulchanova et al.'s (in preparation) research, I assume that it would.

In terms of predicting response times, only the participants' level of proficiency in English writing had significant effect ($p < .05$). Table 6B lists the estimated coefficients, their standard errors, t-values and associated p-values for the predictors that were significant in the final model of *response times*.

Table 6B: Dataset 1, final model of response times, monolingual participants

	Estimate	Std. Error	t value	pMCMC
(Intercept)	0.20306	0.19451	1.044	0.3418
Eng_writing	-0.13320	0.05883	-2.264	**0.0396**

More proficient participants responded faster than less proficient participants ($p < .05$). Proficiency in writing thus appears to facilitate faster response times among monolingual participants. This finding is consistent with Vulchanova et al.'s (in preparation) results. They found that writing Nynorsk facilitate speed and working memory. Table 6B shows that participants benefitted from dual language literacy.

6.2 Dataset 2: Group comparison

The second dataset included data from the comprehension section of task 1. The analyses of dataset 2 included the same predictors as the analyses of dataset 1. Table 7A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that emerged as significant in the final model of *accuracy*.

Table 7A: Dataset 2, final model of accuracy

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.2200	0.5814	0.378	0.7052
BilingualYES	-0.5137	0.2038	-2.521	0.0117 *
StayInEngYES	0.3792	0.2200	1.723	0.0849 .
Eng_listen_read	0.9831	0.5737	1.714	0.0866 .

. p < .1. *p < .05. **p < .01. ***p < .001.

Again, monolingual participants made fewer errors than bilingual participants (p > .05). Bilingual participants were significantly less accurate than monolingual participants. This suggests that the grouping did not have the predicted effect on comprehension. These results are consistent with the findings in dataset 1. Table 7A shows that English proficiency and direct exposure to English had marginal effects on accuracy (p < .1). More proficient participants were more accurate than less proficient participants. Level of experience and exposure to English affected their overall performance, although not significantly.

Table 7B: Dataset 2, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.13421	0.03914	-3.429	0.0001
Eng_writing	-0.01968	0.01102	-1.786	**0.0430**

Table 7B illustrates that the level of proficiency in English writing was the only predictor of response times (p < .05). Further confirming the role of literacy, this model shows that proficiency in English writing and speed of reaction are highly correlated. High-proficient participants respond faster than low-proficient participants. This finding confirms evidence from previous research suggesting that degree of bilingualism determines the bilingual effects on other achievements.

6.2.1 Dataset 2: Bilingual participants

The results from the analyses of the bilingual participants' performance are the following:

Table 8A: Dataset 2, final model of accuracy, bilingual participants

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.5211	0.2340	2.227	0.026 *
StayInEngYES	0.7854	0.3504	2.241	0.025 *

. p < .1. *p < .05. **p < .01. ***p < .001.

The model estimates in table 8A show that participants who had stayed in an English speaking country were more accurate than participants who had not ($p < .05$). Again, I was surprised to see that neither Norwegian onset nor years spent in Norway predicted accuracy. Nevertheless, bilingual experience on a broader level appeared to affect the participants' performance.

Table 8B: Dataset 2, final model of response times, bilingual participants

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.16432	0.06690	-2.456	0.0088
StayInOtherYES	0.12388	0.03105	3.989	**0.0001**
Eng_write_listen	-0.13510	0.06431	-2.101	**0.0252**

Consistent with the analysis of bilingual response times in dataset 1, Table 8B shows that participants who had stayed in a country where they do not speak English were slower to respond than participants who had not ($p < .001$). Nevertheless, Table 8B illustrates that participants with high levels of proficiency in English were faster to respond than less proficient participants ($p < .05$). Bilingual participants were positively affected by their literacy skills. This result confirms my prediction that bilingualism entails advantages in speech perception and comprehension.

6.2.2 Dataset 2: Monolingual participants

Analyzing the monolingual data, I found no factors predicting accuracy. Level of bilingualism did not affect monolingual participants.

Table 9: Dataset 2, final model of response times, monolingual participants

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.05075	0.04546	-1.116	0.2392
StayInOtherYES	-0.05728	0.01987	-2.883	**0.0034**
Eng_speak_listen	-0.15031	0.04240	-3.545	**0.0008**

However, participants who had stayed in a foreign country where they do not speak English responded faster than participants who had not ($p < .01$). Similarly, the participants' levels of proficiency in English speaking/listening predicted response times ($p < .001$). High-proficient participants were faster to respond than low-proficient participants. Although not as clear as the bilingual participants did, monolingual participants benefitted from knowing more than one language.

6.3 Dataset 2A: Group comparison

The comprehension questions were divided by three different texts: One read in dialect, two read in foreign accents. Presumably, the participants were more familiar with the different Norwegian dialects than the foreign accents. I therefore separated the comprehension questions into two groups: questions from the text read in dialect and questions from the accented texts.

Dataset 2A included data from the text read in dialect.

Again, the initial full model of participants' accuracy included: Group, age, handedness, years spent in Norway, proficiency in English (listening, speaking, writing, reading), dialect, stay in English speaking country, stay in non-English speaking country, the number of Norwegian communes in which the participants had lived and the number of other languages the participants were familiar with.

Table 10A: Dataset 2A, final model of accuracy

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	2.89270	0.69944	4.136	3.54e-05 ***
BilingualYES	-0.58036	0.31751	-1.828	0.0676 .
Age	-0.05586	0.02769	-2.017	0.0437 *

. p < .1. *p < .05. **p < .01. ***p < .001.

The final model, presented in table10A, suggests that monolingual participants were more accurate than bilingual participants. However, this bilingual effect is only marginal ($p < .1$). This tendency of a bilingual disadvantage is weaker in the analysis of dataset 3 than in the previous two. This suggests that their level of familiarity with the different language variants could, in part, explain why bilinguals performed worse. We must keep in mind that most of the bilingual participants in this study acquired Norwegian as their L2; they were tested in their weaker language. They did not share the same amount of experience with the Norwegian language as the monolingual participants did. The heterogeneity of the group, thus, made it difficult to assess the bilingual advantage in speech perception.

Also, table 10A illustrates that younger participants were more accurate than older participants ($p < .05$). However, there is a correlation with age and Norwegian onset, so there may be a confound here. Younger participants had more experience with the Norwegian language than older participants.

Table 10B: Dataset 2A, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.159654	0.043150	-3.700	0.0001
StayInEngYES	-0.029439	0.016367	-1.799	**0.0440**
DialectNordnorsk	-0.023735	0.025057	-0.947	0.2562
DialectTr¿ndsk	-0.041597	0.017723	-2.347	**0.0080**
DialectVestnorsk	-0.003576	0.039003	-0.092	0.9338
Age	0.003203	0.001632	1.962	**0.0336**
YearsInNO	-0.003686	0.001400	-2.633	**0.0020**

The final model of variables predicting *response times* is presented in Table 10B. Once again, analyses show that participants who had stayed in an English speaking country responded faster than participants who had not ($p < .05$). More interestingly, however, this model shows that the participants who spoke Trøndsk were faster to respond than the participants who spoke Østnorsk, Vestnorsk and Nordnorsk ($p < .01$). I attribute these results to the distinctiveness of this dialect. The acquisition of Trøndsk entails the acquisition of multiple different dialectal characteristics, including 'apokope', 'tjukk l' and 'palatalisering', among others. Familiarity with these different characteristics might make it easier to understand other dialects.

The model presented in Table 10B also confirms, for the first time, that the number of years spent in Norway affected the participants' performance ($p < .01$). This numeric variable had positive effects on response times. Age, however, slowed the participants down ($p < .05$). This is not surprising as younger participants had more experience with the Norwegian language than older participants.

6.3.1 Dataset 2A: Bilingual participants

Table 11A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that emerged as significant in the final model of *accuracy* among bilingual participants.

Table 11A: Dataset 2A, final model of accuracy, bilingual participants

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	1.2941	0.5985	2.162	0.0306 *
DialectNordnorsk	0.6034	0.5898	1.023	0.3063
DialectTr¿ndsk	1.3052	0.5247	2.487	0.0129 *
DialectVestnorsk	2.1496	1.3278	1.619	0.1055
Nor_Communes	-0.5747	0.3181	-1.807	0.0708 .

. p < .1. *p < .05. **p < .01. ***p < .001.

Confirming the value of Trøndsk as a distinct linguistic system, this model shows that bilinguals who spoke Trøndsk were more accurate than bilinguals who spoke Østnorsk, Vestnorsk and Nordnorsk ($p < .05$). This model complements the results from the previous analysis.

Again, the number of Norwegian communes in which the bilingual participants had lived appeared to predict response times. However, this effect was only marginal ($p < .1$).

Table 11B: Dataset 2A, final model of response times, bilingual participants

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.119261	0.039731	-3.002	0.0022
YearsInNO	-0.004393	0.001499	-2.931	**0.0032**
StayInOtherYES	0.080827	0.028888	2.798	**0.0032**
DialectNordnorsk	-0.043225	0.030150	-1.434	0.1676
DialectTr¿ndsk	-0.097433	0.024952	-3.905	**0.0001**
DialectVestnorsk	-0.082232	0.050767	-1.620	0.0864

The results from the analysis of bilingual *response times* (presented in Table 12B) show that bilinguals are significantly affected by dialect ($p < .001$) and number of years spent in Norway ($p < .01$). Bilingual participants appear to be positively affected by exposure to and experience with the Norwegian language. Participants who had stayed in a country where they do not speak English, however, responded slower than participants who had not ($p < .01$). Again, I attribute these results to the fact that 'StayInOther' was included as a categorical factor.

6.3.2 Dataset 2A: Monolingual participants

The initial full model for accuracy among monolingual participants included all the predictors I had previously used to analyze monolingual performance. However, none of these factors appeared to predict accuracy in dataset 2A. Neither did they predict response times. This lack of result suggests that the first set of analyses, including all participants, reflected the effects of dialect and years spent in Norway for bilingual participants, not monolingual participants.

A possible explanation as to why monolingual participants remain unaffected by dialect is their previous experience with different Norwegian language variants. Growing up in Norway entails diverse linguistic exposure. The monolingual participants had most likely had some experience with these dialects. Norwegian dialects are well represented in the media (TV and radio). Presenters and people interviewed speak different dialects. Also, Norwegian people move around a lot. The Norwegian mobility thus increases dialectal exposure. For this reason,

the effects of dialect might not be as big for participants from the monolingual group as for many of the bilingual participants who came to Norway during their teens. The bilingual participants did not share this diverse dialectal experience.

6.4 Dataset 2B: Group comparison

Dataset 2b included data from the comprehension section of task 1 in which the participants were tested in terms of how well they were able to understand two different foreign accents in Norwegian, respectively American and French.

The initial full model included all the previous predictors. Table 12A lists the estimated coefficients, their standard errors, z-values and associated p-values for the significant predictors in the final model of *accuracy*.

Table 12A: Dataset 2B, final model of accuracy

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	2.1888	0.8332	2.627	0.00861 **
StayInEngYES	0.7429	0.2823	2.632	0.00849 **
Eng_write_listen	1.5641	0.7511	-2.082	0.03731 *

. p < .1. *p < .05. **p < .01. ***p < .001.

Again, this model illustrates that both level of proficiency in English writing/listening ($p < .05$) and whether or not the participants had stayed in an English speaking country ($p < .01$) affected their levels of accuracy. Both predictors decreased the number of errors. The fact that one of the foreign accents was American suggests that the participants might have overlaid the phonological structure of English on Norwegian and thus benefitted from their experience with the English language. This is indeed a metalinguistic task of a phonological nature.

Moreover, it is interesting to note that this model suggests that monolingual and bilingual participants performed equally well. A possible explanation is the overall lack of familiarity with these accents, across both groups. It was equally difficult for both groups to process these foreign accents.

Table 12B: Dataset 2B, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.239084	0.061963	-3.859	0.0001
Age	0.004255	0.001893	2.248	**0.0110**
Eng_speak	-0.032631	0.012524	-2.606	**0.0056**

Table 12B illustrates that age and proficiency in English speaking were the only predictors of *response times*. Younger participants responded faster than older participants ($p < .05$). High-proficient speakers of English responded faster than low-proficient speakers of English ($p < .01$). However, there was no difference between the two groups.

6.5 Dataset 3: Group comparison

Dataset 3 included only data from the short term memory section of task 1. Table 13A lists the estimated coefficients, their standard errors, z-values and associated p-values for the predictors that emerged as significant in the final model of *accuracy* in dataset 3, including both groups of participants.

Table 13A: Dataset 3, final model of accuracy

	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.02644	0.90403	0.029	0.9767
Nor_Communes	-0.43524	0.20234	-2.151	0.0315 *
Eng_listen_speak	1.76562	0.79556	2.219	0.0265 *

. $p < .1$. *$p < .05$. **$p < .01$. ***$p < .001$.

The analysis of possible predictors of accuracy in dataset 3 showed that the number of Norwegian communes in which the participants had lived and the participants' proficiency in English listening/speaking were the only significant predictors. Whereas the numeric variable 'Nor_Communes' decreased accuracy ($p < .05$), English proficiency increased accuracy ($p < .05$). This suggests that oral proficiency facilitates short term memory. These results indicate

that bilingualism enhances comprehension and storing of unfamiliar sound patterns. This finding is consistent with results from previous research which suggests that bilingualism entails advantages in working memory (Bialystok, Craik, & Luk, 2012; Lauchlan, Parisi, & Fadda, 2012).

The grouping did not have significant effect on accuracy. The two groups were equally able to understand and retrieve this factual information.

Table 13B: Dataset 3, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.41036	0.05308	-7.731	0.0001
BilingualYES	0.05237	0.02355	2.224	**0.0096**
Eng_listen_speak	0.07453	0.03966	1.879	**0.0304**

However, Table 13B illustrates that bilinguals were significantly slower to respond correctly to these questions than monolinguals ($p < .01$). This suggests a slight monolingual advantage for short term memory questions. Also, this model suggests that participants with high levels of English proficiency were slower to respond than less proficient participants ($p < .05$). Nevertheless, this is not very interesting.

6.6 Dataset 4: Group comparison

Dataset 4 included data from task 2: the lexical decision task. No factors appeared to be significant in terms of determining the participants' accuracy. There was no difference between the two groups.

Table 14: Dataset 4, final model of response times

	Estimate	Std. Error	t value	pMCMC
(Intercept)	-0.63952	0.03764	-16.99	0.0001
StayInOtherYES	0.09068	0.04983	1.82	**0.0288**

Table 14 shows that stay in a non-English speaking country was the only predictor of response times ($p < .05$). As opposed to the results from the short term memory section of task 1, this model suggests that there was no difference between the two groups in terms of how fast they gave their responds. This result can be attributed to the bilingual participants' diverse linguistic experience which might make it easier for them to remember words as opposed to factual information. This also indicates that they were all bilingual to a certain degree.

7 Discussion

In this study two groups of Norwegian speakers were tested in processing of Norwegian dialects and foreign accents in Norwegian. The participants completed two individual tasks. Dataset 1, 2, 2a, 2b and 3 included data from task 1. Dataset 4 included data from task 2 (the lexical decision task).

The results from this study invalidated my original hypotheses. Analyses of dataset 1-3 showed that participants from what was originally defined as the bilingual group were less accurate and slower to respond to the questions than participants from the monolingual group. At first sight, bilingualism appeared to be disadvantageous.

However, all analyses from task 1 consistently showed that bilingual factors, including English proficiency and diverse experience with linguistic systems, predicted both accuracy and response times amongst both groups of participants. I observed that the supposedly monolingual participants benefitted from their experience with other languages. Their level of bilingualism affected their ability to process Norwegian dialects and foreign accents in Norwegian. The bilingual advantage in speech perception among young adults was thus largely confirmed.

The results from this study can be attributed to the heterogeneity of the bilingual group and the complexity of the Norwegian language situation, as well as the documented bilingual advantage in executive and attentional control.

7.1 Heterogeneity

My first research question was: Does the bilingual advantage in speech perception persist into young adulthood? Judging from the analyses of dataset 1-3, the answer is: no, bilingual participants lag behind monolingual participants. However, as confirmed by developmental research, bilingualism is not a clear-cut variable (Bialystok, 1988; Bialystok, 2001). According to Werker & Byers-Heinlein (2008), language combination, context of exposure and age of acquisition are important factors in determining the bilingual characteristics.

Initially, I was surprised to find that monolingual participants performed better than bilingual participants. I expected that the participants from the bilingual group would benefit from their bilingualism and outperform the participants from the monolingual group who presumably shared a lower level of bilingual language competence.

However, the bilingual group was a heterogeneous group. 17 different language combinations were represented in this study. According to Werker & Byers-Heinlein (2008), these different language pairs represent different linguistic challenges and cannot rightfully be compared. Previous research has found that different language pairs entail different sets of bilingual effects on other achievements (Bialystok, 2001). The variety of language combinations included in this study can thus explain the puzzling finding that monolingual participants outperformed bilingual participants who supposedly shared a higher level of bilingualism.

This study does, in fact, confirm how different linguistic challenges entail different sets of bilingual effects on cognitive and linguistic development. Bilingual participants who spoke Trøndsk were better able to understand the different dialects and accents included in task 1 than bilingual participants who spoke Vestnorsk, Nordnorsk and Østnorsk. This shows that experience with certain linguistic environments compared to other environments convey more advantages.

Developmental research has demonstrated that level of bilingual proficiency depends upon onset age (Bialystok, 2001; Werker, & Byers-Heinlein, 2008). The surprising finding that participants from the bilingual group were less accurate than participants from the monolingual group can thus be further attributed to the bilingual group's wide range of onset age. The age range of Norwegian onset among bilingual participants in this study was 0-30. Whereas some of the bilingual participants were born and raised in Norway and had acquired Norwegian as one of their L1s, others arrived in Norway during their early teens and thus acquired Norwegian as their L2. This suggests that they did not share the same level of bilingualism. According to Lenneberg (1967), the ability to acquire language is linked to age. It is easier to acquire language in childhood.

All bilingual participants shared a background in Norwegian. However, as simultaneous acquisition entails a different set of bilingual characteristics than sequential acquisition of language, one may assume that these participants did not share the same level of Norwegian proficiency. They did not share the same bilingual characteristics. Many of the bilingual participants were, thus, tested in their weaker language. The participants from the bilingual group did not share the same amount of experience with Norwegian.

We know that different learning environments enhance different sets of language abilities as different settings require different skills. This is another indicator that the level of bilingual proficiency among the bilingual participants differed a lot. The bilingual participants had

acquired Norwegian under different condition; in different contexts. Grosjean (2008) argues that different language contexts require different patterns of language behavior. These differences can account for the variety of levels of bilingualism among these participants, and explain why the results from this study showed that bilinguals were outperformed by monolinguals.

The heterogeneity of this group was thus a methodological disadvantage and it clearly affected the results.

7.2 The bilingual value of the Norwegian language situation

My second aim was to establish whether the Norwegian context affected the processing of Norwegian dialects and accents.

The results from this study show that participants from both groups benefitted from their experience with English and exposure to other languages. This study thus confirms that the level of bilingualism among Norwegians has positive effects on speech perception. Language input in the Norwegian community can further explain the unexpected finding of monolingual participants outperforming bilingual participants.

Growing up in Norway, the monolingual participants have received massive input in different dialects as well as in English. Dialect variation is in fact taught in school. The Norwegian school system thus promotes bilingualism. The Norwegian language situation is unique. Norwegians acquire multiple different linguistic systems, including Nynorsk and Bokmål (the two standard languages) and a variety of different dialects. Multidialectal literacy is taught in school.

This research confirms the bilingual nature of the Norwegian language situation and its potential benefits. The questionnaire did not include Norwegian proficiency. Levels of proficiency in Nynorsk/Bokmål were therefore not included as predictors in the analyses of participants' performance. However, the results from this study show that the linguistic diversity to which Norwegians are exposed is beneficial in terms of the development of speech perception skills. I therefore expect that the participants' experience with different language variants of Norwegian only would have strengthened this effect. Norwegians are in fact bilingual and benefit from their linguistic experience. The Norwegian context did in fact affect the participant's performance.

The monolingual group represented a homogeneous variant of bilingualism which suggests that this group was more representative of bilingualism in Norway than the bilingual group. Homogeneity is crucial in assuring the generality of the claim.

7.3 Cognitive control and linguistic experience

All analyses consistently showed that both groups were affected by their previous experience with linguistic systems. The results showed that their proficiency in English and experience with other languages affected the participants' performance in this study. Werker et al. (2007) attribute their results to the bilingual selective and attentional control. This is consistent with previous research which suggests that bilingualism enhances different cognitive skills, including the executive control system.

It is well-established that bilingualism enhances cognitive control. Bilinguals are better able to control their attention than monolinguals (Bialystok, 2001). Bialystok (2001) describes this advantage as one of the most important cognitive effects of bilingualism. Unique to bilinguals, the sensitivity towards language differences and the ability to focus on relevant information is practiced every single day in the handling of two languages at the same time. I therefore attribute the results from this study to the documented bilingual cognitive advantages and the bilingual experience with diverse linguistic systems; the bilingual awareness of the arbitrary nature of words.

Their unique sensitivity towards language differences and ability to control their attention appear to benefit bilinguals in the processing of Norwegian dialects and foreign accents in Norwegian. The analyses show that more varied linguistic experience increases accuracy and decreases response times. This suggests that bilingualism makes it easier to focus on relevant information. Bilingualism helps the participants to focus on linguistic information (content) rather than the formal phonological specificities of the dialects/accents they were listening to. This study suggests that bilingual factors increase attentional control and executive processing. However, the evidence is tentative. Further evidence is required.

Modern research clearly demonstrates cognitive advantages for bilinguals, displayed in metalinguistic awareness, creativity and flexibility. However, recent research has shown that these effects depend on level of bilingual language competence. This is further confirmed in this study. High proficient bilinguals (from both groups) were more accurate than less proficient bilinguals. Participants with diverse linguistic experience were better able to

perceive speech than participants with less linguistic experience. Participants from both groups benefitted from their bilingual language experience, suggesting that they had acquired the threshold level of language competence described by Cummins (1979).

8 Conclusion

First of all, the present study demonstrates that bilingual experience and exposure has positive effect on speech perception in young adults. Although the supposedly monolingual group outperformed the bilingual group, both groups were positively affected by their bilingual background.

Coding the participants' background information provided in the questionnaire, I found that the bilingual group was very heterogeneous. Also, I found that the monolingual group shared a high level of diverse linguistic experience. I therefore adjusted my hypothesis. Nevertheless, I assumed bilingualism to be a positive force in the processing of Norwegian dialects and foreign accents in Norwegian.

These results confirm the bilingual nature of the Norwegian language situation. The two groups included in this study represented two variants of bilingualism. The monolingual participants shared a diverse linguistic background. Born and raised in Norway, the participants in the supposedly monolingual group had been exposed to a number of different dialects as well as they had acquired multidialectal literacy in school. This suggests that they shared a high level of bilingualism. Additionally, they were very proficient in English. The two groups included in this study were, thus, both bilingual. These results complement Vulchanova et al.'s (in preparation) studies and maintain the bilingual value of the linguistic situation in Norway.

This study confirms previous evidence suggesting that degree of language proficiency determines the bilingual effects on the development of cognitive and linguistic skills. Participants with high levels of English proficiency and diverse linguistic experience performed better than low-proficient participants with less linguistic experience. Amount of language exposure and type of bilingualism are important aspects of determining the bilingual characteristics. As confirmed in this study, different language pairs entail different linguistic outcomes. Bilingual participants who spoke Trøndsk were better able to understand Norwegian dialects and foreign accents than bilingual participants who spoke Østnorsk, Nordnorsk and Vestnorsk.

Although my original hypothesis was invalidated, my prediction that bilingualism would have positive affect on the processing of Norwegian dialects and accents was largely confirmed. I attribute the fact that the supposedly monolingual group outperformed the bilingual group to

the heterogeneity of the bilingual group and the diverse linguistic experience of the monolingual group. Degree of bilingualism determines how bilingualism affects different areas of development and should therefore be accounted for in future research.

This study gives us an idea of how we can study bilingualism further in the Norwegian context. The complexity of the Norwegian context must be taken into account. Further larger sample should ensure the homogeneity of groups, check for proficiency in Norwegian and the effects of active/inactive use of Nynorsk/Bokmål.

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Appendix 1: Questionnaire

Bakgrunnsinformasjon for forskningsprosjekt om taleoppfatning og flerspråklige ferdigheter

Tusen takk for at du har sagt ja til å delta i mitt forskningsprosjekt om taleoppfatning og flerspråklige ferdigheter. I dette skjemaet ber vi om bakgrunnsinformasjon som er nødvendig for at resultatene fra undersøkelsen skal kunne brukes.

Alle opplysningene du gir her, vil senere bli behandlet uten direkte gjenkjennende opplysninger. En kode knytter deg til dine opplysninger gjennom en deltakerliste. Det er kun autorisert personell knyttet til prosjektet som har adgang til deltakerlisten og som kan finne tilbake til infoen. Del B og C av dette skjemaet vil bare oppbevares med koden. All informasjon vil bli anonymisert ved prosjektslutt. Det vil ikke være mulig å identifisere deg i resultatene av studien når disse publiseres.

Legg merke til at skjemaet har 3 sider.

Skjemaet leveres direkte til meg.

Med takknemlig hilsen,

Maria F. Asbjørnsen

Masterstudent ved Institutt for moderne fremmedspråk, NTNU

<u>Del A: Personlig informasjon</u>

Fag/Yrke: _____

Fødselsår: _____

Kjønn □ Kvinne □ Mann

Bostedskommune: _____

Deltakerkode:
(Fylles inn av prosjektleder)

Del B: Språklig bakgrunn

Morsmål

Er norsk morsmålet ditt?

□ Ja □ Nei

Hvis ja, har du andre morsmål i tillegg?

□ Ja □ Nei

Hvis ja, hvilke(t) språk? _____

Hvilket språk bruker dere hjemme? _____

På norsk, hvilken dialekt snakker du? _____

Hvor i Norge har du bodd, og hvor lenge?

Kommune	**Antall år totalt**

Engelsk og andre fremmedspråk

I **engelsk**, hvordan vurderer du ferdighetene dine på hvert av disse områdene?

	Grunnleggende	**Middels**	**Avansert**	**Flytende**
Lesing				
Skriving				
Snakke				
Lytte				
Totalt				

Har du bodd i, eller hatt lengre opphold i, et land hvor engelsk er hovedspråk?

□ Ja □ Nei

Hvis ja, hvor lenge varte oppholdet/oppholdene?_____

_____

Har du bodd i, eller hatt lengre opphold i, et land hvor annet enn engelsk er hovedspråk?

□ Ja □ Nei

Hvis ja, hvor var det, og hvor lenge varte oppholdet/oppholdene?

_____

Hvilke språk kan du utover morsmålet ditt og engelsk?
*(Hvis du ikke snakker andre språk, gå til **del C**)*

Språk	**Nivå**			
	Grunnleggende	**Middels**	**Avansert**	**Flytende**
Tysk				
Fransk				
Spansk				
- angi språk				
- angi språk				
- angi språk				

Del C: Andre faktorer i språklæring

Har du, eller har du hatt, problemer med synet utover normal brillebruk?
□ Ja □ Nei

Har du, eller har du hatt, problemer med hørselen?
□ Ja □ Nei

Har du, eller har du hatt, språkvansker av noe slag (spesifikke språkvansker, lese-/lærevansker eller lignende)?
□ Ja □ Nei

Har du, eller har du hatt, andre diagnoser som kan tenkes å påvirke språklæring (ADHD, autisme eller lignende)?
□ Ja □ Nei

Er du venstrehendt?
□ Ja □ Nei

Appendix 2: Task 1, text read in dialect

Nordavinden og sola kranglet om hvem av dem som var den sterkeste. Da kom det en mann gående med en varm frakk på seg. De ble enige om at den som først kunne få mannen til å ta av seg frakken skulle regnes som den sterkeste av dem. Så blåste nordavinden med all sin makt. Men desto mer han blåste jo tettere trakk mannen frakken rundt seg og til slutt måtte nordavinden gi opp. Da skinte sola frem så godt og varmt at mannen straks måtte ta av seg frakken. Og så måtte nordavinden innrømme at sola var den sterkeste av dem.

Appendix 3: Task 1, text read in dialect, questions

1. Hva gjorde nordavinden og sola? (comprehension question)
   a) Lekte
   b) Kranglet
   c) Diskuterte
   d) Danset
2. Hva kranglet nordavinden og sola om? (comprehension question)
   a) Hvem som var den sterkeste
   b) Hvem som var den varmeste
   c) Hvem som kunne få damen til å ta av seg frakken
   d) Hvem som var den kraftigste
3. Hva hadde mannen på seg? (comprehension question)
   a) En varm frakk
   b) En ullfrakk
   c) En tynn frakk
   d) En tykk frakk
4. Hva gjorde mannen når Nordavinden blåste alt han kunne? (comprehension question)
   a) Trakk frakken tettere rundt seg
   b) Knyttet frakken rundt seg
   c) Tok av seg frakken
   d) Kneppet igjen frakken
5. Hvorfor tok mannen av seg frakken? (comprehension question)
   a) Fordi solen skinte så varmt
   b) Fordi nordavinden blåste alt han kunne
   c) Fordi solen vokste og skinte på mannen
   d) Fordi nordavinden gav opp
6. Hvor stammer denne dialekten fra? (comprehension question)
   a) Telemark (Fyresdal)
   b) Sogn og Fjordane (Gaular)
   c) Nord-Trøndelag (Stjørdal)
   d) Hedmark (Trysil)

Appendix 4: Task 1, text read in French accent

Anne og Kjell har tre barn. Bjørn er minst. Han er bare to år og går i barnehagen. Ulf er åtte år og går på den samme skolen som Kjell underviser. Det eldste barnet er en jente på 12 år som heter Synnøve. Hun skal begynne på ungdomstrinnet snart. Synnøve har allerede bestemt seg for at hun skal bli lærer akkurat som faren.

Appendix 5: Task 1, text read in French accent, questions

1. Hvor mange barn har Anne og Kjell? (STM question)
   a) 1
   b) 2
   c) 3
   d) 4
2. Hvem er den yngste? (STM question)
   a) Bjørn
   b) Ulf
   c) Synnøve
3. Hvor gammel er Ulf? (STM question)
   a) 2
   b) 8
   c) 12
   d) 13
4. På hvilket skoletrinn går Synnøve? (comprehension question)
   a) Førskolen
   b) Barneskolen
   c) Ungdomsskolen
   d) Videregående skole
5. Hva skal Synnøve bli når hun blir stor? (comprehension question)
   a) Lærer
   b) Professor
   c) Tannlege
   d) Førskolelærer
6. Hva slags aksent hadde personen som leste teksten? (comprehension question)
   a) Finsk
   b) Fransk
   c) Kinesisk
   d) Amerikansk

Appendix 6: Task 1, text read in American accent

Anne er gift med Kjell. Han er 45 år gammel og jobber som lærer på barneskolen. Akkurat nå har han ansvaret for en klasse på 24 elever. Kjell synes det er fint å være lærer, men han må ofte jobbe om kvelden også. Da retter han stiler og prøver som elevene har skrevet. Kjell liker å gå på kafe eller kino med venner når han ikke jobber.

Appendix 7: Task 1, text read in American accent, questions

1. Hvem er gift med Kjell? (STM question)
   a) Anne
   b) Anette
   c) Berit
   d) Bente
2. Hvor gammel er Kjell? (STM question)
   a) 40
   b) 35
   c) 45
   d) 30
3. Hvor jobber Kjell? (comprehension question)
   a) På barneskolen
   b) På ungdomsskolen
   c) På videregående skole
   d) I barnehagen
4. Hvor mange elever har Kjell ansvaret for? (STM question)
   a) 24
   b) 31
   c) 20
   d) 22
5. Hva gjør Kjell ofte på kveldene? (comprehension question)
   a) Går på kafé med venner
   b) Retter prøver og stiler
   c) Setter karakterer
   d) Går på kino
6. Hva slags aksent hadde personen som leste teksten? (comprehension question)
   a) Finsk
   b) Fransk
   c) Kinesisk
   d) Amerikansk

Appendix 8: Task 2, words included in the lexical decision task

Target	Text
Barneskolen	American
Klasse	American
Synes	American
Nå	American
Venner	American
Ansvaret	American
Elever	American
Ofte	American
Gammel	American
Gift	American
Begynne	French
Barnehagen	French
Bare	French
Underviser	French
Bestemt	French
Allerede	French
Akkurat	French
Barn	French
Jente	French
Minst	French
Gående	Dialect

Regnes	Dialect
Makt	Dialect
Hvem	Dialect
Innrømme	Dialect
Sterkeste	Dialect
Først	Dialect
Dem	Dialect
Varm	Dialect
Godt	Dialect
Hunden	Did not appear
Spennende	Did not appear
Lik	Did not appear
PC	Did not appear
Klasseavslutning	Did not appear
Niste	Did not appear
Lærerværelse	Did not appear
Hvilken	Did not appear
Elsker	Did not appear
Erte	Did not appear
Lekser	Did not appear
Bursdag	Did not appear
Kjærlighet	Did not appear
Senere	Did not appear

Sjelden	Did not appear
Enkelt	Did not appear
Spille	Did not appear
Spise	Did not appear
Nekte	Did not appear
Sist	Did not appear
Dataspill	Did not appear
Nesten	Did not appear
Tentamen	Did not appear
Lønn	Did not appear
Kun	Did not appear
Aldri	Did not appear
Kaffe	Did not appear
Ungdomsskolen	Did not appear
Ingenting	Did not appear
Trist	Did not appear