



Demystifying Bilingualism

How Metaphor Guides Research
towards Mythification

Silke Jansen · Sonja Higuera del Moral
Jessica Stefanie Barzen · Pia Reimann
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1

Introduction

Since language is not a thing-in-itself nor an end-in-itself, the mere possession of two languages in no sense ensures any intellectual advantage over the monoglot, nor does it necessarily involve any other advantage of any kind. The value, like the life, of a language depends exclusively on the use made of it.
—O’Doherty (1958: 284)

For more than 100 years, bilingualism has fascinated and polarized researchers and practitioners alike. Opinions on the implications of bilingualism for individuals could not have been more divergent. In 1890, Simon Somerville Laurie, Professor of Education at Edinburgh University, affirms in his textbook *Lectures on Language and Linguistic Method in School*, delivered at the University of Cambridge:

If it were possible for a child or boy to live in two languages at once equally well, so much the worse. His intellectual and spiritual growth would not thereby be doubled but halved. Unity of mind and of character would have great difficulty in asserting itself in such circumstances. (Laurie 1890: 15–16)

Today, we appear to have left those prejudices behind. Far from condemning bilingualism as an unnatural and potentially harmful condition, educationalists champion it, supported by education policy and academia. Many researchers espouse the benefits of multilingualism, both for one's personal life and for cognitive development:

For those fortunate individuals who have mastered multiple languages, either by the force of circumstance or the fruit of free choice, there is little doubt that life is enriched and experience enhanced [...] It is incontrovertible that bilingualism enriches life by opening the individual to other forms of knowledge, other cultures, and other types of thought. It is a serendipitous bonus that it may also bestow the individual with an enhanced skill in executing a fundamental cognitive process. (Bialystok et al. 2005: 103, 117)

These two excerpts typify the common doctrine regarding the impact of bilingualism on cognition at different moments in time. At the end of the nineteenth century and in the first half of the twentieth century, the idea that bilingualism had detrimental effects on cognitive development and performance was a common belief among psychologists and seemed to be widely supported by empirical data gathered in intelligence tests since 1911. Beginning with a seminal study by the Canadian researchers Peal and Lambert (1962), however, the 1960s saw a radical upheaval in research on bilingualism and cognition. It was claimed not only that bilingualism was not an obstacle to the normal development of children, but that it was even beneficial because it increased cognitive flexibility and creativity. From the 1980s onward, this positive evaluation of bilingualism gained more and more ground in Cognitive Psychology. A new line of research arose around the Canadian psychologist Ellen Bialystok, who claimed that bilingualism enhanced executive functions—a view that would come to be known as the “bilingual advantage hypothesis.” Although it did not go unchallenged, the bilingual advantage hypothesis has been the dominant paradigm in experimental research on bilingualism and cognition until recently. In the last few years, however, growing evidence has been presented to indicate that cognitive differences between monolinguals and bilinguals might indeed be insignificant or non-existent.

Even when we assume that science advances, such a dramatic turn-around seems suspicious—especially for an empirical discipline such as Cognitive Psychology, with its high commitment to reliability, validity, and objectivity. Consequently, within-discipline critique has mainly focused on methodological issues that may have imposed different kinds of biases during research, among them the choice of informants, the tools of data collection, the execution of tests, and the statistical processing of data. Very few authors have raised questions that go beyond the discussion of established quality criteria for psychometrical research nor have they addressed possible epistemic biases that arise from underlying mental models and attitudes. In one of the few critical reflections, Kroll, Dussias, Bogulski, and Valdes Kroff wonder why bilingualism should be considered to be an exceptional condition at all:

In retrospect, it is remarkable given the prevalence of bilingualism in many places in the world that bilinguals would be considered a special group, as if the active use of two languages were a disorder (e.g., Grosjean, 1989). Why have bilinguals been considered special? On grounds of parsimony, one might argue that humans evolved to speak a single language and that adding a second language (L2) complicates the situation in a way that makes bilinguals special and different from ideal speakers. But why assume that evolution selected monolingualism as the norm? There are far too many bilingual and multilingual speakers in the world to believe that multiple language use is an aberration. A more compelling argument is that the acquisition of a second language as an adult has been documented to be a difficult task, often marked by incomplete knowledge of the L2 grammar and phonology. (Kroll et al. 2012: 230)

What is striking here is the ahistorical nature of the argumentation, which attributes perceptions of bilinguals as being special to an evolutionary disposition of the human species, or to general human experience with second language (L2) learning and acquisition. Yet, an alternative view could be that perceptions and evaluations of bilingualism in scientific research are social phenomena that emerge from cultural traditions. Seen from such an angle, the view of bilingualism as abnormal can be traced back to the nation-state model, which regarded monolingualism as

the ideal condition of societies and individuals, while postmodern thinking that arose in the second half of the twentieth century allowed and even stimulated more positive evaluations of bilingualism (see Geeraerts 2008). Acknowledging the “intrinsically historical, action-related and socio-culturally anchored nature of all phenomena of language” (Blommaert 1999: 5), we argue that some researchers of bilingualism were affected by socio-cultural context and changing attitudes toward bilingualism in mainstream society, be it consciously or not. Against this backdrop, we take the debate on possible cognitive advantages or disadvantages of bilinguals as a starting point to reflect on the socio-cultural situatedness of science. Our assumption is that language myths—that is, generally held beliefs about the nature and functioning of language(s)—have played an important part in how cognitive psychologists have formulated their research questions, designed their experiments, and interpreted their data. According to Watts (2011: 16), “[L]anguage myths, like all other myths, are communally shared stories that, regardless of their factual basis, are believed and propagated as the cultural property of a group” (see also Charteris-Black 2009: 100). As cultural artifacts, they are passed on within societies and to future generations as a means of making sense of the world surrounding us. The language myths relevant to our study have been spun around the nature of language, the relationships between languages as well as between languages and their speakers, and the role of language(s) within society. They form part of the bulk of popular representations and folk traditions that unconsciously shape our understanding of language in society. Although many myths contain a grain of truth, they are still historically bound social constructions of reality.

The most obvious way of shedding light onto language myths is analyzing metalinguistic discourse. As will become clear from our analysis, researchers in Cognitive Psychology cannot discuss issues of bilingualism and cognition without revealing their fundamental ideas concerning the nature of language, its functioning in the brain, and its role in society. Thus, discourse on bilingualism and cognition *is* actually a kind of metalinguistic discourse. If it is true that Cognitive Psychology builds its theories of bilingualism on common language myths, we should find them reflected in the way researchers discuss language in their papers. Given

that widespread language myths essentially rely on metaphors, and that metaphor is also a central tool in scientific theory-building, metaphorical language provides an important access point for studying how language myths have shaped scientific practice.

The aim of the present study is to trace language myths (as instantiated by metaphors) in this particular scientific discourse domain, and to unravel its interconnections with other discourse domains and practices of knowledge production in Western societies. Utilizing a corpus of scientific papers that cover a time period of approximately one century, it combines qualitative and computer-aided quantitative approaches under a critical metaphor analysis framework (see Charteris-Black 2004; Koller 2005).

Following this introduction, Chap. 2 provides an overview of the development of research on the effects of bilingualism on cognitive performance from the beginning of the twentieth century until today. It presents the different stances that research has taken toward bilingualism at different moments in time and in different countries. Chapter 3 is dedicated to theoretical and methodological issues, among them the concept of language myth, the composition of the corpus analyzed here, the selection of linguistic phenomena that are the focus of our study, and the theoretical foundations of our study in Cognitive Linguistics and discourse analysis. Metaphors and, to a lesser degree, metonymies will be the focus of our analysis given their particular contribution to the discursive construction of language(s) and bilingualism in the corpus texts, and their heuristic function both in language myths and in scientific theory-building. Chapters 4–7 form the centerpiece of this study, where we aim to detect language myths in scientific discourse. Chapter 4 discusses ontological metaphors, that is, the conceptualization of abstract phenomena, such as language(s) in terms of objects, substances, or containers. It is only thanks to these ontological reifications that psychologists can think of languages and language components as having some kind of concrete existence in the brain, and of interacting with each other in different ways. Chapter 5 is devoted to a widespread and deeply entrenched narrative that metonymically links languages to nations and to issues of national identity and belonging. We will argue that the nation-state myth has had a profound and long-lasting impact on (mainly negative)

attitudes toward bilingualism, which still manifests itself today in the terminology used to refer to linguistic issues. In line with the basic assumptions of nineteenth-century nationalism and imperialism, the metonymic conflation of languages, language components, speakers, and nations paved the way for the understanding of bilingualism in terms of conflict and rivalry in speaker's brains: Because languages and their speakers were identified with nations, and nations were considered to constantly be engaged in war, it was assumed that interactions between languages in the mind should also be understood in terms of war.

Chapter 6 discusses two metaphors that scientific discourse relied on at different moments in time to describe human brains and mental activities: *THE MIND IS AN ORGANISM* and *THE MIND IS A MACHINE*. In the course of our investigation period, researchers increasingly moved away from an organic understanding of language as being intimately interconnected with emotions, ways of thinking, as well as individual and collective identity, in order to embrace a mechanistic view of mental processes and speech production. This shift allowed speed and efficiency to become core values in scientific discourse on bilinguals' cognitive performance. Against this backdrop, Chap. 7 provides a detailed analysis of different kinds of metaphors that have been used in scientific discourse to explain how different languages coexist and interact in a bilingual's brain. These metaphors can be related mainly to three source domains: *WAR* in the first half of the twentieth century, and later *SPORTS* and *BUSINESS COMPETITION*. These different source domains can be schematically reduced to the idea of *contentious activities* between two parties. The *CONTENTION* metaphor scheme is not only all-pervasive in discourse on the impact of bilingualism on cognition, but even constitutive for theories proposed to explain the bilingual advantage or disadvantage. In line with our everyday understanding of these activities, war has disastrous consequences for the people involved, while sports and business competition are associated with enhanced performance of competitors. Thus, the idea that being bilingual entails conflict and/or competition between languages is consistent throughout the entire investigation period, while it receives different interpretations at different moments in time, leading to either negative or positive evaluations.

Chapter 8 situates these findings within a broader context of knowledge production in science and society. It argues that the archetype of Cognitive Psychology's metaphorical models of bilingualism is the LIFE-AS-A-STRUGGLE metaphor, which is historically and ideologically linked to Darwin's evolutionary theory. To the extent that this metaphor evolved into a dominant paradigm in a broad range of disciplines from the Sciences and Humanities, it was also able to spread into public thinking and discourse, and to become an epochal making, overarching explanatory pattern of our time. Once being established in experimental research on bilingualism and cognition, the LIFE-AS-A-STRUGGLE metaphor received different interpretations according to changing mainstream beliefs and attitudes toward bilingualism that evolved in the course of the twentieth century, under the successive influence of imperialism and nationalism, postmodernity and neoliberal multiculturalism. All this reveals that science is not an objective search for "truth," but a socio-culturally situated practice of knowledge production, whose results are highly influenced by context and ideological stance.

In summary, our point is that bilingualism has become an object of mythification in Western societies and, as a consequence, in science. We will argue that the discourse of bilingual exceptionalism that has characterized research into bilingualism and cognition is ultimately derived from the nation state myth with its idealized one-to-one relationship between language and (national) collective identity. The aim of our study is to systematically uncover the language myths—understood here as a set of historically transmitted and largely unquestioned assumptions on the nature of language and its relationship to speakers and speaker groups—that underlie conceptualizations of bilingualism in research in order to encourage discussion on the heuristic status of scientific models and findings, as well as on their historical roots and social embeddedness. Although we may not be able to definitively unravel the mystery of whether bilinguals are more or less intelligent than monolinguals, we can at least shed some light on what has made the "bilingual (dis)advantage" hypothesis seem so natural and so appealing to scientists.

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2

Historical Development and State of the Art in Experimental Research on the “Bilingual Advantage/ Disadvantage”

Some investigators have failed to find evidence of a bilingual advantage; others have suggested that bilingual advantages may be entirely spurious, while proponents of the advantage case have continued to defend it. A heated debate has ensued, and the field has now reached an impasse.

—Antoniou (2019: 395)

Research on bilingualism is a vast and fast-developing field that covers a wide range of different research questions and methodological approaches. This chapter presents the historical development of one particular direction within this field that we call the “bilingual advantage/disadvantage” debate. It comprises studies that are based on experimental designs in which several kinds of cognitive performance tests are applied to participants with different language profiles, with the aim of documenting and explaining possible cognitive differences between monolinguals and bilinguals. As will be shown in the following sections, the procedures and results of these studies have been remarkably different across time.

2.1 From the Nineteenth Century to the 1960s: Deficit-Oriented View on Bilingualism

Although bilingualism had concerned Laurie and other educationalists since the nineteenth century, experimentally oriented research on the relationship between bilingualism and cognition was only possible with the creation of instruments to measure intellectual performance.¹ Using the Stanford–Binet test (1911), Saer (1923), Saer et al. (1924) and Smith (1923) published the first studies on possible consequences of bilingualism for cognitive development and intelligence, focusing on Welsh children in the United Kingdom. They found that bilingualism had a detrimental effect on the individual’s identity and cognition—a claim that would mark scholars’ and lay persons’ perspectives on bilingualism for the next four decades. In these and similar studies, it was assumed that bilingual children would display “mental confusion” (Saer 1923: 38), show signs of “mental retardation” (Goodenough 1926: 39), and suffer from a “language handicap” (Anastasi and Cordova 1953: 17; Darcy 1953: 50). Some writers even went so far as to claim that bilingualism led to split personalities and schizophrenia (e.g., Diebold 1968; also cf. Wagener 1928 from a non-experimental perspective). Saer’s and Smith’s work was presented at the international conference *Le bilinguisme et l’éducation*, held in Luxemburg in 1928, where outstanding researchers from different European countries came together for the first time to discuss the implications of bilingualism for individuals and societies (see Bureau international d’éducation 1928, as well as Jansen forthcoming-a). With just a few exceptions that found no impact of bilingualism on intelligence (e.g., Arsenian 1972 [1937]; Darsie 1926; Hill 1936; Jones 1960; Pintner and Arsenian 1937) or even favorable effects (e.g., Davies and Hughes 1927; Stark 1940), the large majority of empirical studies conducted between the 1920s and the 1960s tended to corroborate this deficit viewpoint, finding that bilingual children underperformed in a variety of mental tasks, among them Cattell’s “Culture Fair Intelligence Test”

¹ See also Hakuta (1986: esp. 16ff) on the origins of research on cognition and bilingualism, and its relationship to research on intelligence.

(Anastasi and Cordova 1953), the “Cotswold Mental Ability Task” (Jones and Stewart 1951), and the “National Intelligence Test” (Yoshioka 1929) (e.g., Anastasi and Cordova 1953; Graham 1925; Jones and Stewart 1951; Lewis 1959; Saer 1923; Smith 1923, 1939, 1942; Wang 1926; Yoshioka 1929). As a standard approach, the experiments realized during this period administered an intelligence test (usually the Stanford–Binet test) to the participants which was standardized in the language that was considered to be their native one. The usual result was that bilinguals were inferior to monolinguals, particularly on verbal IQ. It is important to note, though, that these studies reflect a rather progressive attitude for their time, given that in the first decades of the twentieth century, mainstream research on intelligence, especially in the United States, centered around the nature–nurture controversy, and was especially interested in “race.” For example, differences in intelligence found between immigrants and non-immigrant Americans were generally attributed to inheritance rather than to environmental factors such as bilingualism (see Hakuta 1986: 22ff).

2.2 From the 1970s to 2000: Emergence of the Bilingual Advantage Hypothesis

A major turning point in the perceptions of the relationship between bilingualism and cognition was the publication of a seminal article by Peal and Lambert (1962), which overcame many of the methodological weaknesses of the previous period of research which found primarily unfavorable effects (see Baker 1988: 16). Contrary to the findings of previous research, they found that the French–English bilingual children participating in their study performed reliably better than their monolingual peers on several measures of verbal and nonverbal intelligence. Their conclusion—revolutionary at the time—was that bilinguals are advantaged, compared to monolinguals, especially in tasks which require mental flexibility and concept formation. Since their landmark work, the dominant approach to bilingualism and cognitive functioning has moved

away from intelligence testing to a broader range of cognitive measures, including thinking styles, cognitive strategies, and skills.

Subsequent research largely focused on bilinguals' advantages in developing metalinguistic awareness (e.g., Ben-Zeev 1977; Bialystok 1986; Bialystok 1988; Campbell and Sais 1995; Cromdal 1999; Cummins 1978; Feldman and Shen 1971; Galambos and Goldin-Meadow 1990; Galambos and Hakuta 1988; Ianco-Worrall 1972; Ricciardelli 1992). In addition, a range of studies set out to demonstrate advantages in bilinguals concerning non-linguistic cognitive skills, such as symbolic and abstract reasoning (e.g., Bamford and Mizokawa 1991; Diaz 1985; Goncz, 1988; Johnson 1991; McLeay 2003), problem-solving (e.g., Bain 1974; Bialystok 1999; Bialystok and Majumder 1998; Bialystok and Shapero 2005), theory of mind and false-belief reasoning (e.g., Goetz 2003; Rubio-Fernández and Glucksberg 2012), divergent and creative thinking (e.g., Carringer 1974; Cummins and Gulutsan 1975; Kharkhurin 2009; Lee and Kim 2011; Ricciardelli 1992; Srivastava 1991; Torrance et al. 1970), perceptual disembedding and field independence (e.g., Duncan and De Avila 1979), concept formation (e.g., Bain 1974; Liedtke and Nelson 1968), and cognitive flexibility (e.g., Balkan 1970; Kozulin 1999).

Promoted by Ellen Bialystok, one of the leading researchers in this field, the so-called bilingual advantage, broadly understood as enhanced executive control for bilinguals as compared to monolinguals, has been an active focus of research since around 2000. Although she demonstrated that bilinguals are disadvantaged in linguistic proficiency and verbal fluency (i.e., that they show smaller vocabulary in each of their languages than monolingual speakers, as well as deficits in lexical access and retrieval) in various studies (e.g., Bialystok 2001, 2009; Bialystok and Craik 2010; Bialystok et al. 2010, 2012), she argues that this disadvantage is outweighed by advantages in executive function that result in better cognitive performance and substantially predict academic success, and in turn, long-term health and well-being (see Bialystok 2015: 118).

The generally accepted explanation for the positive effects of bilingualism on domain-general non-linguistic skills is based on the assumption that the continuous use and control of, as well as the need to switch between, two languages provides speakers with additional cognitive

training that improves the executive control system. Assuming that both languages are constantly active in bilinguals, even if only one of them is actually spoken in a given setting, attention needs to be focused on the target language and the non-target language must be inhibited to avoid interference that could harm effective communication (see Luk et al. 2011; Antón et al. 2016).

Research on the influence of bilingualism on executive functions² has often focused on the three components initially identified by Miyake et al. (2000): inhibition, shifting or switching, and updating or monitoring. Several researchers have tried to identify precise processes of executive function that are possibly boosted by bilingualism and proposed candidates for this effect, the most common of which is inhibition, as bilinguals performed better in tasks involving conflict conditions in which misleading information must be suppressed than monolinguals (e.g., Bialystok 2001; Bialystok et al. 2008; Bialystok and Martin 2004; Bialystok and Viswanathan 2009; Green 1998; Martin-Rhee and Bialystok 2008).

Furthermore, Costa et al. (2009) and Hernández et al. (2010) stated that the “bilingual advantage” reflects a more efficient monitoring system for conflict resolution, in that bilinguals may be better at coping with cognitively demanding tasks in which different stimuli (some relevant, some irrelevant in a given situation) are present and intermixed. The “bilingual advantage” is found in tasks with inhibitory or monitoring demands, and therefore also extends to task-switching paradigms. Bialystok and Viswanathan (2009), Prior and MacWhinney (2010), Barac and Bialystok (2012), and Gold et al. (2013b) found smaller switching costs for bilinguals as opposed to monolinguals and these effects have been associated with language switching frequency in daily life (see Prior and Gollan 2011).

One executive control process that has been less studied in the context of bilingualism is working memory. The few studies that exist provide mixed results, with some demonstrating a bilingual benefit (e.g., Bialystok et al. 2004; Blom et al. 2014; Grundy and Timmer 2017; Luo et al.

² Broadly speaking, executive functions can be understood as mental processes that are necessary to cognitively control behavior (see Marton 2016: 576 and Veenstra et al. 2016: 6; see also Sect. 7.3.2).

2013; Morales et al. 2013; Soliman 2014; Wodniecka et al. 2010) and others finding no such effect (e.g., Bialystok et al. 2008; Engel de Abreu 2011; Namazi and Thordardottir 2010; Ratiu and Azuma 2015).

Adesope et al. (2010) conducted a meta-analysis and reported that bilingualism was reliably associated with several cognitive outcomes, including increased attentional control, working memory, metalinguistic awareness, and abstract and symbolic representation skills, irrespective of the language pairs spoken by bilinguals (including typologically distant language pairs as English–French and English–Chinese). Ultimately, Kroll and Bialystok (2013) argued that bilingual advantages might be more about general mental flexibility than any specific cognitive component.

Evidence for the cognitive benefits of bilingualism has been provided for a wide variety of tasks (e.g., Simon task, Flanker task, Stroop task, Attentional Networks task, and Dimensional Change Card Sort task, among others) and across the entire lifespan, including infants (e.g., Brito and Barr 2012; Kovács and Mehler 2009), toddlers (e.g., Poulin-Dubois et al. 2011), children (e.g., Bialystok and Barac 2012; Bialystok and Martin 2004; Calvo and Bialystok 2014; Carlson and Meltzoff 2008; Engel de Abreu et al. 2012; Martin-Rhee and Bialystok 2008; Yang et al. 2011) young adults (e.g., Costa et al. 2008; Bak et al. 2014a; Prior and MacWhinney 2010; Vega-Mendoza et al. 2015), and older adults (e.g., Bak et al. 2014b; Bialystok et al. 2004, 2006; Gold et al. 2013a, b; Kavé et al. 2008; Salvatierra and Rosselli 2010).

Furthermore, defenders of the “bilingual advantage” postulate a potential clinical relevance, suggesting that the complex cognitive demands associated with bilingualism contribute to cognitive reserve, which, in turn, delays the onset of dementia symptoms by 4–5 years (see Alladi et al. 2013; Bialystok et al. 2007; Craik et al. 2010; Schweizer et al. 2012; Woumans et al. 2015), and leads to a better cognitive outcome after stroke (see Alladi et al. 2015).

Recently, the behavioral data have been supported by evidence from structural and functional neuroimaging studies, using mainly functional magnetic resonance imaging (fMRI) experiments and showing systematic differences in brain activation and organization between monolingual and bilingual subjects (e.g., Abutalebi et al. 2012, 2015, Gold et al.

2013a; Luk et al. 2011; Mechelli et al. 2004). It is important to note that the evidence for cognitive advantages of bilinguals is only correlational (Kroll et al. 2012b: 14, Bialystok p.c.). Even after 150 years of experimental research on bilingualism and cognition, the question of causation still remains unproven.

2.3 Recent Developments: Backlash Against the Bilingual Advantage Theory

It is worth noting that the fast-growing literature on bilingualism and executive control has been qualified by failures to replicate bilingual advantages. These null results lead several independent research groups to call into question the validity of the putative cognitive benefits of bilingualism and to conclude that the so-called bilingual advantage is either non-existent or might only occur under very specific circumstances (e.g., Antón et al. 2016; Cox et al. 2016; Clare et al. 2016, 2010; De Bruin et al. 2015a; Duñabeitia et al. 2014; Gathercole et al. 2014; Hilchey and Klein 2011; Klein 2016; Kousaie and Phillips 2012a, b; Lawton et al. 2015; Morton and Harper 2007; Paap 2014; Paap and Greenberg 2013; Paap and Sawi 2014; Paap et al. 2014, 2015a; Yeung et al. 2014; Zahodne et al. 2014).

According to Kenneth R. Paap, one of the most prominent of the critics, and his colleagues (Paap 2015; Paap et al. 2015b, 2016), previous research relied on small sample sizes and neglected the role of potentially confounding socio-demographic factors such as immigrant status, educational level, and socio-economic status. With regard to the promising neuroimaging data, they argued that the results were often ambiguous because they failed to align with behavioral performance advantages. Another problem mentioned is the direction of causality between bilingualism and cognitive differences (see also Baum and Titone 2014; Cox et al. 2016): Does bilingualism lead to improved executive functions or are individuals with better executive abilities more likely to become bilingual?

Moreover, they raised the concern of systematic biases: the file drawer problem (i.e., selectively publishing only significant results) and

confirmation bias (i.e., the tendency to search for, interpret, and recall information in a way that confirms one's preexisting assumptions and hypotheses), both result in a strong publication bias in the field. The current literature on bilingualism and executive control has been distorted by researchers, reviewers, and editors who choose to highlight the variables and analyses that "worked," that is, agreed with the assumption that bilingualism enhances executive function, while letting many inconvenient results recede into the background (see Paap 2014: 249; Paap and Liu 2014: 71; Paap & Sawi 2014: 3; Paap et al. 2014: 632, 2015a: 1). In conclusion, bilingual advantages on domain-general cognitive processes might be overestimated due to these publication mechanisms (see De Bruin et al. 2015b).

Bak (2016: 707) counters, however, that critics of the bilingual advantage hypothesis are not immune to those biases either, as they focus almost exclusively on the null results regarding bilingualism and leave unnoticed any other findings. Further, he remarks that a lack of representativity is due to the fact that until recently, most studies on bilingualism and cognition came from a relatively small number of countries, almost exclusively in the Western world, where immigration is an important confounding variable in bilingualism research (see Bak 2016: 711). Laine and Lehtonen (2018: 3) mention further methodological problems, among others, the absence of longitudinal studies that take a random sample of individuals and assign them either to a training group (in an environment that fosters bilingualism) or to a control group (in a monolingual environment), and test both groups before and after the intervention. Furthermore, they argue that an important way forward is to put more emphasis on the individual features of bilingual experience and the interplay of language behaviors and cognition analyzing within-groups of bilinguals instead of comparing bilinguals to monolinguals (see Laine and Lehtonen 2018: 5-6).

While the "bilingual advantage" continues to be the focus of intense controversy, Marzecová (2015) and Baum and Titone (2014) point out that a topic as complex as the interaction between bilingualism and cognitive functions cannot be reduced to a simple "yes" or "no" question. Rather, the debate should be reframed in terms of issues of neuroplasticity more generally in order to develop a more detailed analytic approach that would bring real progress.

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