WORKING IN MULTILINGUAL SETTINGS: THE IMPACT OF SPEAKING A LOWER-FLUENCY LANGUAGE ON BILINGUALS' SELF-REGULATION

by

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Abstract

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With the rise in linguistic diversity in the U.S., many companies are requiring bilingual employees to speak English, even if English is one's low-fluency language. Surprisingly, there is no research investigating the impact of such practices on bilinguals' performance. Therefore, this dissertation examined the link between language use (high-fluency vs. low-fluency) on bilinguals' self-regulatory performance. Self-regulation was chosen as the dependent variable because this construct underlies important behaviors, such as persistence on difficult tasks and controlling emotions. The underlying framework for the current research is that of a depletion model, which regards self-regulation as drawing on a finite pool of resources (Baumeister et al., 1998). Based on this empirically supported model, I hypothesized that use of a low-fluency (compared to high-fluency) language would exhaust one's self-regulatory resources, leaving fewer resources for subsequent tasks that also require self-regulation. This depleted state was expected to manifest itself in decreased subsequent self-regulatory performance. The two main experiments were closely modeled after prior depletion studies and were conducted with samples of bilingual university students who were all new to the U.S. Language use was manipulated by having participants orally describe a picture (Study 1) or engage in an off-line personal conversation with a fellow student (Study 2). Study 1 showed that

while use of a low fluency (but not high fluency) language led to reduced mood and state self-esteem, it did not significantly impact subsequent persistence on a difficult task. Study 2 revealed that, contrary to the hypothesis, those using a low-fluency language outperformed those speaking a high-fluency language on a subsequent self-regulatory task. In Study 2, language use did not impact mood or state self-esteem. The findings of these studies do not provide clear support for a depletion model of language use. One speculative possibility is that use of a low-fluency language involves additional psychological processes that override the effect of depletion. Specifically, bilinguals may compensate for poor perceived language performance by working harder on subsequent tasks. The discussion includes possible explanations for the results, a review of the strengths and limitations of the current research and suggested areas for future research.

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Finally, thank you to the bilinguals who participated in my research. I hope their contribution will help bring attention to the topic of language use in the workplace.

Dedication

I dedicate this dissertation, with love, to my parents, Chaim and Gabriella Dotan, who always encouraged my intellectual and emotional development, even if it meant that I would live and raise a family thousands of miles away from them.

I also dedicate this work to my children, Guy and Mia. May you always accomplish any goals you set for yourselves.

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Chapter 1: Introduction

The most recent U.S. Census data (2000) reports that 45 million Americans (or 17.5% of the population) speak a language other than English at home. These numbers are driven by an influx of immigrants (Parliman & Shoeman, 1994), as well as increasing numbers of highly skilled foreign workers who are often from non-English speaking countries (Reena, 2000; Ramsey, 2004). The rise in linguistic diversity suggests that there are increasing numbers of bilingual employees who are more fluent in language other than English. It is therefore reasonable to expect that that there are bilingual employees who might prefer to use their non-English language in the workplace simply because they are more fluent in this language.

Responding to employees' desire to use non-English languages at work, organizations are increasingly implementing "English Only" policies. Such policies limit the use of non-English languages in the workplace. English-only policies are considered legal as long as "business necessity" can be demonstrated; necessities may include safety reasons or the need to effectively supervise employees (Dicker, 1998).

The assumption made by organizations is that English-only policies will create a more cohesive work environment, because everyone present would be included in verbal interactions. Indeed, many organizations have claimed to institute such policies as a way to alleviate racial and ethnic discrimination in the workplace (for example, Spun Steak the defendant in Garcia V. Spun Steak, 1993). Implicitly supporting this view, empirical research has shown that when people are in the presence of others who speak a foreign language, they tend to feel rejected and have low feelings of liking towards those who

"linguistically ostracize" them (Dotan-Eliaz, Rubin, & Sommer, under review; Hitlan, Kelley, & Zarate, under review).

Considerations of inclusion are clearly important. However, these considerations are not necessarily sufficient to justify the implementation of English-only policies. In particular, I suggest the reactions of those working alongside bilinguals are merely "half of the larger picture." Organizations frequently disregard the perspective of the bilinguals who are required to comply with restrictive language policies. For example, some organizations that have implemented English-only policies have claimed that their employees were fluent enough in English to use this language (e.g., Spun Steak, in Garcia V. Spun Steak, 1993). However, it is plausible that despite having a basic fluency in English, bilingual employees might still find it easier to use their most fluent, non-English language. The urge to use a fluent, non-English language might be particularly strong when bilinguals converse with others who speak the same language. To illustrate, imagine two Chinese-speakers who are highly fluent in Mandarin and have only a basic fluency in English. They might normally speak to each other in Mandarin. However, in accordance with an English-only policy, they would be required to speak English. In other words, they would have to override their tendency to speak in their high-fluency language and instead speak in a low-fluency language. The process of overriding one's urge to speak in a high-fluency language and instead use a low-fluency language would seem to be effortful. A question that emerges is how effort associated with use of a low-fluency language might affect bilinguals' functioning, and particularly their job performance.

Research on language use in the workplace is sparse. In particular, there is apparently no published research specifically investigating the psychological demands that are imposed on employees who wish to speak a language other than English. Currently, organizations' and psychologists' knowledge about language use in the workplace stems primarily from legal cases pertaining to English-only policies and from professional publications in the area of human resource management. In my dissertation I attempted to address this gap in the literature as I investigated how language use impacts bilinguals' performance.

The specific research questions I addressed in my dissertation were: (1) what is the impact of speaking a low-fluency (compared to a high-fluency) language on one's subsequent self-regulatory performance? And (2) what mechanism underlies the relationship between language use and subsequent self-regulation?

The predictions of the current research drew heavily from the social psychology literature and in particular from research regarding "self-regulatory depletion" (e.g., Muraven, Tice, and Baumeister, 1998). Self-regulatory depletion (also called ego depletion) theory and research suggest that self-regulation (i.e., self-control) draws on a finite pool of "energy." When this energy is depleted by an act of self-regulation, less energy is available to use for subsequent tasks that also require self-regulation. Mirroring this literature and drawing on relevant research from the psycholinguistics literature, I suggested that speaking a low-fluency (compared to high-fluency) language is an effortful process that requires self-regulation. Therefore, use of a low-fluency language was predicted to leave bilinguals in a depleted state, thus impairing their performance on subsequent self-regulatory tasks.

The potential link between use of a low-fluency language and subsequent self regulatory performance is of both theoretical and applied importance. This research attempted to extend the self-regulatory depletion model to new domains of behavior. From an applied perspective, this research attempted to expand the way organizations are currently thinking about language issues in the workplace.

This dissertation is organized as follows: First, I begin by introducing the reader to basic definitions of bilingualism (Chapter 2) as well as to the existing literature on bilingualism in the workplace (Chapter 3). I then describe legal cases pertaining to the use of Non-English languages in the workplace (chapter 4). These cases shed light on some of the challenges that bilinguals face. The next chapter (chapter 5) presents the self-regulatory depletion model and relevant work in this area. I then review relevant theory and research from the area of psycholinguistics that, along with the self-regulatory depletion model, lead directly to the development of the hypotheses (chapter 6). I next describe three pilot studies that were conducted in preparation for the proposed main studies (chapter 7). The next two chapters (Nos. 8 and 9) describe the two main research studies that were conducted. I conclude the dissertation (chapter 10) by reviewing the strengths and limitations of the current research and by discussing areas for future research as well as ways in which such research may contribute to theory and practice related to bilinguals' language use in the workplace.

Chapter 2: Definitions of Bilingualism

Before presenting research about bilingualism in the workplace, it is necessary to define the construct of bilingualism and other basic concepts from the psycholinguistics literature. Most relevant to the proposed research are the concepts of "unbalanced" bilingualism, "language mode," and "code-switching."

Bilingualism is not clearly defined. It could pertain to people who speak two languages at an equal proficiency (i.e., fluency), those who speak two languages even if they are at unequal levels of fluency, or even those who speak (but not necessarily write) in more than one language (Loveday, 1982). Though the term bilingualism has been interpreted in different ways, an accepted definition is "the regular use of two or more languages" (Grosjean & Miller, 1994). A person's first language is referred to as "L1" whereas a person's second language is known as "L2" (Hamers & Blanc, 1989).

Though bilinguals might regularly use two languages, they frequently do so at different fluency levels. Bilinguals could be described as "balanced," that is, as possessing an equal fluency level in both languages, or as "unbalanced" in which case there is a stronger fluency in one of the two languages (Loveday, 1982). The notion of balanced bilingualism is more of an ideal than an actual occurrence, as most bilinguals are more fluent in one of the two (or more) languages they know (Grosjean, 2001). Psycholinguists have defined low fluency as a "halting, hesitating quality of nonnative speech" (Molinsky, 2005, p.108). Several studies have shown that immigrants who move to a new country and learn a new language at a young age (typically before 13 years of age) tend to be more dominant in their L2 language. In contrast, immigrants who move as

adults tend to remain dominant in their L1 language (Flege, Mackay & Piske, 2002; Guion, Flege, OIu, & Yeni-Komshian, 2000; Silva, 2001).

There are two main theories about the way bilinguals process languages: According to the "coordinate" view, each language is processed separately, without any interference between the languages. In contrast, according to the "compound" view, the bilingual is thought to have a unique linguistic information processing system that includes both languages (Grosjean, 2001; Silva, 2001). The latter is a more acceptable view of bilingualism (Grosjean, 2001).

Grosjean (2001), a leading proponent of the compound view of bilingualism, emphasizes the notion of "language mode." Language mode is defined as "the state of activation of the bilingual's languages and language processing mechanisms, at a given point in time" (p.2). The language mode is a continuum: On one end, the monolingual mode, one of the two languages is completely activated (the base language) while the other is repressed. On the other end of the continuum, the bilingual mode, both languages are highly activated (Grosjean, 2001; Grosjean and Miller, 1994).

When bilinguals are in a bilingual language mode they tend to engage in "code switching-" a shift in and out of the two languages, when one of the languages serves as the base language. Code switching may involve saying a word, phrase, or even complete sentences or segments of conversation in a second language (Grosjean & Miller, 1994). Bilinguals typically use the language in which they are most dominant as their base language. In contrast, two bilinguals who are equally dominant in both languages they know might shift their base language during a conversation (Grosjean, 2001).

This dissertation focuses on bilinguals who are dominant in one of their languages (i.e., "unbalanced" bilinguals). This is because it was expected that bilinguals who are more fluent in a language other than English would experience difficulties complying with English-only policies in the workplace. In contrast, this dissertation does not focus on bilinguals who might be dominant in both of the languages they know but prefer to use one of their languages as a way of asserting their identity.

Armed with basic definitions regarding bilingualism, I now proceed to review the literature pertaining to bilingualism in the workplace. Throughout the dissertation, I use the terms "high-fluency language" (i.e., HFL) to describe bilinguals' most fluent language, and "low-fluency language" (i.e., LFL) to describe a language that bilinguals use at a relatively lower fluency than their most dominant language.

Chapter 3: Bilingualism in the Workplace

There is little research directly tackling the issue of bilingualism in the workplace. This is puzzling considering the demographic changes in the workplace and the abundant theory and research about diversity in organizations in general (e.g., Jackson, 1992) as well as about employees' ethnicity (e.g., Kraiger & Ford, 1985; Smith, 2002; Sorenson, 2004; Tsui & O'Reilly, 1989). However, this research typically focuses on ethnicity per se (e.g., in relational demography studies) rather than on language use.

Existing work on language in the workplace can be found in various literatures: communications, industrial and organizational (I/O) psychology, and sociology. A review of this work suggests that it might be divided into three major streams: (1) Research about perceptions that others have about bilinguals, (2) Research about language as a form of exclusion, and (3) Research focusing on the experiences of bilinguals themselves. I describe each stream of research below.

The first body of work examines the relationship between bilinguals' language skills and ways in which others perceive and judge them. Language fluency is mostly examined within this context. For example, researchers have investigated how bilinguals' fluency in a second language impacts the way others perceive the bilinguals' traits and personality (e.g., Stewart, Ryan, and Giles, 1985; White & Li, 1999; Wible & Hui, 1985). Also, research has examined bilinguals' perceived suitability for different job types or job levels (Hopper, 1977; Hopper & Williams, 1973). This research has generally shown that people speaking in accents or dialects associated with low social status (e.g., Southern White English or British Cockney) are perceived to be a better fit for lower level jobs; in contrast, people speaking in accents associated with high social status are perceived to be

a better fit for higher level jobs (for an exception, see Cargile, 2000). Recently, Molinsky (2005) conducted an experiment to examine the way bilinguals' fluency level in English interacted with the extent to which they committed cultural faux-pas. The dependent variables were ratings the bilinguals' received regarding their interpersonal skills as well as their professional competence. When those who committed faux pas had lower fluency in English, they were rated less harshly on interpersonal dimensions than those who had higher fluency in English. This pattern was however reversed for assessments of professional competence. This research is helpful for understanding the challenges non-native English speakers face as related to their acceptance and integration into the workplace.

The second stream of research includes recent studies examining language use as a form of exclusion (Dotan-Eliaz, Rubin & Sommer, under review; Hitlan, Kelly, Schepman, Schneider, & Zarate, 2006; Hitlan, Kelly, & Zarate, under review). Dotan-Eliaz et al. suggested that people may "linguistically ostracize" others by speaking a language that others who are present do not understand (even while otherwise being socially inclusive). They found that people who were linguistically ostracized (compared to linguistically included) by confederates during an experiment reported feeling more rejected, more dislike for their ostracizers, and were less confident in their team's ability to perform well. Perhaps most interesting was the finding that after being linguistically ostracized, those who were high in social self-efficacy (i.e., confident in their abilities to make friends) worked especially hard on a subsequent creativity task when they expected to work again with their ostracizers as compared to when they did not expect to work with them. Also, targets of linguistic ostracism who were high in rejection-sensitivity

(compared to those who were not) performed in ways that were aggressively charged (i.e., generated ideas in a creative task that were particularly aggressive in nature). These findings suggest that linguistic ostracism is a powerful determinant of performance in work group settings.

Hitlan, et al. (under review) conducted research along similar lines. In an experiment, they examined the effect of language-based exclusion (essentially linguistic ostracism) on attitudes towards immigrants. They found that language-based exclusion (compared to language-based inclusion) led to stronger feelings of anger and less caring towards group members. In a vignette-based study, Hitlan et al. (2006) compared the attitudes and expressed prejudice of participants who imagined they were interacting with coworkers. They varied whether participants were socially and linguistically included, socially and linguistically excluded, or socially excluded while linguistically included. They found that targets who were linguistically and socially excluded (i.e., were ignored by others who spoke Spanish) compared to those who were linguistically included and socially excluded (i.e., were ignored in English) reported stronger feelings of prejudice towards Mexicans in general and lower commitment toward their workgroup. This research suggests that bilinguals' language use in the workplace impacts not only work-related behaviors but also inter-group relations in the workplace.

Whereas the first two streams of research examine attitudes others have about bilinguals or the reactions people have when working with bilinguals, the dependent variables in the third stream of research include the feelings and attitudes of bilinguals about their own experiences. This dissertation, which investigated the impact of using a LFL on bilinguals, also fits within this third category, described next.

Research in the third area focuses mostly on expatriates or immigrants faced with the need to speak a non-native language while working and/or residing in a different country. While language barriers are frequently mentioned as a challenge for expatriates and while language fluency is considered a predictor of success in expatriate assignments, most researchers (e.g., Black, Mendenhall, & Oddou, 1991; Tung, 1998) focus on other aspects of adjustment, such as being able to understand the host country's values. Some researchers, however, have focused specifically on language fluency. For example, Shaffer, Harrison, and Giley (1999) found that fluency in a host country's language positively predicted expatriates' adjustment. The authors suggested that higher fluency levels might facilitate expatriates' ability to communicate more easily, rely less on translators, and understand the nuances of the host culture. In another study, Swagler and Ellis (2003) explored challenges that expatriates from Taiwan face when they reside temporarily in the United States. Focus group discussions indicated that low fluency in English was the biggest perceived barrier to adjusting in American culture and to establishing friendships with English-speaking peers. Interestingly, one of the participants emphasized the constant effort needed to speak English. Because of this difficulty, he reportedly disengaged from his English-speaking peers and preferred to relax and spend time with those who spoke Chinese. This seems to imply that using a LFL rather than a HFL is indeed effortful.

Recently, Bergman, Watrous and Gaulke (2004) conducted several focus groups with bilinguals (Spanish-English) and monolinguals (Spanish) to examine the experiences of bilinguals in the workplace. Unfortunately, the discussion derailed to cover general life experiences. However, mirroring empirical work on language use and

exclusion, Bergman et al. found that bilinguals were aware of the exclusionary nature of speaking in a language not understood by others (in this case Spanish) and were careful to limit such behavior when around non-Spanish speakers. Though this study was small and limited in scope, it shows a spark of interest within the I/O psychology community in the needs and concerns of bilinguals themselves (rather than focusing on how others are impacted).

Sociologists have also conducted research about language in the workplace, relying mainly on qualitative research methods. This research adds to the third body of work about bilinguals because it sheds light on the psychological demands that bilinguals face when they communicate, as well as on the language preferences of employees. Goldstein (1991) provided a rich examination of bilingual (Portuguese-English) workers' experiences on an assembly line in a Canadian manufacturing factory. The researcher observed the workers for two years and focused on the ways in which bilingual employees used language and on the meanings associated with the languages used. The workers, virtually all immigrants, spoke Portuguese on the assembly line to discuss task-related as well as personal topics. Goldstein found that use of Portuguese was associated with gaining access to friendships and thus assistance on the job. Surprisingly, this was the language of choice even for non-Portuguese workers who learned the language through their close contact with their coworkers. In contrast, English was the language associated with supervisory and management positions. On the occasion that Portuguese-speaking workers spoke English to their Portuguese coworkers, the reaction was that of insult, because English symbolized power and authority rather than friendship and equality. According to Goldstein, speaking English on the assembly line carried with it

risks because it connoted a lack of friendship or sense of community with other workers on the assembly line who spoke Portuguese. This study illustrates that choice of language in the workplace is not simply a function of fluency. Rather, it also depends on the symbolic meanings associated with different languages.

Canagarajah (1995), a sociolinguist, spent time working alongside Tamil fishmongers in Sri Lanka. Tamil fishmongers are typically bilingual, speaking English as well as the local language of Tamil. The researcher identified different ways in which language was used as a function of the status of the customers. For example, the fishmongers used different dialects when they sold fish to customers of higher-status than when they sold fish to customers of lower-status. By doing so, they were able to communicate more effectively. Using Canagarajah's terminology, they created different "negotiation strategies" with each group to sell more fish. This is another fascinating example of how language use is symbolic in nature and can have very real implications in terms of one's productivity (in this case, generating profits from sales).

In another workplace-based study, Herrick (2005) studied workers in a Chicago-based manufacturing company. The worker pool was quite heterogeneous, with a growing Latino population. Herrick predicted that the greater the linguistic diversity in a group, the more communication barriers would emerge. The researcher worked as part of an inventory control unit and was thus exposed to conversations taking place on the production floor and planning committees in the company. Contrary to her prediction, she found that workers who worked in closely-knit teams were able to overcome communication challenges that were associated with low-fluency in a common language. She found that even when coworkers spoke different languages or different dialects, they

were still able to understand each other as long as they made an effort to do so. For example, when necessary, team members would supplement words with gestures, would point to the object of their discussion, would write things down, and would use props. Herrick also found that communication was facilitated when coworkers were sensitive and supportive towards each other. For example, they reduced potential embarrassment associated with low-fluency by using gentle humor and face-saving comments.

This rich ethnographic research is important because it sheds light on the language related challenges and choices that bilinguals make while at work. Unsurprisingly, because sociologists conduct most of this work, the focus is on macro-level issues (e.g., meanings associated with language). However, more research is also needed on micro-level, individual-level, issues – namely the psychological experiences of bilinguals at work. Because of the paucity of this type of research, I found it helpful to examine court cases pertaining to English-only policies in the workplace. In particular, I searched these legal cases for information about the psychological demands imposed on bilinguals who are required to use a LFL. These are described next.

Chapter 4: Legal Issues Related To Language Use In The Workplace

A growing number of court cases illustrate that while there is a mounting demand on behalf of employees to speak different languages in the workplace, some U.S. organizations are seeking to formally prohibit the use of non-English languages, or are restricting use of non-English languages to non-work hours, such as during breaks (Dicker, 1998; Parliman & Shoeman, 1994). In this chapter I briefly describe the main legal issues related to language use in the workplace and describe the cases that bear direct relevance to the proposed research.

Language in the Workplace: The Legal Arena

Lawsuits concerning English-only rules are filed under the umbrella of discrimination based on national-origin. The Equal Employment Opportunity Commission (EEOC) started to track the number of lawsuits related to English-only policies in 1996; since that time, such filings have increased six-fold (EEOC, 2003).

Companies involved in English-only lawsuits have claimed that instituting an English-only policy was necessary to alleviate ethnic-based tensions within the company. In some cases, the bilingual employees were said to have insulted their English-speaking coworkers in Spanish (e.g., Garcia V. Spun Steak, 1993; Dimaranan v. Pomona Valley Hospital, 1991). Thus, companies often require employees to use only one language at work as a way of maintaining a positive atmosphere at work and fostering inclusiveness (Tuschman, 2002).

The EEOC's current position regarding English-only policies is included within their guidelines on discrimination due to national origin (EEOC, 2002). Employees may be required to speak English in the workplace as long as it can be shown to constitute a

"business necessity." Business necessities include the need to effectively handle emergency or safety-related situations, the need to communicate with customers who are English-speaking, or the need of English-speaking supervisors to effectively manage their employees. English-only policies may be imposed during work hours and cannot extend to personal time, such as lunchtime or other breaks. Though English-only work policies have often been considered a violation of employees' civil rights, discrimination may be said to occur only if the policy is imposed on specific languages, or if the policy leads to "adverse impact" (negatively impacting members of protected groups). Furthermore, to ensure the rights of employees, such policies must be clearly communicated (Parliman & Shoeman, 1994).

In Garcia v. Spun Steak Co. (1993), one of the only cases to have been heard by higher appellate courts, the plaintiffs were bilingual (Spanish-English) employees who worked in a meat company in Northern California. The company set forth an English-only policy, and Hispanic employees later filed a claim with the EEOC, asserting that this practice was a form of national origin discrimination. The company stated that non-English languages were restricted as a way to alleviate reported instances of racial tension and harassment. A U.S. District court ruled for the plaintiffs. However, this ruling was later reversed in the Ninth Circuit Court, because the English-only policy pertained only to work hours rather than to personal time. Furthermore, claims of discrimination were dismissed because there was no evidence that the policy had adverse impact against a protected group (e.g., a particular ethnic group).

Challenges Associated with Code-Switching

Some legal cases pertaining to restrictive language policies shed light on the psychological challenges associated with the process of code-switching. An interesting point raised by Spun Steak Co, in the example described above, is that the plaintiffs were all bilinguals able to work effectively in English and that therefore the policy was deemed appropriate by the organization. In other words, the organization considered the fluency of employees in both languages to be high (or at least high enough) for them to work effectively while speaking in English. Nevertheless, these employees may have still found it easier, and more natural, to converse in Spanish while speaking to their Spanish-speaking colleagues. As was described earlier, qualitative research about expatriates' language difficulties suggests that constantly speaking a lower fluency language is tiring and difficult for unbalanced bilinguals (Swagler & Ellis, 2003).

The need to refrain from using a fluent language and instead use a second, less fluent language was explicitly discussed in a recent high-profile case. Thirteen Hispanic employees working at Premier Operator Services, Inc, a Dallas-based company, were awarded over $700,000 in damages after their company had instituted an English-only policy (EEOC, 2000a). The company had a large Spanish speaking customer base and therefore made an effort to hire bilingual (Spanish and English) employees. While the company encouraged employees to speak Spanish with customers who preferred to do so, they required all other interactions to take place in English. In other words, employees were expected to code-switch between Spanish and English but only in a way that met the company's expectations. Use of Spanish with coworkers (even during breaks) was considered a violation of the policy. The notices about the language policy were posted in a highly visible place in the building. The notices also included warnings against carrying

weapons into the building, thus implying that Spanish-speakers were more likely than others to be violent. Thirteen Hispanic employees were fired after they refused to sign the language policy and filed discrimination charges with the EEOC. Susan Berk-Seligson, a linguist testifying on behalf of the plaintiffs in the Premier Operating Services case, stated that "code switching" (i.e., transitioning between languages) occurs automatically and unconsciously. The automatic nature of this response, she claimed, made it "difficult to suppress one's primary language." The judge relied on this testimony as well as on the apparent discriminatory behavior that accompanied the language policy to rule in favor of the plaintiffs and to award them compensatory and punitive damages (EEOC, 2000a).

Indeed, when bilinguals code-switch, they may start one sentence in one language and finish it in another. This shift is seamless and done effortlessly (Hamers & Blanc, 1989). Companies that set strict language policies, such as in the Premier Operating Services example, appear to have little understanding of this psycholinguistic process.

Similar challenges related to code switching appear to have been operating in another lawsuit. In 2000, the EEOC reached a nearly $200,000 settlement between a Chicago manufacturer, Watlow Batavia, and its Hispanic employees. The employees claimed that they were unfairly discriminated against when the company required them to comply with an English-only policy and that they were wrongly terminated when they spoke Spanish in the workplace. In this case, workers were fired after speaking Spanish with their friends, including one employee who was fired after merely saying "buenos dias" (good day) to a coworker (EEOC, 2000b). The ruling in this case did not explicitly cite the issue of automaticity of the code-switching process. However, for this reason, it

seems that the organization's expectation that their employees would speak to their Spanish-speaking coworkers solely in English was unreasonable.

As was noted earlier, according to the US census data, nearly one in five Americans speaks a non-English language at home. Therefore, it seems likely that a significant proportion of workers in the United States consider their most fluent language to be a non-English language. As was suggested by the expert testimony in the Premier Operating Services case, requiring bilinguals to use only one language while in the workplace, namely a language in which they are not very fluent, might place significant cognitive demands on bilingual employees.

Employees complying with language policies must not only refrain from using phrases that they would naturally use in a non-English language, but they must also replace these phrases with English ones. These behaviors -- focusing attention from one thing to another, restraining certain types of behaviors and instead imposing other ones, are considered to be the essence of the self-regulation (Carver & Scheier, 1981; Mischel & Ayduk, 2004). One question that therefore emerges is whether speaking a low-fluency language (LFL) requires self-regulation, and if so, what impact this might have on bilinguals' capacity for future self-regulation and thus on their future performance.

In the next chapter I present a model of self-regulation that served as the underlying framework for examining the impact of speaking a low-fluency language on one's subsequent performance.

Chapter 5: Self-Regulatory Depletion: A Strength Model of Self-Regulation

Self-regulation (often called self-control) is the act of intentionally governing one's behavior. Self-regulation is necessary in order to act in a goal-oriented way and to ensure that one does not stray from the path identified as leading toward a goal (Carver & Schier, 1981). Self-regulatory behaviors (SR) are those that require one to override impulses or learned, automatic behaviors (Baumeister & Heatherton, 1996; Baumeister, Bratslavsky, Muraven & Tice, 1998; Gollwitzer, 1999; Muraven, Tice & Baumeister, 1998), and may or may not occur on a fully conscious level (Baumeister & Vohs, 2004). Examples of self-regulatory behaviors include suppressing emotions (Larsen & Prizmic, 2004), suppressing thoughts (Muraven, Baumeister & Tice, 1999), persisting in the face of failure (Baumeister et al., 1998), and delaying gratification (e.g., Mischel & Ayduk, 2004), for example, of a sexual nature (Gailliot & Baumeister, 2007). (The literature on self-regulation is vast and beyond the scope of this paper. For a comprehensive compilation of works in this area see Baumeister & Vohs, 2004.)

In an effort to identify causes for self-regulatory breakdowns, Baumeister, Muraven, and their colleagues developed a resource model of SR (Baumeister et al, 1998; Baumeister, Heatherton & Tice, 1994; Muraven et al., 1998; Muraven, Baumeister & Tice, 1999). They proposed that self-regulation may be conceptualized as process that draws on a finite reservoir of "strength" or "energy." According to this model, consumption of resources necessary for the performance of self-regulatory tasks temporarily depletes this reservoir of energy until it replenishes itself. Therefore, if someone performs a self-regulatory task immediately after having performed a prior task that required self-regulation, then that person operates under conditions of self-regulatory

depletion. The person has fewer self-regulatory resources available to draw on, thus resulting in lower performance on subsequent tasks that also require self-regulation. This effect has been referred to as "regulatory depletion," "cognitive depletion," or "ego depletion" (Baumeister et al., 1998; Baumeister & Heatherton, 1996; Muraven et al., 1998).

To show that self-regulation temporarily depletes one's resources, participants in a depletion study engage in either a SR task (experimental group) or a non-SR task (control group). Manipulation checks tapping effort show significant differences between these two conditions. Participants then perform another task that requires self-regulation. Depletion is said to have occurred if performance or persistence is lower in the second SR task for those in the experimental compared to the control group. Recently, Schmeichel, Vohs & Baumeister (2003) have also added a second dependent variable – a task that does not require self-regulation (non-SR). In these cases, evidence of depletion is even more compelling when subsequent performance is impaired only on tasks that require self-regulation but not on tasks that do not require SR, even though the two dependent measures were equated on difficulty. This suggests that only SR tasks (but not non-SR tasks) draw on the same resource.

In their efforts to demonstrate the validity of their proposed strength model of self-regulation, Baumeister, Muraven, and their colleagues (Baumeister et al., 1998; Muraven et al., 1998) discussed two alternative ways to conceptualize self-regulation and suggested that each conceptualization would lead to different outcomes for subsequent performance. One alternative conceptualization is that of self-regulation as a master schema; as such, successful self-regulation serves as a prime for subsequent self-

regulatory processes. In other words, engaging in one self-regulatory task will facilitate one's ability to exert subsequent self-regulation. Therefore, a schema model predicts an increase in performance on a second task after a prior self-regulatory task. A second conceptualization is that of self-regulation as a skill. According to this model, as with any skill, one can expect that practice will increase one's self-regulatory proficiency. However, improvement will be gradual rather than immediate. Therefore, a skill model predicts no change in immediate subsequent performance. These two predictions (increase of performance and no change in performance) differ from their proposed strength model, which predicts a decrease in subsequent performance on a second self-regulatory task.

The results from many rigorous experiments lend considerable empirical support to the strength conceptualization of self-regulation (e.g., Baumeister et al., 1998; Muraven et al., 1998; Muraven et al., 1999; Vohs & Heatherton, 2000). In all of these experiments, performance on a second SR task was lower after performing a prior SR task than after performing a prior non-SR task, even when the first and second tasks were seemingly unrelated to each other. For example, Muraven et al. (1998) conducted several experiments using different operationalizations of self-regulatory tasks in various domains (emotional, physical, and motivational). In one experiment, participants watched an emotionally-laden videotape (either funny or sad) and were asked either to enhance the emotions experienced (first SR depletion condition) or suppress their emotions (second SR depletion condition). A third, control, group did not receive any instructions about how to behave while viewing the film (non-SR depletion condition). Afterwards, participants were asked to perform a physical task that has been empirically shown to

require self-control more than physical strength – gripping an object for as long as possible. The researchers found that suppressing or enhancing the emotional experience of the movie led to similar decreases in performance on the handgrip task as compared to the control condition. In a second experiment, similar effects were found when self-regulation was manipulated by way of thought suppression, and when the dependent variable was persistence on difficult anagrams that participants did not realize were actually unsolvable.

Two points should be noted about the design of depletion studies: First, the designs consist of two consecutive rather than two simultaneous tasks. The logic of this is that if two simultaneous tasks are used, then deterioration in performance on any one of these tasks would surely support a limited capacity resource model, such as that one's attention is limited. However, this would not support the claim that self-regulatory resources per se are limited. By having two consecutive tasks one eliminates the possibility that attention is limited (because for each task, attention is focused only on that task). Thus it is plausible to conclude that self-regulation is what causes the deterioration in the second task (Muraven et al., 1999).

A second point, which is related to the first, pertains to the nature of the tasks used in self-regulatory depletion studies. As Muraven et al's (1998) study shows, the two consecutive tasks tap unrelated domains of performance. For example, if the first task is an emotional suppression task (e.g., resisting the display of certain emotions), then the second task is a cognitive task (e.g., solving anagrams). The reasoning behind this is that if a person performs two tasks in the same domain (i.e., both cognitive or both emotional), one could argue that a decrease in subsequent performance is merely an

indication that the person is experiencing cognitive load or perhaps a decrease in self-efficacy specific to that task or domain. In other words, because the person is attending to a task that is similar in nature to the first task, attention to the second task is still somewhat limited. However, by showing that deterioration in performance occurs on a second task even when it is unrelated to the first task, one may conclude that both activities draw on a shared resource (Muraven & Baumeister, 2000).

Recently, researchers have demonstrated that self-regulatory resources are also used for broader cognitive functioning as well as for acting upon choices that are not completely autonomous. Schmeichel et al. (2003) demonstrated that self-regulatory resources are drawn upon for high level cognitive processing, such as for problem solving, reading comprehension, cognitive extrapolation, and logic. This was demonstrated by showing that performance on such tasks (compared to performance on tasks that required only rote processing) was impaired after prior SR tasks. Schmeichel and his colleagues reasoned that when confronted with complex (as compared to simple) cognitive problems, a person must actively decide how to construe the problem and which avenue to pursue. In doing so, one may need to sustain one's attention, override initial reactions to a problem, and persist in solving the problem, all of which require self-regulation. Recently, Moller et al. (2006) linked depletion research with self-determination theory by suggesting that being deprived of autonomy can deplete one's SR resources, as reflected by subsequent performance. In sum, the self-regulatory depletion research lends support to the idea that many self-regulatory behaviors draw on a single source of "energy" and that depleting this source will have detrimental outcomes for subsequent tasks that also require self-regulation.

The self-regulatory depletion framework helps shape predictions about what should happen when bilinguals speak a low-fluency language. Speaking a high fluency language (HFL) is thought to be an automatic response that does not require self-regulation. In contrast, speaking a low-fluency language (LFL) is thought to be an effortful process that does require self-regulation. Mirroring the findings identified in the depletion literature, one may reason that use of a LFL (but not HFL) will negatively impact subsequent performance on self-regulatory tasks. In the next chapter I present theory and research from the area of psycholinguistics that bolster support for the argument that use of a LFL requires self-regulation. This literature review leads directly to the generation of the main hypothesis that was tested in this dissertation.

Chapter 6: Bilinguals' Language Use And Subsequent Performance

In this chapter I present support for the idea that the sheer use of a LFL (compared to a HFL) requires self-regulation. Though the psycholinguistics literature does not make direct links between the social psychological construct of self-regulation and bilinguals' use of language, there is theory and research that would support the idea that use of a LFL requires self-regulation and therefore would lead to a state of depletion.

Language Use and Depletion

In developing a framework for understanding normal and pathological speech, Green (1986) maintains that speech production might be regarded as any other skilled action. Speaking in one language rather than another requires that one of the languages exceeds a level of activation and that the other is suppressed. He proposes that activation and suppression of speech requires an operating system and that such a system requires some kind of energy. Green also suggests that when resources are consumed, they should impact subsequent activities that are affected by the nature of the first activity. Green, whose work is geared towards neuroscientists, qualified his work by stating that he does not propose any direct neurological or structural correlates for his proposed energy model. Indeed, the self-regulatory depletion model, developed by Baumeister and colleagues nearly a decade later, is strikingly similar to Green's theory. Green does not provide empirical support for his theory. However, later research in the area of linguistics fits with Green's idea of resource limitations associated with bilinguals' language use.

Grosjean (2001) states that when bilinguals are in monolingual language modes, one of the languages they know is relatively inhibited. As an example, he cites results from an empirical study by Grosjean and Beauvillian (1987), who found that the speed in

which words in a non-native language were read was faster for participants who were in a monolingual language mode (i.e., only the non-native language was activated) compared to a bilingual language mode (i.e., both languages were activated). Interpreting this finding using self-regulatory terms, it appears that when both languages are activated, the language that is not relevant to the situation needs to be suppressed. This requires effort. In contrast, when only one language is activated and required for the task, the other language does not need to be suppressed. Grosjean's research was based on samples of bilinguals who were equally dominant in both languages. One might expect the difficulty associated with suppressing a language to be even greater for bilinguals who are "unbalanced," particularly if they have to suppress their most fluent language.

Bilinguals vary in the degree to which they need to suppress their first language (L1). Several studies show that immigrants' age of arrival predicts level of interference in their second language (L2) (Guion et al., 2000; Mackay & Flege, 2004). Guion et al. (2000), for example, found that bilinguals (speaking English-Italian or English-Korean) who had emmigrated at a young age ("early" bilinguals) experienced less interference with the production of English speech as compared to those who had arrived at an older age ("late" bilinguals). Interference was operationalized as the length of time needed to read assigned sentences in the L2 language (in this case, English). The authors stated that "the more established the L1 is at the time of the time of first exposure to the L2, the more it interferes with L2 production and the greater the processing resources are needed to suppress it" (page 208). Mackay and Flege (2004) found similar results. They were able to eliminate the possibilities that duration of L2 sentences were affected by low familiarity with the words that were read, or by the fact that late bilinguals tend to speak

more slowly than early bilinguals as a way of ensuring that their words are clearly understood.

Research on bilinguals' syntax (i.e., the structure and sequence within sentences) also supports the idea that production of speech in a relatively lower fluency language requires suppression of one's more fluent language. When bilinguals learn a second language at a later age, they already have an existing linguistic structure in their minds. When they speak the L2 language, they will frequently do so using the pragmatic structure of the L1 language, often resulting in awkward wording of sentences or phrases in the L2 language (Silva, 2001). Rather than simply "thinking in one language" they are relying on existing language structures to produce language in the other language.

Drawing on the self-regulatory depletion model, Green's theory of language activation, and the described psycholinguistics research, the main proposition of this research was that speaking a LFL is likely to require SR. When a person uses a LFL he or she must reduce activation of the HFL (i.e., suppress the HFL) and instead activate use of the LFL. In contrast, speaking a HFL is not likely to require SR because in this case, it would not be necessary to deactivate a language. Therefore, the main hypothesis of this research was that the sheer use of a LFL (compared to a HFL) would lead bilinguals to experience self-regulatory depletion.

Many different factors can activate a particular language. Grosjean (2001) describes how contextual factors, such as the interlocutor's language proficiency, may determine the language mode of a bilingual at any given time. Languages are activated as a function of many communication factors, including the topic of conversation or the language spoken by one's interlocutor (Grosjean, 2001). One might consider different situations

bilinguals might encounter. For example, imagine two Mexican colleagues who are relatively new to the United States speaking between themselves. The language most activated is likely to be Spanish. Consider one situation in which they might be permitted to speak Spanish and another in which they might not be permitted to do so and might be required instead to use English (a LFL for both parties). In the first situation in which they speak Spanish they would not need to suppress any language and they would be able to act in accordance with the triggered language (i.e., act automatically without exerting self-regulation). However, in the second situation they would need to override the urge to speak Spanish and instead speak English (i.e., exert self-regulation).

The comparison between these two situations mirrors the challenges that unbalanced bilinguals face when they work for organizations that impose English-only policies and was therefore the focus of this dissertation. Therefore, in the current research, participants were placed in situations that pilot data (described later on in chapter 7) showed would trigger one's HFL. This was expected to exacerbate any differences between bilinguals who were required to either resist using the HFL (i.e., were expected to exert self-regulation) and those who were able to use the HFL (i.e., were not expected to exert self-regulation).

Alternative Explanations

Though the SR depletion model appeared to provide a good framework for making predictions about the way bilinguals' language use would impact subsequent performance, it seemed pertinent to explore alternative mechanisms by which language use (HFL or LFL) might impact bilinguals' self-regulatory functioning. In this dissertation I tested three possible alternative explanations, described next.

Alternative Explanation 1: State Self-Esteem as a Mediator

One alternative explanation for the proposed effects was that rather than experience depletion, unbalanced bilinguals using a LFL might experience a temporary drop in their self-esteem, which might in turn lead to a decrease in performance. Bilinguals speaking a LFL might be able to communicate their main ideas, yet do so using poor grammar, poor syntax, and/or with a heavy accent. Therefore, bilinguals might feel that they represented their thoughts and ideas poorly and represented themselves negatively. It seemed plausible that such negative self-perceptions would generalize to other tasks and thus lead to low subsequent performance.

Negative self-perceptions have been tested as a possible alternative mechanism to that of self-regulatory depletion. Wallace and Baumeister (2002) suggested that manipulations used in various studies of self-regulatory depletion (e.g., exerting self-regulation by controlling one's emotional display or by attempting to solve difficult anagrams) might have led participants to perceive themselves as unsuccessful in exerting control. These perceptions might have then negatively impacted performance on the subsequent task. In other words, self-attribution of failure or decreased feelings of self-efficacy, rather than SR depletion, might have explained subsequent decreases in performance. To test this alternative explanation, Wallace and Baumeister conducted a typical SR depletion study in which participants were assigned to one of four tasks: They either performed a SR task (i.e., a Stroop task) or a non-SR task (Stroop with matching colors and words) followed by a second self-regulatory task (in this case attempting to solve a visual puzzle that was actually unsolvable). Feedback was manipulated such that participants were told that they either performed better or worse than others (positive and

negative feedback, respectively), or they were only given information about the time it took them to perform the task (no feedback). (Those in the non-SR condition did not receive any feedback). The positive feedback was expected to eliminate any possibility of perceived failure. In line with the existing SR depletion research, persistence on the second SR task was significantly lower for those who performed a prior SR task, regardless of feedback, compared to those who performed a prior non-SR task. Though state self-efficacy or self-attributions were not measured directly, Wallace and Baumeister's study appeared to rule out these explanations and provide additional support for a SR depletion model.

Though Wallace and Baumeister did not find support for the idea that decreases in self-perceptions serves as an alternative mechanism by which subsequent performance is negatively impacted, it seems important to still consider this possibility in the context of language use. In particular, it seemed possible that use of a LFL might negatively impact one's self-esteem because language is a basic vehicle for communication and is related to the way people present themselves (e.g., Zilles & King, 2005). There is evidence that learners of second languages often experience a mismatch between their mature thoughts and the low level in which they express their thoughts, which in turn leads to elevated self-consciousness and even anxiety (Horwitz, Horwitz & Cope, 1986). In other words, one's ability to make a positive impression, a facet of self-esteem (Tice & Baumeister, 1990), might be compromised when bilinguals use a LFL. A decrease in state self-esteem following use of a LFL could generalize to negatively impact one's performance on later tasks.

Alternative Explanation 2: Anxiety as a Mediator

A second alternative explanation to the language use-performance relationship was that unbalanced bilinguals might experience anxiety when using a LFL. Indeed, the relationship between acquisition of a second language and anxiety is well documented (e.g., Horwitz et al., 1986; MacIntyre & Gardner, 1991). In particular, oral speech in a second language is a strong source of anxiety (Horowitz et al., 1986). Therefore, it seemed plausible that use of a LFL would create anxiety, which in turn would hinder subsequent performance. Researchers have not found any evidence that mood mediates the self-regulation-subsequent performance relationship (e.g., Baumeister et al., 1998; Muraven et al., 1998; Schmeichel et al., 2003). However, anxiety, per se, was not measured in these studies.

For these two explanations, there are two ways to identify which of the alternative mechanisms is driving any effects on performance. One is to examine the relationships that emerge for subsequent SR versus non-SR tasks. If negative changes in state self-esteem and/or anxiety are the operating mechanism, then they should negatively impact subsequent performance on any kind of task (SR as well as non-SR). In contrast, if depletion is indeed the operating underlying mechanism, then negative changes in performance should occur only for subsequent SR tasks. An equally effective way to gauge the underlying mechanisms driving performance is to directly measure changes in state self-esteem and state anxiety after the first task (use of a LFL or HFL) and then test whether or not these variables mediate the relationship between self-regulatory tasks and subsequent performance on SR tasks. If the latter option is used, then it is no longer necessary to assess performance on subsequent non-SR tasks.

Alternative Explanation 3: Arousal as a Mediator

A third possible alternative to explain the expected language-performance relationship was that speaking a LFL (compared to a HFL) might elicit arousal. As social facilitation theory shows (Zajonc, 1965), people who experience high (compared to low) arousal tend to perform better on easy tasks, but not on difficult tasks. In the context of bilinguals' language use, the subsequent non-SR task might be considered the easy, less effortful, task. To assess whether the language-performance relationship was explained by arousal rather than by depletion, one would compare performance on the non-SR task as a function of the language used (HFL or LFL). If use of a LFL indeed created more arousal than use of a HFL, then performance on a non-SR task should be greater for those in the LFL condition. This prediction is opposite to that offered by the depletion literature, in which performance on the non-SR task is not expected to vary as a function of language. In addition to examining this pattern of results, participants provided self-reports of their arousal levels so that I could conduct a mediation analysis. Prior depletion research has not found any indication that arousal explained decrements in subsequent performance (Schmeichel et al., 2003). Nonetheless, the test of a depletion model in a new language context merited an examination of this possible mediator.

Overview of Research

Two experiments were conducted. In the first, I tested the proposition that use of a LFL (compared to a HFL) leads to self-regulatory depletion, as evidenced by poor performance on a subsequent SR task but with no impact on performance on a subsequent non-SR task. To do so, I manipulated the language used by participants (HFL or LFL) as they described a picture, and I assessed their persistence and performance on subsequent

SR and non-SR tasks. This first study focused on only the use of a LFL or HFL per se within a very limited communication environment. In the second study, using a Chinese sample, I tested the same hypothesis within a more realistic communication context. In this case, participants first used either their HFL or LFL when responding to an interlocutor who spoke Chinese. Their performance on a SR task was then assessed. The language manipulation used in this study was thought to provide a more realistic understanding of the conditions under which use of a LFL might be depleting. In both studies I also directly measured possible mediators of the language use-SR performance relationship, specifically self-esteem, anxiety, and arousal.

Before delving into each of the main studies, I first describe three pilot studies that I conducted in preparation for the main studies. The first pilot study was a descriptive, mainly qualitative study designed to explore whether bilinguals' use of a LFL evoked experiences associated with depletion. In the second pilot study, I conducted structured interviews with bilinguals. Participants stated which languages they felt were most automatically triggered in various communication contexts. The purpose of this pilot was to identify research materials that would clearly trigger use of one's HFL. The third pilot study was a controlled lab experiment designed to examine the impact of using a LFL (compared to a HFL) on bilinguals' self-reported feelings. The pilot studies are described in the next chapter.

Chapter 7: Report of Three Pilot Studies

Pilot Study 1

The main objectives of this pilot study were to explore bilinguals' reactions to using a LFL and to explore the proposition that use of a LFL requires self-regulation. Bilingual participants were asked to describe a situation in which they used a LFL and to elaborate on reactions to this experience.

The resulting narratives were coded for evidence that use of a LFL was depleting. Self-regulation, by definition, requires effort (Baumeister et al., 1998). Therefore, I coded the narratives for the words or phrases suggesting that use of a LFL was effortful, difficult, and that, in particular, it was hard to express oneself when using the LFL. I also coded the narratives for the presence of words indicating that use of a LFL was mentally effortful or not automatic.

According to the depletion literature, when someone exerts self-regulation, this leads to temporary breakdowns in self-regulation, as evident by decreased performance on subsequent SR tasks (Baumeister et al., 1998). I speculated that in the context of language use, SR breakdowns might present themselves in the act of code-switching (i.e., a shift between languages) after one uses only the LFL, particularly if the language switched over to was not conducive to the communication process. Therefore, I also coded the narratives for the presence of statements reflecting the shift from the LFL to the HFL or even to a third language that was unrelated to the situation. In the same vein, I also coded the narratives for bilinguals' reliance on visual props or gestures rather than speaking clearly. It seems that these behaviors might be considered as "communication shortcuts" that do not require as much self-regulatory resources as using one's LFL.

Ego depletion theory also suggests that after draining one's self-regulatory resources, a person will be driven to replenish his or her resources (Baumeister et al., 1998). I speculated that this might present itself in a person's need to relax (physically or mentally) after using one's LFL. I also reasoned that, after speaking a LFL, one might replenish his or her resources by finding opportunities to speak one's HFL. I therefore coded the narratives for indications of speaking the HFL or relaxing after use of a LFL.

As was discussed earlier, I also sought to explore whether people imagining and describing an instance in which they used a LFL would make comments suggestive of a decreased sense of self-worth. Borrowing from Heatherton and Polivy's (1991) measure of state self-esteem, I coded the narratives for indications of drops in social-based and performance-based SSE. The narratives were also coded for reports of increased anxiety.

Finally, I remained open to themes that emerged naturally from the data and coded the narratives for the presence of these themes. Thus, narratives were coded for the presence of various negative reactions, for reports of physically leaving the situation after use of a LFL, or for feeling of relief afterwards. Another theme that emerged from the data was the presence of positive reactions when using a LFL. In particular, some participants mentioned feeling generally positive, and in particular feeling pride. I therefore coded the narratives for the presence of these reactions.

Method

Participants

The sample consisted of 56 bilinguals (30 women) who were recruited through the Psychology Department's participant pool at Baruch College. The solicitation notice recruited bilinguals and stated that the study was about languages in which people were

not very fluent. The sample was linguistically diverse, with participants reporting knowledge of a total of 27 non-English languages. Forty percent of the sample had been living in the U.S. either since birth or since before they were 13 years old. A third of the sample reported having moved to the U.S. when they were 18 years old or older.

Measures

A web-based questionnaire, using ASSET, Baruch College's survey-builder system, was designed for the purpose of this study. The measures appeared in the questionnaire in the following order:

Self-reported language fluency. Participants were presented with a comprehensive list of languages and were asked, for each one, to indicate whether they spoke the language and if so, to indicate their fluency level on a 5-point scale (1=very low fluency; 5 = extremely fluent). They were also asked to indicate their most fluent language (0= another language; 1= English) for "personal matters," for "work-related matters," as well as "in general." The purpose of this scale was to ensure that indeed the languages they described using were indeed LFLs.

Use of a Low-fluency language (LFL). Participants described, in writing, a time in which they had to speak a LFL. They were asked to describe a situation that occurred for at least several minutes and had some significance for them. Participants were instructed to include information about the language they used, who they spoke to, the nature of the situation, their location, the purpose of the conversation, and the length of the conversation. They were asked to provide as much detail as possible about the situation. Participants were then asked to keep the situation in mind as they described how they felt and acted during and after the time they used a LFL.

Felt Depletion. After describing the situation, participants rated on 5-point scales of agreement (1=Strongly disagree; 5=Strongly agree) the extent to which they felt "mentally exhausted," "strained," and "drained." Responses on the three items were summed to provide an overall measure of felt depletion (α =.77).

Coding Scheme

Based on the existing depletion theory, I generated categories that reflected the experience of depletion. For each category, I generated descriptors that were conceptually believed to reflect each category. The narratives were then coded for the presence of each of the descriptors. Descriptors that were present were first coded as "1" whereas those absent were coded as "0." As was noted earlier, the narratives were coded for the presence of the following constructs: Effort, difficulty, self-regulatory breakdowns, and replenishment of resources, drops in state self-esteem, and increases in anxiety. To generate descriptors reflecting state self-esteem, I borrowed from Heatherton and Polivy's (1991) measure of state self-esteem, and in particular from their performance and social subscales. I then identified other constructs that emerged naturally from the data. All the narratives were then coded for these constructs. Thus I also coded the narratives for negative reactions, relief, exiting behaviors (e.g., leaving the situation), rumination about the situation, positive reactions, and laughing about the situation. A detailed report of the descriptors used in each category is presented in Table 1.

Results and Discussion

Language Measures

A language considered as “most fluent in general” tended to be the same as that considered “most fluent for personal matters” (82% overlap), and to a lesser degree was also the same language considered “most fluent for work purposes” (75% overlap).

Analyses of Narratives

Only 44 of the 56 narratives were analyzed. Twelve narratives were excluded from the analyses because rather than focus on the experience of speaking a LFL, they described situations in which the participants had difficulties understanding what other bilinguals were saying. Results for each of the coded descriptors are presented in Table 1.

Thirty participants (68%) explicitly noted that use of a LFL was difficult or effortful. Of these, ten participants (23%) made comments suggesting that, in particular, use of a LFL required effortful mental processing. Specifically, participants noted that use of a LFL required concentration, required processing their thoughts, that use of the LFL was not an automatic process, and that using the LFL was confusing and mentally exhausting. One person used a driving metaphor to express how he felt: “It’s like when you know how to drive a car theoretically but you cannot do it practically.” These comments suggest that use of a LFL might indeed require self-regulatory effort and thus be depleting.

As I suggested earlier, one possible manifestation of impaired self-regulation within the context of bilingualism might be the act of code switching or reliance on gestures and props. Indeed, nine participants (20%) wrote that they code-switched or that they relied on gestures or other visual aids to communicate with their interlocutor (one person reportedly did both).

Theoretically, just as one might experience a breakdown in self-regulation after using a LFL, the reverse might also be expected. In other words, one might expect that using a LFL would be particularly difficult when a person is already in a depleted state, such as after a person controls his or her emotions -- an action that has been shown in the literature to cause depletion (Muraven et al., 1998). This seems to have been the case for one participant who described an encounter with a customer service representative and commented that "I can speak/understand English pretty well, but its level becomes moderate when I get upset."

Four participants (9%) noted that, after using their LFLs, they either relaxed or found opportunities to use their HFL. As I suggested earlier, it is possible that by resting or using one's HFL, activities presumed not to require self-regulation, participants attempted to replenish their self-regulatory resources, which were depleted while using the LFL.

Many participants reported feeling negatively about themselves when using a LFL. The comments seem to reflect both decreases in performance-based SSE as well as social-based SSE. Fifteen participants (34%) wrote that after using the LFL, they felt either stupid, incompetent, lacking confidence as they used their LFL, or that the situation made them aware of their low fluency in the language they used. These comments suggest a drop in performance-based SSE. Ten participants (23%) stated that they felt one or more of the following feelings: Embarrassed, ashamed, self-conscious, worried about how others would react to their use of the LFL, or feeling inferior to others. These comments suggest a drop in social-based SSE. In addition to these negative feelings, 21 participants (47%) wrote descriptors that reflected anxiety (e.g., anxious, stressed,

uncomfortable). All of these findings fit with research showing that use of a foreign language often induces increased self-consciousness as well as anxiety (Horwitz et al., 1986).

The narratives suggested that use of a LFL was also associated with other negative feelings, particularly that of frustration (18%) and fear of doing or saying the wrong thing (14%). Five participants (11%) described exiting the situation in which they used the LFL and then avoiding subsequent situations that would call for use of their LFLs.

Somewhat unexpectedly, 27 participants (61%) reported experiencing positive feelings. Five of these participants (11% of the total sample) also specified that they experienced pride. The narratives suggested that such positive feelings stemmed from being able to communicate effectively despite using a LFL.

This was the first study to explore bilinguals' experiences when using a LFL, while relying on frameworks of self-regulation and depletion. This exploratory study tentatively suggested that use of a LFL may be depleting. Additionally, this study provided some tentative support that use of a LFL might also lead to decreases in state self-esteem and/or increases in anxiety. This pattern of results was expected. Nonetheless, I expected that a complete test of the language use-performance relationship to show that depletion would operate above and beyond any other effects.

The conclusions of this pilot were limited because there was no comparison group in which participants reported a time in which they spoke their most fluent language. Furthermore, language use was not actually manipulated. Therefore, I sought to conduct another pilot test in which I manipulated language use in a controlled laboratory setting.

Pilot Study 2

Before manipulating language use, I wanted to ensure that I would conduct a procedure that would clearly elicit use of one's HFL. The psycholinguistics literature (e.g., Grosjean, 2001) suggests that the language bilinguals use depends on a host of factors. One of these factors is the topic of conversation. The purpose of this pilot study was to ensure that the materials that participants would describe or discuss later on in the main studies would elicit one's HFL.

Twenty bilinguals were asked to indicate, on a questionnaire, which language they felt emerged most naturally in various communication contexts. They were given a list of 15 situations (e.g., with family members, with friends, with colleagues as well whether the topic of discussion was personal or school/work related) and for each one were to check off a language (English or one's native language). The instructions clearly indicated that they should discuss not what they actually use, but what language they feel " comes up automatically" and feels " most natural."

A key result is that all of the 20 participants stated that their HFL was the most automatic/naturally emerging language when speaking to acquaintances from their country of origin about personal topics. In comparison, 13 participants stated that their LFL (English) was the most automatic/naturally emerging language when speaking to acquaintances from their country of origin about school or work related topics.

I also interviewed 13 participants and asked them to provide ratings, on 7-point scale of comfort (1 = not at all comfortable; 7 = completely comfortable) of how it would feel to solely use their HFL or to solely use English when engaging in an "off-line" interaction with another student by listening to tape recordings of each other discuss

personal topics without actually having a face-to-face interaction (this was how I had intended to manipulate language use in Study 2). The reported comfort level if one would use the HFL in this situation was significantly higher than the reported comfort level if one would use English, t (12) = -13.01, p <.001, Cohen's d = 4.20 (M = 6.60, SD = .48 vs M = 3.90, SD = .75, respectively).

Based on this mini-pilot study, it seemed reasonable to conclude that discussing personal-related context would clearly activate one's HFL. This pilot was the basis for the manipulation to be used in one of the main studies of the dissertation (Study 2).

Pilot Study 3

Encouraged from the findings of the first pilot study, and confident that talking about personal topics would elicit one's HFL, I proceeded to manipulate language use (HFL or LFL) in a controlled laboratory setting. The first objective of this study was to compare bilinguals' self-reported effort and perceived depletion associated with using a LFL or a HFL. I predicted that using a LFL would lead participants to have a more effortful and mentally tiring experience than those using a HFL.

The second objective of this study was to address the possibility that other mechanisms, specifically a decrease in SSE or an increase in anxiety, might mediate the expected language use-performance relationship. Based on the findings of the first, qualitative, pilot study, I also explored the role of negative affect (NA) as a potential mediator. Although mood did not emerge as a mediator in other depletion studies (e.g., Baumeister et al., 1998; Schmeichel et al. 2003), it seemed possible that it might function as a mediator in the present context of language use.

An initial step in mediation analysis is to test if an independent variable predicts the proposed mediator (Baron & Kenny, 1986). In the context of this research, I sought to test whether use of a LFL (but not HFL) would significantly impact anxiety, state self-esteem, or NA. I reasoned that if I did *not* find significant effects of language use on these potential mediator variables, I would be able to eliminate these variables from the design of the main studies, so long as the operationalization of language use remained consistent. This would have served the purpose of minimizing the delay between the independent and dependent variables, which if large, could have potentially compromised the ability to detect depletion effects. This is because effects of LFL use might wear off and self-regulatory resources might "replenish" by the mere passage of time.

Thus, Pilot Study 3 was a controlled laboratory experiment employing a between-groups design. The independent variable was the language used (HFL or LFL). The dependent variables were self-reported effort, felt depletion, state self-esteem (performance-based and social-based), anxiety, and state affect. Language use was manipulated by having participants orally describe a picture, either in their LFL or HFL. Participants were alone while performing this task. In this way, I attempted to assess the impact of using a LFL per se, rather than the impact of using a LFL within a stronger communication context.

Method

Participants

Thirty-one bilingual students participated in this study (9 male, 21 female; 1 participant did not report sex). This sample size was consistent with prior depletion research in which effect sizes greater than .76 were identified (e.g., Baumeister et al.,

1998, Studies 2 and 3; Schmeichel et al., 2003). Therefore, it was considered appropriate to use a similar sample size for detecting a large effect with an alpha level of .05 (Cohen, 1992).

Participants were recruited from the psychology department's participant pool at Baruch College. Recruitment notices stated that participants must be at least 18 years of age, must have lived in the United States for no more than five years, and must have arrived to the United States from a non-English speaking country. Therefore, for participants in this study, English was the LFL and a non-English language was the HFL.

Materials

Picture Description Task. The picture participants were to describe (either in one's LFL or HFL) was Norman Rockwell's "A Day in the Life of a Little Girl" (Hennessey & Knutson, 2000). (The picture is included in Appendix A). This picture includes 24 smaller pictures, similar to a storyboard. The sequence depicts events from everyday life, including waking up, getting ready for school, interacting with other kids, going out on a date with a boy, and kissing the boy. This particular picture was selected for two reasons: First, I sought a picture that would elicit one's HFL. The findings of Pilot 2 demonstrated that talking about events that are personal and more intimate in nature would presumably activate one's native language. Indeed, the picture selected depicted a girl engaging in personal behaviors, such as getting dressed and flirting with a boy. Second, the sequence and the level of detail of the pictures helped create consistency in the descriptions that participants provided.

Effort. Participants rated on 7-point scales (1=not at all; 7=extremely) the extent to which the picture description task was "challenging," and "effortful." The two items were

combined to yield a measure of effort (α = .77). These items were adopted from single-item manipulation checks in existing depletion studies (e.g., Baumeister et al., 1998).

Felt Depletion. Participants rated on 5-point scales (1= disagree strongly; 5= agree strongly) the extent to which they felt "mentally exhausted," "strained," and "drained." These three items were aggregated to reflect felt depletion (α = .80). This measure was designed for the purpose of this study because no existing measures of depletion were identified in the literature. The adjectives selected were chosen because they mirrored conceptual definitions of depletion as well as the reported experiences of participants from Pilot Study 1.

State self-esteem (Heatherton & Polivy, 1991). State self-esteem refers to a person's self-worth at a particular time. Two of three dimensions from Heatherton and Polivy's measure were used in this study: social-based self-esteem (e.g., "I feel like I am not doing well") and performance-based state self-esteem (e.g., "I feel self-conscious," and "I feel displeased with myself"). Items were aggregated for each subscale. Internal consistencies (coefficient α) for the performance and social subscales were .82 and .65, respectively.

Positive and negative affect (PANAS, Watson, Clark, & Tellegen, 1988). Positive affect (PA) refers to "the extent to which a person feels enthusiastic, active, and alert" while negative affect (NA) reflects a person's "subjective distress" (Watson et al., p. 1063). This measure includes a list of adjectives that pertain to different emotions (10 positive and 10 negative). Participants rated the extent to which they experienced each emotion at that moment, using a 5-point scale (1= not at all; 5= to a great extent). The positive affect items and negative affect items were aggregated separately thus creating two subscales. Internal consistencies (α) for this sample were .81 (PA) and .82 (NA).

Anxiety. To assess state anxiety, three items (anxious, stressed, and uncomfortable) were interspersed within the PANAS. Internal consistency (coefficient alpha), however, was negative, -0.64. It is possible that participants did not clearly understand the meaning of the words. For example, "anxious" correlated negatively with "stressed" and "uncomfortable." Because of the inadequate psychometric qualities of this measure, I did not include these items in my analysis.

Procedure

After consenting to participate in the study (including a separate provision to audiotape a portion of the experiment), participants were told that they would be audiotaping themselves as they describe a picture. Participants were told that the purpose of the task was to describe the picture with details so that a listener might understand what the picture was like. The experimenter stated there was no "right or wrong" way to do the task. Participants were instructed to speak at a comfortable pace and were told that they did not have to worry about describing the entire picture. They were instructed to speak continuously for four minutes (pre-piloting showed that four minutes was long enough for participants to describe the picture in detail without running out of things to describe). Participants were then sent into separate rooms to conduct the task. In each room, they found the picture, a mini tape-recorder, and an instructions sheet. The instructions clearly specified which language participants should use (English or their most fluent language). Designation to one of the two language conditions was based on random assignment. The experimenter went into each room before participants started the task to ensure that the instructions were clear. They were given a minute to look at the picture before starting the task. The experimenter rang a bell to indicate when participants

should start, and then again, after exactly four minutes, to indicate when they should stop. Participants were alone while completing this task, but the experimenter listened through the door to ensure that they were performing the task. After completing the picture description task, participants completed the questionnaire with the dependent measures. They were then debriefed and thanked for their participation.

Results

Means, standard deviations, and effect sizes are reported for all variables in Table 2. A one-tailed t-test showed significant differences in the effort associated with describing the picture in English than doing so in one's HFL, t (29) = 1.79, p = .04, d = .64. Thus, the manipulation was successful.

One-tailed t-tests were also conducted to compare the two language conditions on self-reported depletion, performance-based state self-esteem, social-based state self-esteem, PA, and NA. In line with the predictions, participants in the LFL condition also reported feeling more depleted than those in the HFL condition, t (29) = 2.21, p = .02, d = .80. Additionally, those in the LFL (compared to HFL) condition reported lower performance-based SSE, t (29) = - 2.50, p = .01, d = .86.

While the differences between the two conditions on PA and NA were not significant, their effect sizes were moderately high (Cohen's d statistics were .43 and .40, respectively).

Discussion

As expected, describing a picture using one's LFL was more effortful than doing so in one's HFL. Furthermore, those in the LFL (compared to HFL) condition reported feeling more depleted. Indeed, many participants spontaneously noted at the end of the

experiment that it would have been easier to do the task in their most fluent language because the words didn't "come up" as easily in English. This comment reflects Green's (1986) notion of language activation, in that the HFL might be more strongly activated than the LFL. Overall, these findings suggest that use of a LFL (compared to a HFL) require self-regulation and that language use might lead to depletion.

Participants in the LFL condition reported feeling lower performance-based SSE than did participants in the HFL condition. This finding seems to reflect communication research suggesting that bilinguals are aware of the discrepancy between their thought level and the way in which they actually communicate (Horwitz et al., 1986). Thus, this variable emerged as a possible mediator in the main studies.

Even though the findings for PA and NA were not significant, their effect sizes were moderately large. Therefore, I also included these variables in the main studies. Finally, I sought to examine anxiety as a potential mediator in the main studies, using a more appropriate measure.

In the next two chapters I describe the main studies of this dissertation. Chapter 8 includes a detailed report of a laboratory experiment that I conducted to test the proposition that use of a LFL (compared to HFL) leads to self-regulatory depletion, as reflected by poor performance on a subsequent SR task but not on a subsequent non-SR task. In Study 1, the operationalization of language use was identical to that used in the third pilot study (picture description task). In Chapter 9, I describe an experiment testing the same idea but using an operationalization that closely resembled a personal conversation. The proposed research was also designed to rule out the possibility that

other variables (specifically state self-esteem, anxiety, or arousal) mediated the language use-performance relationship.

Chapter 8: Study 1

The purpose of this study was to investigate whether the use of a LFL (compared to HFL) exhausts one's self-regulatory resources and thus impairs bilinguals' performance on a subsequent self-regulatory task. In Chapter 6 I described theory and research from the psycholinguistics literature that lends supports to this idea. Green (1986) suggested that bilinguals' use of one language over another requires that one of the languages be suppressed. He further proposed that suppression of speech requires some kind of 'energy,' though he did not provide any empirical support for this proposition. Empirical research from the psycholinguistics literature supports the idea that use of a LFL requires suppression of one's HFL. For example, Grosjean and Beauvillian (1987) showed that bilinguals in a bilingual language mode read out words in their LFL at a lower speed than when they were in a monolingual language mode, in which case only their LFL was activated. Other research has shown that the earlier bilinguals learn a second language, the less interference they experience when speaking that language, as reflected by speed level when reading out words in the second language (Guion et al., 2000; Mackay & Flege, 2004), as well as by the way in which bilinguals structure sentences in their second language (Silva, 2001). All these studies resonate with the idea that use of a LFL (compared to a HFL) would be effortful and require some kind of "energy."

To test the idea that use of a LFL requires SR, researchers have showed that performing an initial SR (but not non-SR) task leads to decrements in subsequent SR performance (e.g., Baumeister et al., 1998; Muraven et al., 1998, Muraven et al., 1999; Vohs & Heatherton, 2000). Thus, I expected that in the context of language use, use of a LFL (but not a HFL) would impair subsequent SR functioning. Schmeichel, Vohs, and

Baumeister (2003) have recently shown that while an initial SR task negatively impacted subsequent SR functioning, no impact was found on subsequent non-SR functioning. Thus, in the context of the present research I expected that language use would not significantly impact performance on subsequent tasks that were not self-regulatory in nature.

The dependent variables in this study (performance on subsequent SR and non-SR tasks) were adopted from the existing SR depletion literature. Both tasks purposefully did *not* require verbal skills, for two reasons: First, the independent variable in this study, language use, was verbal in nature. As was described earlier, depletion is most convincingly demonstrated when the independent and dependent variables reflect different domains of performance (Muraven et al., 1999). Second, participants would have been expected to perform poorly on a verbal task, such as solving anagrams, because of their low proficiency in English. This would be expected to create a floor effect and make it difficult to observe any depletion effects. Thus, the SR task that was selected for this study was persistence on an unsolvable task. Persistence, as opposed to quitting, is considered a measure of self-regulation (Baumeister et al., 1998). The non-SR task that was used was a visual memorization task, which was adapted from a nonsense word memorization task used by Schmeichel et al. (2003, Study 3). In keeping with the non-verbal dependent measures used in this research, I replaced the nonsense verbal stimuli with the memorization of random (i.e., nonsense) visual shapes. The following hypotheses were formed:

> *Hypothesis 1*: Persistence on an unsolvable SR task will significantly lower following use of a LFL compared to a HFL.

Hypothesis 2: Performance on a solvable non-SR task will *not* vary as a function of the language used (HFL or LFL).

Though the depletion explanation seemed like a useful model for understanding the language use-performance relationship, other variables were tested as possible alternative mediators in the language-SR performance relationship. Specifically, I measured state self-esteem, anxiety, and arousal and examined these constructs as possible mediators in the language use-performance relationship. In addition to this, to identify whether depletion best explained the relationship between language use and subsequent performance, I examined whether both of the dependent measures (SR task or non-SR task) were affected by language use. The depletion model predicts compromised performance on the SR task following use of a LFL (vs. HFL) but no such differences for the non-SR task. In contrast, if other constructs, such as anxiety or SSE, mediated the language-performance relationship, performance on the SR and non-SR tasks would be expected to be affected similarly by the manipulation.

The language manipulation employed in this study was identical to that used in Pilot Study 2. Participants orally described a picture using either their HFL or LFL. Thus, Study 1 examined the impact of language use on bilinguals' self-regulation. The experiment was purposefully designed so that participants would use one of the languages they know in a limited communication context (i.e., without a clear, known interlocutor).

Method

Design

Study 1 was a controlled laboratory experiment. The independent variable was language use (HFL or LFL). The dependent variables were persistence on an unsolvable SR task and performance on a solvable non-SR task. Thus, this study employed a 2 (HFL/LFL) x 2 (SR versus non-SR task) between-groups design. The order of the dependent measures was counterbalanced.

Participants

Seventy-four participants were recruited through the psychology department participant pool. This sample size was consistent with that used in the broader depletion literature (e.g., Baumeister et al., 1998; Moller et al., 2006; Muraven et al., 1998; Schmeichel et al., 2003) and was considered appropriate for achieving moderate to large effect sizes (*d's* ranging from .50 to .80) assuming an alpha level of .05 (Cohen, 1992). Pilot study 2, in which language use was experimentally manipulated also yielded moderate to high effect sizes.

Participants were required to be at least 18 years old, and living in the United States for no more than 5 years after having moved from a non-English speaking country. By setting these eligibility requirements I sought to avoid recruiting participants who were dominant in English. As was noted earlier, when immigrants learn a language after they are 13 years of age, they typically remain dominant in their primary language (Guion et al., 2000).

To ensure that participants were indeed dominant in a non-English language, they rated their fluency level in all of the languages they reported knowing along a 7-point scale (1=Very low fluency; 7=Extremely high fluency). Based on this, eleven participants were excluded from the analyses because they reported having a high fluency in English

(i.e., provided a rating of 6 or 7 on this scale). This cutoff was selected because most of the participants reported a fluency level in English that ranged from 2 to 5, with an average of 4.20. In contrast, the average level of fluency in one's HFL was 6.70. In this study, while English was a LFL for all of the participants, the HFL varied across participants, representing 18 languages in total. Thus, analyses were based on a sample of 63 participants (27 men and 36 women), ranging in age from 18 to 42 (*Md.* =21 years) who had been living in the United States for a period of 1-5 years (*Md.* = 2.5 years).

Measures and Materials

Language Use. Similar to the language manipulation used in Pilot Study 3, participants were asked to describe Norman Rockwell's picture, "Day in the Life of a Little Girl" (Hennessey & Knutson, 2000). They were instructed to use either English (their LFL) or their most fluent language (their HFL).

Cultural Immersion Task. This task, which was borrowed from Sedikides, Gaertner, and Yoshiyasu (2003), was used to evoke a bilingual language mode across conditions (i.e., activate one's HFL in addition to English, which is the language spoken at the college). In five minutes, participants were asked to write, in English, pleasant memories and descriptions from their home country.

Effort. Participants rated the extent to which the picture description task was "challenging" as well as "required effort," using 5-point scales (1 = Strongly disagree; 5 = Strongly agree). Internal consistency (coefficient alpha) for the 2-item scale for the present sample was .79.

State Self-esteem (SSE). Participants completed two of three dimensions from Heatherton and Polivy's (1991) measure of SSE. Using 5-point scales (1 = not at all; 5=

extremely), participants rated items tapping performance-based SSE (e.g., "I feel like I am not doing well") and social-based SSE (e.g., "I feel self-conscious"). A mean was calculated for each subscale. Internal consistencies (coefficient alpha) for the performance-based and social-based scales were .82 and .78, respectively.

Anxiety. Participants completed the state version from Spielberger's (1983) State-Trait Anxiety Inventory (STAI). Using 4-point scales (1 = Not at all; 4 = Very much so), participants rated the extent to which they experienced 20 states at that moment. Example items include "I feel strained," "I feel confused," and "I feel calm". Internal consistency reliability (coefficient alpha) for the present sample was .87.

Arousal. Participants completed Mayer and Gaschke's (1988) brief mood introspection scale (BMIS). The BMIS has been used previously in the depletion literature (Gailliot, Schmeichel, & Baumeister, 2006; Moller et al., 2006; Muraven & Slessareva, 2003). This measure includes 16 adjectives (e.g., happy, lively, calm, content, peppy, nervous, grouchy, tired, sad). Participants rate the extent to which they feel each adjective at that moment, using 4-point scales (1 = Definitely do not feel; 4 = Definitely feel). This measure yields two unrotated factors: *Arousal-Calm* (Arousal) and *Pleasant-unpleasant* (mood). Previous research has shown high internal consistency reliability for the two factors ranging from .76 to .83 (Mayer & Gaschke, 1988). In the present sample, internal consistency for the 12-item arousal factor was low, at .40. Thus, I excluded one of the items ("tired"), which increased the reliability to .59. The internal consistency for the 16-item pleasant-unpleasant factor was.79.

SR-Task. Participants attempted to solve a puzzle that required tracing a figure without lifting the pen from the paper and without repeating lines that were previously

drawn. This task was adopted from Baumeister et al. (1998, Study 1). Participants were first shown several examples that were solvable and were then given one puzzle to solve in as much time as they wanted. They were told to start a new drawing for every attempt they made to solve the puzzle. Unbeknownst to the participants, the puzzle was unsolvable. This task yielded two dependent measures of persistence: the time spent on the task and the number of times participants tried to solve the puzzle.

Non-SR Task. Participants performed a visual memorization test of random (i.e., nonsense) forms, which was adopted from Schmeichel et al. (2003). Participants had 60 seconds to memorize 15 visual stimuli, followed by 90 seconds to work on a distractor task (i.e., solving basic multiplication questions), followed by 60 seconds to recall the stimuli by drawing them on a separate page. The dependent measure was the percentage of correctly recalled stimuli.

Procedure

Participants first answered the language fluency questionnaire. They then completed the cultural immersion task. Upon completion of this task, participants were randomly assigned to one of the two language conditions, either describing a picture in English (LFL) or in their HFL. Participants then completed a questionnaire with the self-report measures (SSE, Anxiety, Arousal). Immediately afterwards they performed the two dependent measures (SR and non-SR task). The order of the tasks (SR and non-SR) was determined based on random assignment. Participants were stopped after 30 minutes if they were still attempting to solve the unsolvable puzzle (SR task). Upon completion of these tasks, participants were fully debriefed. They received a written explanation about the study and its hypotheses, about the deception that had occurred, as well as about the

reason for having used deception. Participants were given as much time as they needed to read the form and were then given the opportunity to ask questions.

Results

Manipulation Check

Means, standard deviations, and inferential statistics are reported in Table 3, and inter-correlations are presented in Table 4. Participants in the LFL condition ($M = 3.53$, $SD = 1.19$) rated the picture description task as more effortful than did participants in the HFL condition ($M = 2.91$, $SD = .96$), $t\ (60) = 2.21$, $p = .03$ (two-tailed), d = .57. Thus, the language manipulation was successful.

Test for Order Effects

I conducted two two-tailed t-tests to compare the effects of order (SR task first or SR task second) on each of the dependent measures. Order did not significantly impact either persistence on the SR task or performance on the non-SR task (t's < 1.34, *ns*). Therefore, to test the main predictions, the dependent measures were collapsed across order.

Test of Main Predictions

The main predictions were that use of a LFL (compared to a HFL) would lead to decreased persistence on the unsolvable puzzle (Hypothesis 1). In contrast, language use (LFL versus HFL) was predicted to have no significant impact on performance on the non-SR, memorization task (Hypothesis 2).

The first hypothesis regarding SR functioning was tested using two measures that have been used in prior depletion research: *time* that participants spent on the unsolvable task and the *number of attempts* to solve the task. Contrary to the prediction, the total

time spent on the task did not differ as a function of language, t (60) = -.62, *ns,* d = .08. Further, the mean for number of attempts to solve the puzzle did not differ significantly between the LFL and HFL conditions, t (59) = 1.58, *ns*, d = .40. Thus, the first hypothesis was not supported.

To test the second hypothesis, a two-tailed t-test was performed to compare the two language conditions on the number of items that were accurately recalled in the memory task. As expected, participants in the LFL and HFL condition did not vary significantly on this measure, t (60) = 1.55, *ns*, d = .39.

Test of Possible Mediators

According to Baron and Kenny (1991), the first step in mediation analyses is to ascertain whether there is a significant relationship between the independent and dependent variables. In this case, language use did not significantly predict either SR or non-SR performance. For exploratory purposes, I conducted t-tests to explore the impact of language use (HFL vs LFL) on the mediator variables. As shown in Table 3, those in the LFL condition reported significantly lower performance-based SSE than those in the HFL condition, t (60) = -2.69, p = .01, d = -.65 (two-tailed). In contrast, language use did not predict social-based SSE, anxiety, or arousal (t's<1.3, *ns*). No a priori hypotheses were made regarding mood. However, those in the HFL condition scored significantly higher in the BMIS' pleasant-unpleasant factor (i.e., were in a better mood) than those in the LFL condition, t (60) = -2.17, p = .03, d = -.55 (two-tailed).

Discussion

The purpose of Study 1 was to examine whether the use of a LFL (compared to a HFL) would deplete self-regulatory resources. As expected, use of a LFL was reported as

more effortful than use of a LFL. This manipulation check mirrored the findings from the pilot studies that were conducted, all of which suggested that use of a LFL (compared to a HFL) required self-regulation. Language use did not impact performance on the subsequent non-SR task. However, contrary to the hypothesis, language use also did not impact performance on the SR task. Even though the finding for the non-SR task was as expected, this is a null effect, which can only be meaningfully interpreted if accompanied by a significant finding for the SR task. Therefore, the findings of this study did not support a depletion model.

Several possible mediator variables were assessed. As in Pilot Study 3, here too performance-based SSE was significantly lower for participants in the LFL (compared to HFL) condition. Participants in the LFL condition also reported significantly lower mood than those in the HFL condition. It should be noted that participants spontaneously commented that they were pleasantly surprised to use their HFLs in the context of the university and particularly in the context of a psychology experiment. Thus, it is possible that those in the HFL condition reported higher mood because of the novelty associated with using their native language as part of an experiment. While language use impacted these two variables, they could not act as mediator variables, because the relationship between language use and performance was not significant.

It is likely that language use did not significantly predict SR functioning because of the particular language manipulation that was employed in this study. Specifically, the use of language in a minimal communication setting (i.e., no interlocutor present) and the fact that the situation was highly artificial, might have prevented participants from becoming engaged in the tasks they completed, thus masking any potential effects of

language use on SR performance. To address this possibility, I conducted a second study in which language use was manipulated within a communication context that more closely resembled a real conversation. This language operationalization was believed to elicit stronger involvement in the task. This study is described in the next chapter.

Chapter 9: Study 2

The purpose of Study 2 was to conduct a test of the language-performance relationship in a stronger, clearer communication context. The automaticity literature (e.g., Bargh, 1997) has demonstrated that behaviors occur automatically to the extent that the environment triggers them. The stronger the cues, the stronger the associated response. In this vein, the more a language is activated by a situation, the more one would be triggered to use that language. Therefore, in this study, participants were placed in a situation that was expected to clearly trigger use of one's HFL. Specifically, participants listened to an audiotape, ostensibly prepared by a fellow student, which was recorded in the participants' HFL. Participants were then instructed to prepare a similar tape, which they were told would be heard by their conversation partner. Thus, participants were made to believe that they would have an "off-line" conversation with a fellow student. To manipulate language use, participants were randomly instructed to prepare their response tapes either in English (their LFL) or in Chinese (their HFL). It was expected that using English would require participants to resist using the triggered language (and exert self-regulation), whereas using Chinese would entail acting in accordance with the triggered language (and not require exerting self-regulation). Mirroring the prediction from Study 1, the following hypothesis was made:

Hypothesis 1: SR performance will be lower among those responding to the interlocutor using a LFL compared to a HFL.

As in Study 1, I attempted to rule out the possibility that mechanisms other than depletion, specifically changes in SSE, anxiety, and/or arousal, might mediate the relationship between language use and subsequent SR performance. Because language

use impacted mood in Study 1, I also examined the role of this variable in Study 2. Though Study 1 showed that describing a picture in one's LFL, within a limited communication context, negatively impacted mood and state self-esteem, it was unclear whether the new, more realistic, language manipulation would yield the same pattern of results.

In Study 2, I examined SR task performance, rather than persistence, by assessing the impact of language use on a solvable self-regulatory task. Prior research has shown both types of self-regulatory functioning to be impaired after prior use of self-regulation (Baumeister et al., 1998; Muraven et al., 1998; Muraven et al., 1999; Schmeichel et al., 2003; Vohs & Heatherton, 2000).

Method

Participants

Sixty-five students were recruited from Baruch College. Recruitment notices solicited students who were highly fluent in Chinese (Mandarin), who had lived in the United States less than 5 years, who had not studied more than 1.5 years in an American (or other English-speaking) high-school, and who were at least 18 years old. Students from Hong Kong (formerly part of the British territories) were not eligible to participate in the study. These criteria were set in attempts to recruit a bilingual population for whom English was a LFL. Additionally, to ensure that the sample was clearly dominant in a non-English language, participants rated their fluency in English as well as in all other languages they spoke, using a 7-point scale of fluency (1 = Very low fluency; 7=Extremely high fluency). Four participants were excluded from the analyses because they reported having a high fluency in English (6 or 7 on this scale). Analyses were thus

based on a sample of 61 bilingual, Chinese speaking participants (44 women), ranging in age from 19 to 37 (*Md* = 23) who had been living in the United States for a period of 1-5 years (*Md* =3 years). This sample size was consistent with that used in the broader depletion literature (e.g., Baumeister et al., 1998; Moller et al., 2006; Muraven et al., 1998; Schmeichel et al., 2003) and was considered appropriate for achieving moderate to large effect sizes (*d's* ranging from .50 to .80) assuming an alpha level of .05 (Cohen, 1992). Pilot study 2, in which the same language manipulation was used also yielded moderate to high effect sizes.

Design

This study employed a one-way, between-groups design (LFL vs HFL). Potential mediators were included SSE (performance- and social-based), anxiety, arousal, and mood. The dependent variable was performance on a SR task.

Measures and Materials

Language Manipulation. Participants were assigned to listen to an audiotape, ostensibly prepared by a fellow student. A native Chinese speaker prepared the tape by following a pre-determined script, which was based on a validated intimacy-building procedure (Sedikides, Campbell, Reeder & Elliot, 1999). The speaker on the tape answered questions from this intimacy-building procedure, which gradually required higher levels of self-disclosure (The list of questions is included as Appendix B.) After listening to the peer's tape, participants prepared a similar response tape that would be returned to their peer. The instructions clearly indicated the language they were to use -- either English (LFL) or Chinese (HFL).

Effort. Participants rated the extent to which the picture description task was "challenging" as well as "required effort," using 5-point scales (1 = Strongly disagree; 5 = Strongly agree; α = .69).

State self-esteem. Participants completed two sub-scales from a SSE measure (Heatherton & Polivy, 1991), tapping performance-based SSE and social-based SSE (α = .85 and α =.80, respectively).

Anxiety, Mood, and Arousal. Participants completed the state version of the State-Trait Anxiety Inventory (STAI) (Spielberger, 1983) (α = .89) and the Brief Mood Introspection Scale (BMIS) (Gaschke, 1988) to assess both mood (16 items, α = .86) and arousal (11 items, α = .67).

SR performance task. A solvable SR task was adopted from Moller et al (2006), which was adapted from Baumeister et al. (1998, Study 4). In this "E-hunting" exercise, participants were given two sheets (hard copies) of printed text and were instructed to cross out the letter 'e' unless certain rules were violated: if the letter 'e' was followed by two consonants, if it was located before or after a vowel, or if it was at the start of a word. This task was considered a measure of self-regulatory performance because, to succeed on the task, participants had to override the automatic response to cross out all 'e's and to cross out only those 'e's' that met certain criteria.

To succeed on the E-hunting task, participants needed to complete two different operations: (1) cross out the 'e's that should have been crossed out and (2) not cross out 'e's that violated the specified rules. Thus, the first success measure was the proportion of "*hits*" (i.e., the number of 'e's that were appropriately crossed out relative to the total number of e's that should have been crossed out. The second success measure was the

proportion of "*correct rejections*," (i.e., the number of e's that were appropriately *not* crossed out relative to the total number of e's that should not have been crossed out).

Procedure

After consenting to participate in the study, participants reported their fluency in each of the languages they reported knowing. Participants were told that the researcher had wanted students to come to the laboratory in groups so that they might have face-to-face introductory conversations with each other. However, due to scheduling difficulties this was changed and instead students were instructed to have "off-line" conversations with each other through audiotapes. They were told that many participants had already completed a portion of an experiment and had audiotaped a personal introduction of themselves. Participants were instructed to listen to one of those tapes and to "respond" to their "conversation partners" by taping a similar introduction that would return to their partners. Participants were provided with the list of questions while they were listening to their peers. (The questions are included as Appendix B.) This operationalization involved deception, because in reality, there was no conversation partner. It was necessary, however, to present the procedure in this manner so that participants would be engaged in the task. Participants were instructed to answer the questions in the order in which they appeared and to check off each question as they answered. They were given 10 minutes to complete this task and were asked to speak continuously. Participants were left alone while preparing their response tapes with the door ajar. The experimenter listened from outside the door to make sure that participants were continuously speaking. After recording their tapes, participants completed a questionnaire with the potential mediator variables. They then were given 10 minutes for the "e-hunting" task. Participants

received two sheets of text, which piloting showed would keep them busy throughout this whole timeframe. Upon completion of the E-hunting exercise participants were fully debriefed. Participants were provided with a written explanation about the purpose of the study and the fact that the experiment involved deception. They were then given an opportunity to ask questions.

Results

Means, standard deviations, and inferential statistics are presented in Table 5 and correlations between all variables are presented in Table 6. All inferential statistics are based on two-tailed analyses.

Manipulation Check

Participants in the LFL condition exerted significantly more effort than those in the HFL condition, t (59) = 2.13, $p < .05$, $d = .63$. Thus, the language manipulation was successful in varying the levels of self-regulatory exertion across conditions.

Test of Main Prediction and Possible Mediators

The hypothesis was that use of a LFL (rather than HFL) would lead to self-regulatory depletion, as reflected by poor performance on a subsequent SR task. Analyses were conducted separately for each dependent measure yielded by the e-hunting task: the proportion of 'hits' and the proportion of 'correct rejections.'

The proportion of 'correct rejections' was not significantly different as a function of condition, t (59) = 1.18, *ns*, Cohen's $d = .04$ whereas the proportion of 'hits' (i.e., e's that were appropriately crossed out) varied significantly as a function of language, t (59) = 2.47, $p < .05$, $d = .63$.The pattern of results was opposite to the predictions, however,

with participants in the LFL condition outperforming those in the HFL condition (M = .77, SD = .16 vs. M = .64, SD = .27, respectively).

Recall that participants were provided with a specified amount of time for the E-hunting exercise. The amount of text reviewed by participants did not vary as a function of condition, t (59) = -1.04, *ns*. Thus, language use did not impact participants' work speed.

Language use in the current operationalization did not significantly impact SSE (either performance-based or social-based), anxiety, arousal, or mood (t's < 1, *ns*). Thus, none of these variables played a role in the language-SR performance relationship.

Discussion

This study employed a language operationalization that involved a realistic conversation in which participants discussed topics that were personal in nature. As in Study 1, the hypothesis was that use of a LFL (compared to HFL) would lead participants to perform worse on a subsequent SR task. Contrary to the prediction, participants in the LFL condition performed significantly better on the subsequent solvable SR task than did participants in the HFL condition, as reflected by the proportion of "hits" on the E-hunting task. While participants across conditions completed the same quantity of work, as reflected by the amount of text reviewed, the work performed by those in the LFL condition was of higher quality than that performed by those in the HFL condition.

With regards to potential mediating variables, language use did not yield any differences in mood or state self-esteem. Language use also had no significant impact on arousal or anxiety. Thus, none of these variables could explain the observed relationship between language use and subsequent SR performance.

These findings regarding mood and SSE contrasted with the significant findings observed in Study 1. I suggested earlier that the novel manipulation used in Study 1 might have led to the significant impact on mood and SSE. In contrast, the language manipulation employed in Study 2 was subtler and more realistic. It is possible that participants in the current study focused on the task itself (i.e., communicating with another student) rather than on the language used, thus not yielding the same effects on mood or SSE. It should be noted that these null findings are also consistent with prior depletion research, which has not found any effects of the SR manipulations on mood and/or self-efficacy (e.g., Baumeister et al., 1998; Muraven & Slessareva, 2003; Wallace & Baumeister, 2002).

This study employed a typical depletion design. Self-regulatory exertion was first manipulated (high vs. low SR effort) and performance on a second self-regulatory task was assessed. The manipulation check established that the language manipulation was indeed successful in creating higher levels of SR effort in the LFL compared to HFL condition. Furthermore, the E-hunting task was adopted from prior depletion research, which showed it to be sensitive to effects of self-regulatory effort (Schmeichel et al., 2003).

While language use clearly impacted subsequent performance, the findings do *not* lend support to a depletion (i.e., strength) model of SR. In order to establish self-regulatory depletion, one must find a reduction in self-regulatory performance following a prior self-regulatory (vs. non self-regulatory) act (Baumeister et al., 1998). Thus, the question that emerges is why significant differences were found in a direction opposite to that predicted by a depletion model.

Several possible explanations for the observed findings are proposed. First, self-regulation on the language task may have improved participants' abilities to self-regulate on the e-hunting task. This explanation is consistent with a "master schema" conceptualization of self-regulation (Baumeister et al., 1998; Muraven et al., 1998). According to this conceptualization, successful SR functioning in one domain serves as a prime for subsequent SR functioning. In the context of language use, this framework would suggest that use of a LFL activated a schema of self-regulation, thus leading to enhanced (rather than decreased) performance on the E-hunting task.

In early depletion writings (e.g., Baumeister et al., 1998; Muraven et al., 1998), a master schema framework was described as a competing, mutually exclusive, model to that of a depletion framework. Thus, researchers tended to view SR as a resource that could either be enhanced or depleted. However, in later works, Muraven and Slessareva (2003) suggested that depletion effects might be reversed when they occur in conjunction with additional psychological processes, suggesting a more complex SR process. Thus, another possible explanation for the results of Study 2 is that language use, while seemingly depleting one's SR resources, might also involves additional motivational processes that override the depletion effect and cause an improvement in subsequent performance.

In their investigation of how depletion might be overcome, Muraven and Slessareva (2003) manipulated the importance of performing a subsequent SR task. They found that depleted participants who believed the subsequent task was important performed significantly better than those who were not provided with such information. In another study, the researchers manipulated the extent to which participants believed that engaging

in self-regulatory activity (i.e., practicing) impacted their performance on the subsequent task. They found that depleted participants who believed their efforts would be related to the outcome outperformed those who were made to believe their efforts would not be related to the outcome. (In these studies, only depleted groups were compared.)

In a similar vein, other researchers have shown that priming depleted individuals with self-control can also override the effects of depletion. Martijn, Alberts, Mercklebach, Havermans, Huijts, and De Vries (2007) conducted a typical depletion study with the addition of a priming manipulation in between the depleting task and the subsequent self-regulatory task. Half of the participants read a story describing a persevering person, while the remaining participants read a neutral story. The authors found a significant interaction between the initial SR task manipulation (solving easy or difficult puzzles) and the priming manipulation (a perseverance or neutral prime). Specifically, those who were previously depleted and received a perseverance prime performed better than those who were previously depleted but received a neutral prime. The reverse pattern was found for those who were previously not depleted.

In the current research, task importance was not manipulated nor was there a perseverance priming manipulation. However, the studies by Muraven and Slessareva (2003) and Martijn et al., (2007) provide some basis to speculate that while use of a LFL requires self-regulatory effort, it might also embed within it additional motivational processes that would counter the effects of depletion. Such an explanation might explain the performance advantage observed among participants in the LFL (compared to HFL) condition.

To elaborate, one potential motivational process operating in the language use-performance relationship is the perception of a discrepancy between one's thoughts and one's communication level. Indeed, communication research shows that bilinguals are typically aware of the discrepancy between their mature thoughts and the level in which they communicate them (Horwitz et al., 1986). Such a discrepancy might hypothetically lead bilinguals to compensate for their perceived low communication by working particularly hard on a subsequent task. In other words, the perceived discrepancy might mediate the relationship between language use and subsequent performance. The magnitude of perceived discrepancy might also moderate the relationship between language use and performance on a subsequent task, such that a stronger effect would emerge for those experiencing a larger (compared to smaller, or no) discrepancy. For example, a perceived discrepancy might be greater when using a LFL in a situation that clearly triggers use of one's HFL, as was the case in Study 2. According to this proposed compensatory model of language use and performance, participants in the LFL (compared to HFL) condition might have performed particularly well on the subsequent E-hunting exercise as a way of compensating for their relative low level of communication on the off-line conversation task.

One might ask why similar findings have not emerged in prior depletion research. That is, past depletion manipulations have also presumably led participants to experience some kind of discrepancy between their intention to perform well on the initial SR tasks and their actual performance on those tasks, whether the manipulation involved not thinking about a particular object, suppressing one's emotions, or even performing a physical task that required self-control (Muraven et al., 1998; Muraven et al., 1999;

Schmeichel et al., 2003). One possibility is that the tasks performed in typical depletion studies were not particularly meaningful to participants or salient to their sense of self. In such cases, a perceived discrepancy between one's intention to perform well and one's actual performance (if such a perceived discrepancy would even arise) would not be big enough to drive compensatory performance on a subsequent task. Thus, in those cases, only a depletion mechanism would operate. In contrast, language use is intricately linked to a person's identity, and research (e.g., Horwitz et al., 1986) and anecdotal evidence suggests that bilinguals are aware of the discrepancy between their thoughts and their communication level. Thus, the act of using a LFL might be expected to generate sufficient motivation to compensate for one's poor communication by performing well on a subsequent task.

This proposed compensatory model of language use and performance might be tested empirically in future research. For example, bilinguals undergoing a depletion manipulation might rate the extent to which they feel they were able to successfully convey their thoughts. This variable might then be tested as a mediator in the language use-performance relationship. In the same vein, feedback (positive vs. negative) might be randomly assigned to bilinguals regarding the success with which they used their LFL. While a pure depletion model would predict no differences on subsequent performance between these two groups, a compensatory model would predict significantly higher subsequent performance for those in the negative compared to positive feedback condition.

Another way to test this model is by randomly assigning bilinguals to experimental conditions that trigger different languages. The psycholinguistics literature suggests that

different topics trigger different languages (Grosjean, 2001). A compensatory model of language use would require identifying the particular contexts that trigger different languages. For example, Pilot Study 3 showed that bilinguals (at least in that sample) preferred to use their LFL for work-related topics. Thus, use of one's HFL when discussing work (i.e., using a language that isn't automatically triggered) should lead bilinguals from that sample to experience a discrepancy between their thoughts and communication. In turn, this might lead to subsequent compensated performance levels. In contrast, using a LFL for work-related topics would be the naturally occurring language and thus would not lead bilinguals to experience a discrepancy between their thoughts and communication. Therefore, use of a LFL in this context would not lead to higher subsequent performance levels.

Thus, it seems possible that even though use of a LFL requires self-regulatory effort, there might be additional factors inherent in this behavior that would overcome depletion-related effects within certain contexts. In this regard, language use might be a more complex behavior than the behaviors examined in prior depletion research and thus not fit neatly within a depletion model.

Another, more technical, explanation for the observed finding in Study 2 is that those who prepared an introductory tape in English were primed with the English language, thus leading to better subsequent performance on the English-based E-hunting task. Though the E-hunting exercise did not require any reading comprehension, it was a language-based task. However, this explanation seems weak when considering that all of the participants completed questionnaires in English after the language manipulation and before completing the E-hunting exercise. Thus, all participants were exposed to English

triggers after the language manipulation. In hindsight, it might have been more appropriate to use a dependent measure that did not rely on English letters at all. For example, the same task might have been used with numbers or other graphic symbols. Such a measure might have altogether eliminated the possibility of this alternative explanation.

In the next chapter I provide a summary and review of the studies included in this dissertation. I also discuss the strengths and limitations of this research and additional areas for future research.

Chapter 10: General Discussion

As organizations become more linguistically diverse, many are requiring bilingual employees to use English in the workplace during work times, even though this language is a LFL for such employees. Surprisingly, there is little research examining the implications of using a LFL (compared to a HFL) on bilingual employees' performance. This dissertation sought to start addressing this gap in the literature.

The underlying framework for this research was that of a depletion model (Baumeister et al., 1998; Muraven et al., 1998). The notion of ego depletion is conceptually compatible with bilingualism research suggesting that use of one language requires suppression of a second language, and that use of one language interferes with production of the second language (Green, 1986, Grosjean, 2001; Guion et al., 2000; Mackay & Flege, 2004). Thus the purpose of the present research was to investigate whether use of a LFL (compared to a HFL) led to self-regulatory failure (i.e., depletion), as reflected by a decrease in subsequent SR performance.

The idea that use of a LFL requires effort and that it is not an automatic process emerged in this dissertation's pilot studies as well as from the two main experiments. The main dependent variables in Study 1 and Study 2, persistence and performance, tapped self-regulatory functioning. I opted to focus on tasks that tapped self-regulation because this construct underlies many important behaviors, including problem- solving, attention to stimuli that deviate from expected patterns, and control of emotional impulses. Thus SR functioning was thought to be of interest to organizations and an appropriate starting point for an initial investigation of the impact of language use on bilinguals' performance.

Summary of Studies and Main findings

Unexpectedly, Study 1 did not show a significant relationship between language use and persistence on a subsequent SR task. In fact, though not significantly different, the number of attempts participants made to solve the subsequent SR task was slightly higher for those in the LFL condition than in the HFL condition. The significant finding from Study 2, in which language was operationalized in a more realistic and involving manner, also did not support a depletion model because SR performance was higher (rather than lower) following use of a LFL.

The manipulation checks and the pilot studies all strongly suggested that use of a LFL required significantly more effort than use of a HFL. Recall that in the qualitative pilot studies participants described the experience of using a LFL as mentally exhausting and tiring – both concepts closely linked to the notion of depletion. Therefore, it was surprising that use of a LFL (compared to HFL) led to significantly higher rather than lower subsequent SR performance (Study 2).

To account for the significant finding in Study 2, I suggested that although use of a LFL (compared to a HFL) constitutes an effortful behavior, it might also involve additional psychological processes that overcome or compensate for any depletion effects. Martijn et al. (2002) suggested that even when people are in a depleted self-regulatory state, this does not mean they are unable to self-regulate; rather, they operate on a "standby" mode in which they seek to conserve their self-regulatory energy. Indeed, different conditions, such as priming of self-control (Muraven & Slessareva, 2003) or providing information about the importance of the second, SR task (Martijn et al., 2002), have been shown to override the performance decrements of depleted individuals.

Thus, an explanation that might potentially help understanding the language use-performance relationship is that of a discrepancy-reduction, compensatory model of language use and performance. I suggest that use of a LFL, particularly in communication contexts that trigger use of one's HFL, might increase bilinguals' awareness to the discrepancy between the ideas they try to convey and the way in which they communicate those thoughts. A high discrepancy might, in turn, motivate bilinguals to perform particularly well on subsequent tasks as a way of compensating for their prior poor communication.

A compensatory model of language use and performance suggests that what must be considered is not the specific language used in a situation but rather the extent to which it is a language that is triggered by the situation. This is because different languages are triggered within different contexts (Grosjean, 2001). Thus, a comprehensive test of a compensatory model of language use and performance would require identifying the languages that are triggered by different communication contexts (e.g., for discussing work/technical topics compared to personal topics). To illustrate, an Israeli residing and working in the United States might consider Hebrew to be her HFL when talking to her Israeli friends about personal topics but might consider English to be her HFL when talking to her Israeli friends about her work.

Methodological Strengths and Limitations

Overall, the current research had several methodological strengths. First, it included qualitative as well as quantitative studies. All quantitative studies were true experiments, high in internal validity. The studies mirrored the methodological approach used in previous depletion studies, thus attempting to link the construct of depletion to the

context of bilingualism. The contradictory findings therefore suggest that a classic depletion framework is not an appropriate or sufficient model within which to understand the link between bilinguals' language use and subsequent SR performance.

Another methodological strength of these studies is that it allowed probing for potential alternative underlying psychological processes in the language use-performance relationship. Because this research did not find support for a language use-SR performance relationship, no mediators were identified.

The obvious limitation of Study 1 is that it lacked verisimilitude, because it did not include contextual factors typical of normal communication situations. However, this was done purposefully and was regarded as a methodological strength because it allowed a test for depletion effects associated with the sheer use of a LFL or HFL. Study 2 addressed the issue of generalizability by including a language manipulation that approximated a conversation. This is because the situations presented in Study 2 paralleled what might actually occur in organizations that impose restrictive language policies. The design of Study 2 was still somewhat limited in its external validity because it involved a simulation of a conversation rather than having two bilinguals interact. However, this choice also enabled control of many contextual variables that exist in real conversations, such as the presence of nonverbal cues, or differences in content of conversations across conditions, which might have introduced numerous possible differences within and across the various conditions. Overall, I opted to design studies that would have high internal validity while being sensitive to concerns of external validity, given that this was the first examination of how bilinguals' language use impacted subsequent performance.

Another feature of both studies is that participants did not have the option to choose a language. Rather, they were instructed to use either their HFLs or LFLs. As was noted earlier, this was done purposefully to ensure a "clean" research design because the construct of choice has been found to relate to the notion of depletion (Baumeister et al., 1998; Moller et al., 2006). However, incorporating a choice factor into studies about language use, for example, by allowing participants to code-switch, would greatly enhance the realism and generalizability of such research.

Additional Areas for Future Research and Organizational Implications

One interesting finding is that in Study 2, language use did not significantly predict mood, SSE, or anxiety. This was surprising considering the results of the qualitative pilot study and prior research about language use and anxiety (e.g., Horwitz et al., 1986). Perhaps the situation with which participants were presented – that of an interpersonal communication situation -- was not perceived as a high stake situation or simply did not engage participants. This would be somewhat surprising, considering that all of the participants appeared to have believed that they were interacting with a fellow student, and they discussed topics that were highly personal. Nonetheless, it is possible that using a LFL (compared to a HFL) in other situations, such as when presenting one's work or when being evaluated, might elicit different reactions. Thus, future research might examine the relationship between language use and subsequent performance in high stake situations. One challenge associated, however, with such research, would be controlling for the content discussed or presented.

Another possible explanation for the lack of mood, anxiety, arousal, or SSE findings in Study 2 is that these measures were not cross-culturally sensitive. Recall that

the participants in Study 2 were all Chinese students who had been living in the U.S. for a relatively short period. Thus, it is possible that the participants interpreted the items differently from the samples on which these measures were validated. Future research might benefit from using cross-culturally valid measures when sampling bilinguals who are new to the local culture.

In addition to examining the underlying mechanism in the language use-performance relationship, researchers might also examine variables that moderate this relationship. Moderators might include individual differences related to self-presentation, such as self-confidence or self-monitoring. For example, people who are high (compared to low) in self-monitoring (Snyder, 1974) might be more sensitive to any discrepancies between their ideas and the way in which they communicate them. Thus, high (compared to low) self-monitors may be more motivated to compensate for subsequent performance. Such research about individual differences would provide additional, converging validity to support a compensatory model of language use and performance.

Another individual difference that might be examined is the extent to which bilinguals assimilate into their local country. Research shows that there are varying levels of acculturation, ranging from maintaining a clear identity based on one's country of origin, blending the two cultural identities, to assimilating into the new culture (Sodowsky & Plake, 1991). It seems plausible that people who are high (compared to low) in assimilation would experience stronger discrepancies between their desired level and actual level of communication when using a LFL, which in turn might lead to increased performance levels following use of a LFL. In contrast, bilinguals who are very low in assimilation tendencies might either not perceive a discrepancy between their

desired and actual communication level when using a LFL or simply not be threatened by it, thus not leading to subsequent compensated performance. In this latter case, one might expect to see a decrease in subsequent performance, consistent with a depletion model.

In addition to conducting additional laboratory research to clarify the way in which language use impacts subsequent performance, research is clearly needed in applied, organizational settings. For example, while legal cases related to language use suggest that use of a LFL is not automatic (and is thus effortful), validating this claim with organizational-based data is important. Additionally, the unexpected finding of increased performance following use of a LFL needs to be replicated in real world settings.

Building on the possibility that depletion effects might be countered by the presence of other motivational processes, it seems important to also consider organization-related motivational constructs that might moderate the relationship between language use and subsequent performance. One such construct is perceived organizational justice. Research shows that employees' reactions to organizational policies are to a large degree a function of the extent to which the policies are considered fair (Bies & Tyler, 2003). In the context of bilingualism, it seems plausible to expect that while use of a LFL might be effortful for all bilinguals, the effect of language use on performance might be mitigated by one's perception of the organization as respective and supportive of bilinguals (who are frequently members of minority groups). Specifically, bilinguals who use a LFL but who consider restrictive language practices to be just might be motivated to perform particularly well on subsequent tasks as a way of compensating for their relatively poor communication, whereas those who consider language practices to be unjust might experience very low motivation to perform well on subsequent tasks.

Researchers might also investigate whether any of these performance effects are long lasting, and if there are any "side-effects" that emerge as bilinguals use a LFL over time. For example, while bilinguals might maintain a high level of performance in the short-term, a constant inclination to over-perform on self-regulatory tasks might lead employees to experience burnout. On the other hand, when employees constantly use a LFL in the workplace this language might gradually become a HFL. In that case, any effects might diminish.

In closing, though the mechanism underlying the language use- performance relationship remains unresolved, language use (LFL versus HFL) impacts subsequent SR performance. Therefore, the research question of how language use impacts bilinguals' performance is a viable one. While there might be performance-related benefits to encouraging employees to use a LFL in the workplace, as implied by the present research, this still needs to be substantiated.

The need for additional research about bilingualism in the workplace seems particularly strong when one considers the relevance of this topic for contemporary organizations. According to the EEOC (2007), many companies continue to prohibit use of non-English languages in the workplace or select employees according to English fluency, even when the job does not require much use of English. On the other hand, anecdotal evidence suggests that companies are increasingly offering English classes to bilingual employees, either during or after work hours (e.g., Kramer, 2007; Sachetti, 2007). These different interventions suggest that organizations are still wrestling with the topic of language use in the workplace.

The issue of bilinguals' language use in the workplace is expected to generate greater attention as the national debate about immigration and immigrants' rights intensifies. Along with the apparent value of having a linguistically diverse workforce, such an environment presents challenges for individuals as well as for organizations. It seems critical for organizations and academic-based researchers to actively investigate the impact of restrictive language policies not only on those working with bilinguals but also on the bilinguals who are required to comply with such policies. Doing so will ensure that organizations understand the impact of their language policies, and that bilinguals' short-term and long-term contributions to the workplace will be maximized.

Table 1. *Pilot Study 1 - Frequency of Constructs and Descriptors*[1]

Number and Percentage of narratives that include t he construct	***Coded Descriptors***	***Frequency of descriptors***
Effort n=30 (68% of narratives)	▪ Hard to express ideas [in one's LFL]; hard to express myself; Hard to get my ideas across	23
	▪ Difficult; not easy; tough; hard	8
	▪ Requires effort; is effortful	1
	▪ Is not relaxing	1
Controlled Processing n=10 (23%)	▪ Requires concentration; searching for words; need to process what to say; words "stuck in head"	4
	▪ Is not automatic; is unnatural; feels weird	3
	▪ Is mentally tiring	2
	▪ Is confusing	1
Self-regulatory breakdowns n=9 (20%)	▪ Found oneself speaking the HFL; started speaking in the LFL and shifted to the HFL; Blurted out words in a third, unrelated language	6
	▪ Used a map/sketch/drawing; used hand gestures; pointed [with hands].	4
Replenishment n=4 (9%)	▪ Found someone who could speak the HFL; found opportunity to use the HFL afterwards; opted/preferred to use the HFL.	3
	▪ Relaxed	1
Decreased performance based SSE n=15 (34%)	▪ Realized that I didn't know the LFL well enough; realized my level in the LFL was not good; realized I could improve the LFL.	6
	▪ Did not feel confident; felt insecure	5
	▪ Felt stupid; felt incompetent	5
Decreased social-based SSE	▪ Embarrassed	4

[1] Forty-four of the 56 narratives were analyzed (see text for explanation). Note that frequency of descriptors does not equal frequency of narratives/participants. This is because, in some cases, more than one descriptor from the same category was included in a particular narrative. The results section refers to the number of narratives/participants who reported one or more descriptors for each of the constructs.

Number and Percentage of narratives that include t he construct	*Coded Descriptors*	*Frequency of descriptors*
n=12 (27%)	▪ Ashamed	2
	▪ Self-conscious	6
	▪ Worried about how others would react	5
	▪ Felt inferior to others	1
Increases in Anxiety	▪ Nervous	9
n=21 (47%)	▪ Uncomfortable; awkward; felt Strange	8
	▪ Anxious; distressed/; stressed	5
Other Negative reactions and related actions	▪ Frustrated	8
n=16 (36%)	▪ Helpless	4
	▪ Upset; annoyed	4
	▪ Disappointed	3
	▪ Scared of doing the wrong thing; Scared of saying the wrong thing	6
	▪ [Afterwards] continued thinking about the situation; couldn't get [the situation] out of my head.	4
	▪ Ran away from the situation; avoided using the LFL afterwards	5
Positive reactions n=27 (61%)	▪ Felt relief [after situation ended]	13
	▪ Felt good; fine; okay	8
	▪ Proud	5
	▪ Laughed about the situation; joked about the situation	4

Table 2. *Means, Standard Deviations, and Effect Sizes for All Variables in Pilot Study 3*

	LFL (n=16)	*HFL* (n=15)	t-test value	p	Effect Size (Cohen's d)
Effort	4.18 (1.27)	3.27 (1.58)	1.79	.04	.64
Felt Depletion	3.15 (.88)	2.40 (1.00)	2.21	.02	.80
SSE_Performance	4.42 (1.13)	5.36 (.92)	-2.5	.01	.86
SSE_Social	5.08 (.73)	5.04 (.94)	-1.08	.15	.36
Positive Affect	2.3 (.77)	2.65 (.61)	-1.4	.08	.43
Negative Affect	1.68 (.68)	1.44 (.46)	1.14	.13	.40

Note. Standard deviations in parentheses.

Table 3. *Means, Standard Deviations, and Group Comparisons (Study 1)*

	LFL	*HFL*	*t-value*	*Cohen's d*
Self-report measures [a]				
Effort	3.53 (1.20)	2.91 (.96)	2.21*	.57
Anxiety	2.09 (.59)	1.92 (.39)	.19	.34
SSE_Social	3.67 (.81)	3.81 (.81)	.27	-.17
SSE_Performance	3.45 (.80)	3.89 (.52)	2.69**	-.65
Arousal	2.21 (.36)	2.15 (.38)	.63	.16
Mood	2.69 (.42)	2.92 (.41)	-2.17*	-.55
Objective measures [b]				
Non-SR task / Number of correct recalls on memory task	5.53 (1.74)	4.86 (1.64)	1.55[a]	.39
SR task / Total time spent on task (sec)	1265.29 (453.78)	1328.55 (550.98)	-.62[a]	-.08
SR task / Number of trials attempted	49.87 (31.26)	37.41 (27.83)	1.58	.40

Note. Standard deviations in parentheses.
* $p < .05$, ** $p < .01$
[a] df=60; [b] df=61

Table 4. *Inter-Correlations between variables (Study 1).*

	1	2	3	4	5	6	7	8	9	10
1. Language [a] (LFL or HFL)	-									
2. Effort	-.25*	-								
3. Memory (accurately recalled items)	-.19	.05	-							
4. Persistence (overall time)	.05	.09	-.05	-						
5. Persistence (number of trials)	-.19	.25*	-.15	.51*	-					
6. Anxiety (STAI)	-.15	.11	-.08	.02	.30*	-				
7. SSE_Social	.21	-.24 $^{+}$	-.09	-.10	-.06	-.46**	-			
8. SSE_Performance	.37**	-.40**	-.06	-.02	-.37**	-.55**	.57**	-		
9. Mood (BMIS)	.22	-.16	.09	.07	-.31**	-.74**	.41**	.46**	-	
10. Arousal (BMIS)	-.07	.00	.20	.18	.03	.15	-.05	-.22	-.11	-

[a] Language was coded such that 1 = LFL, 2 = HFL.
* $p < .05$, ** $p < .01$

Table 5. *Means, Standard Deviations, and Group Comparisons for Experimental Conditions (Study 2)*

	LFL	*HFL*	*t-value*	*Cohen's d*
Objective performance measures				
E-Hunting / Proportion of "hits" [a]	.78 (.16)	.64 (.27)	2.74 **	.63
E-Hunting / Proportion of "correct rejections" [a]	.78 (.22)	.77 (.21)	1.18	.04
Self-report measures				
Effort [a]	2.98 (.77)	2.52 (.93)	2.13*	.53
Anxiety [a]	1.94 (.46)	1.86 (.45)	.69	.17
SSE_Social [b]	3.59 (.84)	3.78 (.75)	-.96	.23
SSE_Performance [b]	3.68 (.62)	3.89 (.75)	-1.17	.30
Arousal [a]	2.22 (.37)	2.17 (.37)	.57	.14
Mood [a]	2.90 (.40)	2.88 (.40)	.25	.05

Note. Standard deviations in parentheses.
* p <.05, **p<.01
[a] df=59; [b] df=56

Table 6. *Inter-Correlations Between Variables (Study 2)*

	1	2	3	4	5	6	7	8	9
1. Language Use [a]	-								
2. Effort	.-27*	-							
3. E-Hunting/ Proportion of "hits"	.-31*	-.15	-						
4. E-Hunting/ Proportion of "correct rejections"	-.02	-.04	-.14	-					
5. Anxiety	-.09	.01	-.21	.07	-				
6. Mood	-.03	-.01	-.04	.07	-.67**	-			
7. Arousal	-.07	.31*	-.08	-.05	.26*	-.37**	-		
8. SSE Soc	.13	-.41**	.05	-.03	-.42**	.32**	-.32*	-	
9. SSE Perf	.15	-.31 *	.07	.01	-.43**	.48**	-.28*	.57**	-

[a] Language was coded such that 1 = LFL, 2 = HFL.
* $p < .05$ level , ** $p < .01$ level

Appendix A. Stimulus used in Study 1: Norman Rockwell's "A Day in the Life of a Little Girl."

Due to copyright restrictions, this picture cannot be included in the electronic version of this dissertation.

Appendix B. Questions included in the Language Manipulation Task, Study 2.

☐ 1. What is your name? (It is okay to just say your initials or first name)

☐ 2. How old are you?

☐ 3. Where are you from?

☐ 4. How long have you lived in the United States?

☐ 5. What made you come to Baruch College?

☐ 6. What is your major, and why did you choose that major?

☐ 7. Name something about Baruch College that you really like.

☐ 8. Name something about Baruch College that you don't like at all.

☐ 9. What are your hobbies/interests?

☐ 10. What would you like to do after graduating from Baruch?

☐ 11. What would be the perfect lifestyle for you?

☐ 12. What is something you have always wanted to do but probably never will?

☐ 13. If you could travel anywhere in the world, where would you go and why?

☐ 14. Describe something that was difficult when you moved to the United States.

☐ 15. Name one thing you miss from your home country.

☐ 16. What habit would you like to break?

☐ 17. If you could change one thing about yourself, what would that be?

☐ 18. Do you have an easy time making new friends?

☐ 19. Describe one emotional experience that you've had with a good friend.

☐ 20. Describe a happy childhood memory of yours.

☐ 21. What is one thing about yourself that most people would consider surprising?

☐ 22. Describe a recent accomplishment that you are very proud of.

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