# THE EFFECTS OF TASK SWITCHING WITHIN AND BETWEEN LANGUAGES ON L2 READING COMPREHENSION

A MASTER'S THESIS

BY

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THE PROGRAM OF TEACHING ENGLISH AS A FOREIGN LANGUAGE

İHSAN DOĞRAMACI BILKENT UNIVERSITY
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*This work is dedicated to my dear husband and children, who have suffered the incredible irony of my fractured attention as I have attempted to balance family, work, school, and way too much social media, all while learning and writing about the hazards of fractured attention. The sacrifices over these last three years may have been many, but they were thankfully not in vain; this unexpected sojourn has taught me to become a more mindful wife and mother.*

*You have my full attention.*

# The Effects of Task Switching Within and Between Languages on L2 Reading Comprehension

The Graduate School of Education

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by

Lorie Marie Tan

In Partial Fulfilment of the Requirements for the Degree of

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Oral Defence June 2016

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Teaching English as a Foreign Language.

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Asst. Prof. Dr. Deniz Ortaçtepe (Supervisor)

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Teaching English as a Foreign Language.

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Prof. Dr. Margaret Sands (Director)

# ABSTRACT

THE EFFECTS OF TASK SWITCHING WITHIN AND BETWEEN LANGUAGES ON L2 READING COMPREHENSION

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June 2016

The purpose of this study is to compare how scores on reading comprehension tasks are affected by switching between two activities within and between languages. Two overarching scenarios with three subsections are involved in this study. The first scenario measures reading task scores when both the reading task and an extraneous task are being performed in one's second language (L2); the participants switch between tasks but remain in L2. The second scenario measures reading task scores when the reading task is performed in L2, but the extraneous task is performed in one's native language (L1); the participants not only switch between tasks, but also switch between L2 and L1. The subsections denote the nature of the extraneous tasks: hearing a conversation in the background, speaking with someone face to face, and engaging in text messaging.

This study was conducted at the English preparatory school of an English-medium university in Ankara, Turkey. Seven groups of participants completed the

same reading comprehension tasks in L2 under varying conditions: hearing a conversation in L2 in the background, hearing a conversation in L1 in the background, engaging in conversation in L2, engaging in conversation in L1, engaging in text messaging in L2, engaging in text messaging in L1, and no distractions. The results indicate that participants scored higher, on average, when remaining in L2 for both tasks and scored lower when switching between L2 and L1. To gain insight into these results, interviews were conducted with two individuals who had engaged participants in conversation and text messaging in L1 and L2. Analysis of the interview transcripts indicates that the word choices and styles of communication differed between L1 and L2, and that participant responses tended to be more extensive in L1, particularly while text messaging.

As the findings of this study indicate that overhearing conversation in L1 can pose a distraction to learners working in L2, teachers and students alike ought to be mindful of this and curb the dispensable use of L1 in the classroom. Further pedagogical implications include creating language courses that promote metacognition and reflection in order to raise learner awareness of the effects of task switching, language switching, and divided attention on learning.

Key words: multitasking, task switching, continuous partial attention, L1 and L2 comparison, L2 reading comprehension, background conversation, speaking, text messaging

# ÖZET


DİL İÇİ VE DİLLER ARASI GÖREV DEĞİŞİMİNİN OKUDUĞUNU ANLAMA ÜZERİNDE ETKİSİ

Lorie Marie Tan

Yüksek Lisans, Yabancı Dil Olarak İngilizce Öğretimi Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Deniz Ortaçtepe

Haziran, 2016

Bu çalışma dil içi ve diller arasında değişiklik yaparak tamamlanan iki aktivitenin okuma becerisini üzerindeki etkisini ölçmektedir. Bu amaçla, çalışma üç alt kısmı içeren iki kapsamlı senaryodan oluşmaktadır. İlk senaryo, yabancı dilde verilen okuma metni sırasında dışarıdan gelen yabancı dildeki bir aktivitenin okuma metni skorları üzerindeki etkisini ölçmektedir. Bu durumda katılımcılar, yabancı dil kullanarak aktiviteler arası değişim yapmaktadır. İkinci senaryoda yabancı dilde verilen okuma metni sırasında katılımcılara dışarıdan anadillerinde aktivite verildiğinde okuma metninden elde edilen sonuçlar ölçülmüştür; katılımcılar sadece aktiviteler arası geçiş yapmakla kalmayıp, yabancı dil ile anadil kullanımı arasında da geçiş yapmışlardır. Alt kısımlar dışarıdan verilen aktivitelerin doğasını açıklamaktadır: arka planda konuşma duymak, biriyle yüz yüze görüşmek, ve telefonla kısa mesaj gönderimi yapmak

Bu çalışma, öğretim dili İngilizce olan bir üniversitenin İngilizce hazırlık okulunda, Ankara Türkiye'de yapılmıştır. Yedi grup katılımcı yabanci dilde verilen ayni okuma metninin sorularını çeşitlilik gösteren koşullar altında tamamlamışlardır: arka fonda yabancı dilde duyulan bir konuşma, arka fonda anadilde duyulan bir konuşma, yabancı dilde konuşmaya katılmak, ana dilde konuşmaya katılmak, yabancı dilde kısa mesaj gönderimi, anadilde kısa mesaj gönderimi, ve dikkat dağıtan elementlerin olmaması. Çalışma sonuçları katılımcıların iki aktiviteyi de İngilizce olarak yaptıklarında okuma metninden daha yüksek, diller arası geçişte bulunduklarında okuma metninden daha düşük puanlar aldıklarını göstermektedir. Bu sonuçları daha derinleştirmek için, katılımcılara okuma metnini çözdükleri sırada anadilde ve yabancı dilde kısa mesaj gönderen iki kişi ile görüşmeler yapılmıştır. Görüşmeler üzerinde yapılan analiz, yabancı dil ve anadil arasındaki konuşmaların tarzı ve kelime seçiminin farklılıklar gösterdiğini, ve katılımcı kısa mesaj yanıtlarının anadil ile olduğunda daha kapsamlı olduğunu ortaya koymuştur.

Bu çalışmanın sonuçları, anadilde duyulan konuşmaların yabancı dil ile çalışma yapan öğrenciler üzerinde dikkat dağıtan bir etmen olabileceğini, bu sebeple, öğretmenlerin ve öğrencilerin sınıf içinde anadil kullanımında daha dikkatli olmaları gerektiğini göstermektedir. Çalışmanın pedagojik çıkarımları arasında öğrencilerin farkındalığını arttıracak görev değişimi ve dil değişimi ile öğrenmedeki bölünmüş dikkatin arttırılmasına yönelik üstbiliş ve yansıtıcı düşünmeyi geliştirebilecek yabancı dil derslerinin oluşturulması da yer almaktadır.

Anahtar kelimeler: Çoklu görev, görev değiştirme, aralıksız kısmi dikkat, 1. Dil ve 2. Dil karşılaştırması, 2. Dilde okuduğunu anlama, arka fonda konuşma, konuşma, kısa mesaj gönderim

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To my colleagues and classmates, whom I am also privileged to call my friends, thank you all for the different roles you have played in this project. Öznur Alver Yücel, Başak Erol Güçlü, Seda Özdoğan, Sabriye Gür, Clare Yalçın, Debra Glover, and Shawnda Hines, you generously gave of your free time to assist during the data collection process, and without you, this research design simply would not have been possible. To Elif Burhan Horsanlı I owe my gratitude for not only translating my abstract into Turkish, but for, along with İlkim Yıldız, being a

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Finally, I am indebted to my family for their unending love, support, and prayers. My husband, Vedat Tan, has pulled double duty over the past three years by caring for our two young children when I was away at classes or at the library working on my thesis. He never complained once, and I am filled with gratitude for his selfless heart of gold. Without him, this endeavor never would have been possible. To my parents, Stan and Linda Shepski, I am grateful to you for grounding me with roots bound in truth and love while simultaneously encouraging me to exercise my wings. For my brothers, Mike and Lee Shepski, I am truly thankful. Mike, you have taught me to stand strong, even laugh, in the face of adversity, and you are the glue which has held our family together in recent years. I am grateful for your wisdom, support, and prayers. Lee, not only did you teach me to think critically, you taught me what it meant to be a friend. I'm not sure how I made it through graduate school without you, but imagining you offering up your sagely advice punctuated by your beautiful laughter helped carry me through. I hope I've made you proud.

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# CHAPTER I: INTRODUCTION

## Introduction

The use of technology in the classroom, specifically personal electronic devices such as laptops, tablets, and smart phones, is a double-edged sword. On one hand, the resources that are available to both teachers and students alike are a veritable gold mine, and access to valuable online teaching and learning resources in the classroom can enhance learning (Faizi, Afia, & Chiheb, 2014). On the other hand, many students openly use their electronic devices in the classroom, which can prove to be challenging for the teacher to adequately monitor whether the use of such devices contributes to student learning (e.g., checking a dictionary) or compromises it (e.g., playing video games or sending text messages) in some way (Kuznekoff & Titsworth, 2013).

One might suggest that there is nothing new under the sun since, in days gone by, students hid comic books inside their course textbooks and read comics instead of actively participating in their lessons. However true, the ubiquity of personal electronic devices coupled with their multi-functional nature, buzzing vibrations, and flashing alert messages are arguably more distracting than a simple comic book, thereby amplifying the problem of students switching between on and off task behaviors in the classroom (Rosen, Mark Carrier, & Cheever, 2013). The effects of students switching attention between reading in their first language (L1) and attending to instant messages in L1 have been found to have a negative impact on both the speed of reading and comprehension (Bowman, Levine, Waite, & Gendron, 2010; Fox, Rosen, & Crawford, 2009). The effects of task-switching between

languages on reading comprehension, however, remain largely unexplored.

**Background of the Study**

Multitasking is a term that is commonly used to describe a person engaging in two or more tasks simultaneously such as watching a television program, studying for a test, and sending a text message to a friend, all seemingly at the same time. However, it is important to note that not all models of multitasking are equal (Borst, Taatgen, & van Rijn, 2010). While it is possible to simultaneously engage in two activities where both tasks do not require full cognitive attention such as walking and talking, it is more difficult to read a text message and watch the road while driving a car; the more the cognitive resources required to perform simultaneous activities overlap, the more difficult, or even impossible, true multitasking becomes (Borst et al., 2010).

Taking reading a text message and driving a car as an example, it is impossible for one's eyes to be focused on the telephone and on the road simultaneously. Instead of engaging in these two acts at the exact same time, the person who is reading a text message while driving is actually switching back and forth between looking at the phone and looking at the road. Some prefer to use the term *task switching* or *switch tasking* to describe this type of back-and-forth action, distinguishing it from multitasking (Junco & Cotten, 2012; Rosen et al., 2013).

The effects of task switching on student performance has become a recurring theme in recent academic literature (Judd, 2014; Junco & Cotten, 2012; Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2012; Kirschner & Karpinski, 2010). Studies demonstrate that students who frequently task switch with personal electronic devices in the classroom or while studying show a decline in performance (Bowman et al., 2010; Fox et al., 2009), yet despite evidence to the contrary, many people

report that they are capable of engaging in multiple activities without sacrificing performance (Bowman et al., 2010; Junco & Cotten, 2011).

Most studies investigating the relationship between task switching in the classroom and academic performance present grim results (Bowman et al., 2010; Fox et al., 2009; Junco & Cotten, 2012). Bowman et al. (2010), for example, conducted a study in which students were given a test of reading comprehension on a computer. Some of the participants were interrupted by messages similar to those one might receive from a stranger on an instant messaging program or social networking site. It was found that the participants who received the messages were hindered in one of two ways: either they received scores similar to the control group but took significantly longer to complete the reading task, or the reading comprehension scores were lower than in the control group. In both circumstances, the performance of the participants was hindered. It is important to note that the context of these studies dealing with task-switching and academic performance are limited to participants completing a task in their L1 while switching between other tasks also in L1.

While task-switching between L1 and one's second language (L2) has also been investigated, studies that have been carried out in this area have had a much more narrow scope. Numerous studies have been designed to measure the time it takes bilinguals to switch between languages (Bobb & Wodniecka, 2013; Costa & Santesteban, 2004). However, most of these studies are picture or number identifying tasks in which the subject is asked to say a word in either L1 or L2. The elapsed time between seeing an item and naming it is referred to as switch costs (Bobb & Wodniecka, 2013). For those with similar proficiency levels in both languages, switch costs remain relatively the same whether switching from L1 to L2 or from L2

to L1. For those with unbalanced proficiency levels, on the other hand, switch costs are greater when switching from L2 to L1 than when switching from L1 to L2 (Bobb & Wodniecka, 2013). While these studies serve an important purpose, their applicability to the English language classroom is limited as they do not explore the effects of task-switching between L1 and L2 on academic performance.

## Statement of the Problem

Turkish university students tend to engage in multiple activities in their classes either by chatting with classmates face to face or by engaging with mobile technology during university lectures (Üstünlüoğlu, 2013). Research has demonstrated that students perform more poorly when engaging in extraneous activities during lessons, one of the most common distractions being social media (Judd, 2014; Junco & Cotten, 2012; Junco, 2012b; Kirschner & Karpinski, 2010). While the majority of task-switching studies were conducted with non-Turkish learners, it is not unreasonable to assume that Turkish learners of English would also perform less well when engaging in task-switching behaviors in the classroom than when devoting their undivided attention to their lessons.

Based on the evidence that unbalanced bilinguals (those who are notably weaker in L2 than L1) take longer to switch from L2 to L1 compared to balanced bilinguals (those who are highly proficient in both languages) (Bobb & Wodniecka, 2013), it can be assumed that Turkish learners enrolled in English language preparatory programs suffer higher degrees of switch costs when disengaging from a classroom activity in L2 and switching into face to face conversation or engaging in social media activities in L1. However, studies investigating switch costs and task-switching between languages tend to focus on simple vocabulary tasks and rarely investigate anything more complex (Bobb & Wodniecka, 2013; Costa &

Santesteban, 2004; Meuter & Allport, 1999). Furthermore, research which evaluates the effects of task-switching on measures of reading comprehension lacks a bilingual component (Bowman et al., 2010). How unbalanced bilinguals will perform on measures of reading comprehension in L2 while switching between multiple tasks executed in L2 only compared to switching between multiple activities in both L2 and L1 is still unknown. This study aims to investigate the effects of task-switching within L2 and between L2 and L1 by simulating the type of task-switching that university lecturers in Turkey frequently observe among the learners in their classrooms.

## Research Questions

1. How do B2 level English language learners at a Turkish university perform on reading comprehension tasks in L2 while:

   a) recorded conversations in L1 and L2 are playing in the background?

   b) engaging in spoken interaction with bilinguals in L1 and L2?

   c) engaging in electronic written interaction with bilinguals in L1 and L2?

2. If differences in performance are found, what possible factors contribute to the differences?

## Significance of the Study

As task switching in the classroom is reported by university professors to be a significant problem among students in Turkey (Üstünlüoğlu, 2013), this study will investigate, among Turkish learners of English, the impact of task switching between two activities in L2 versus the impact of task switching between an activity in L2 and another activity in L1. Previous research (Judd, 2014; Junco & Cotten, 2012; Junco, 2012; Kirschner & Karpinski, 2010) establishes that task switching negatively affects academic performance, but such studies do not include a bilingual component. This

study investigates whether one of the following scenarios more negatively impacts performance on measures of L2 reading comprehension than the other: switching between an L2 reading task and a secondary task in L2 or switching between an L2 reading task and a secondary task in L1.

The results of this study will help English language teachers estimate the degree of impact task-switching between L1 and L2 has on the performance of language learners and can serve as a basis for making specific recommendations to students regarding time management, study skills, and in-class participation. Additionally, the results of this study can help inform the creation of school policies related to off-task behaviors and the use of personal electronic devices in the classroom. While there are schools that ban or closely control the use of cell phones in the classroom, there are many with no such policies (Beland & Murphy, 2016; Tindell & Bohlander, 2012). Due to an initiative to utilize online resources both in and out of the classroom, the university where the research for this paper has been carried out is included among those schools with no policies regarding cell phone use in the classroom. At the local level, language learners benefit from quick, easy access to online dictionaries and other educational apps via their cell phones. However, the use of cell phones for off-task activities such as text messaging, social media, and video games are rampant and difficult to curtail in the classroom. Finally, the experimental tasks used for the purposes of this research may raise awareness among the participants regarding perceptions of their own abilities to learn a foreign language while attempting to engage in off-task behaviors. If these experimental tasks cause a shift in participant perceptions, this could play a role in curbing their off-task behaviors in the classroom or while studying, which could have a positive effect on the participants' acquisition of English.

## Conclusion

This chapter outlines the purpose and rationale of this study. First, key terms were introduced, and a brief overview of the topic was provided. The gap in the existing literature regarding the bilingual aspect of task switching was then highlighted. The target research questions driving this study were presented, followed by an explanation of how this study can broaden the scope of the existing literature as well as help address problems observed at the local level. The following chapter will examine the existing literature related to models of multitasking, continuous partial attention, switch costs, language switching, and the effects of task-switching on academic performance in further detail.

# CHAPTER II: LITERATURE REVIEW

## Introduction

This chapter delves into the existing research related to multitasking, task switching, and its effects on academic performance. In the first section of this chapter, the nature of multitasking will be discussed. The concept of continual partial attention will be highlighted in the second section. The third portion of this chapter will explain task switching and switch costs, and the fourth section will explain the effects of task switching on academic performance. Part five of the literature review will discuss research that has been conducted on bilingual individuals switching between languages. The final section will highlight the gap in the existing literature between the amounts of research conducted on the relationships between task switching and academic performance among monolingual individuals versus those who are bilingual.

## Multitasking

Multitasking is colloquially described as doing more than one thing at the same time, and in confirmation of this common understanding of the word, the Cambridge dictionary defines multitasking as, "a person's ability to do more than one thing at a time" ("Multitasking Meaning in the Cambridge English Dictionary," n.d.). How literally this definition of multitasking holds true, however, depends on which aspect of multitasking one is talking about. Two common ways of examining the concept of multitasking are through the lenses of *concurrent multitasking* and *sequential multitasking* (Borst, Taatgen, & van Rijn, 2010; Buser & Peter, 2012; Salvucci & Taatgen, 2008).

As the name implies, in concurrent multitasking, two or more tasks are performed concurrently (Borst et al., 2010; Meyer & Kieras, 1997; Salvucci & Taatgen, 2008). Examples of this include holding a conversation with someone while washing dishes, taking notes while listening, or singing while playing the guitar. In some of these cases, the ability to perform such activities simultaneously hinges upon a person's individual talent or proficiency level (Salvucci & Taatgen, 2008). In sequential multitasking, on the other hand, it is impossible to do the tasks at the exact same time. Reading a text message while driving a car is an excellent example of sequential multitasking, as it is physically impossible to focus one's eyes on the road while also focusing on a mobile telephone (Borst et al., 2010). A person must perform such tasks sequentially by first looking at the road, then looking at the telephone, and then back at the road again. Other examples of sequential multitasking include engaging in a text message conversation on a personal electronic device while listening to a class lecture or looking up unknown words in a dictionary while reading a book.

Salucci and Taatgen (2008) proposed a theory incorporating both concurrent and sequential multitasking called *threaded cognition*. With its roots in Adaptive Character of Thought—Rational (ACT-R), a theory of how human cognition functions (Anderson et al., 2004), the theory of threaded cognition postulates that "multitasking behavior can be represented as the execution of multiple task threads, coordinated by a serial cognitive processor and distributed across multiple processing resources" (Salvucci & Taatgen, 2008, p. 102). In other words, there are several independent modules, or threads, in action in the brain, each of which is responsible for a different process (e.g., aural processing, language production, physical movement). According to this theory, the threads are distinct, operate independently

of one another, and are capable of operating in parallel. That is, a person can listen to music using the thread responsible for aural processing and, in tandem, walk down the street by using the thread responsible for gross motor movements (Borst & Taatgen, 2007; Salvucci & Taatgen, 2008). While these independently operating threads can interact, thereby facilitating the execution of concurrent tasks, each thread operates sequentially and cannot handle more than one action at a time. If two activities such as reading academic journal articles and composing a master's thesis both require the use of the same thread responsible for language, for example, those two tasks must be completed sequentially and cannot be carried out simultaneously (Salvucci, Taatgen, & Borst, 2009).

Threaded cognition can perhaps best be likened to the preparation of a meal (Salvucci & Taatgen, 2008). Multiple activities requiring different resources can take place simultaneously; the table can be set while the lasagna is baking in the oven and the rice is simmering on the stove. However, once the same resource is required for more than one activity, those activities must be completed in sequence. Wiping up a spill on the counter while setting the table both require the use of the same resource—the hands of the dinner host—and the spill must cleaned up before the table can be set (or vice versa). Similarly, if the cake for dessert cannot fit into the oven with the lasagna, or if they must be baked at different temperatures, there is competition for the same resource, and the two cannot be prepared simultaneously.

While the theory of threaded cognition succeeds in explaining how concurrent and sequential tasks operate and interact, the theory does not account for the fact that these concepts are not black and white in nature. In reality, many overlapping tasks take place on a continuum, as many tasks that are executed within the same time frame are neither fully concurrent nor fully sequential (Salvucci et al.,

2009). The theory of threaded cognition was updated to encompass the concept of a multitasking continuum as pictured in Figure 1 below.

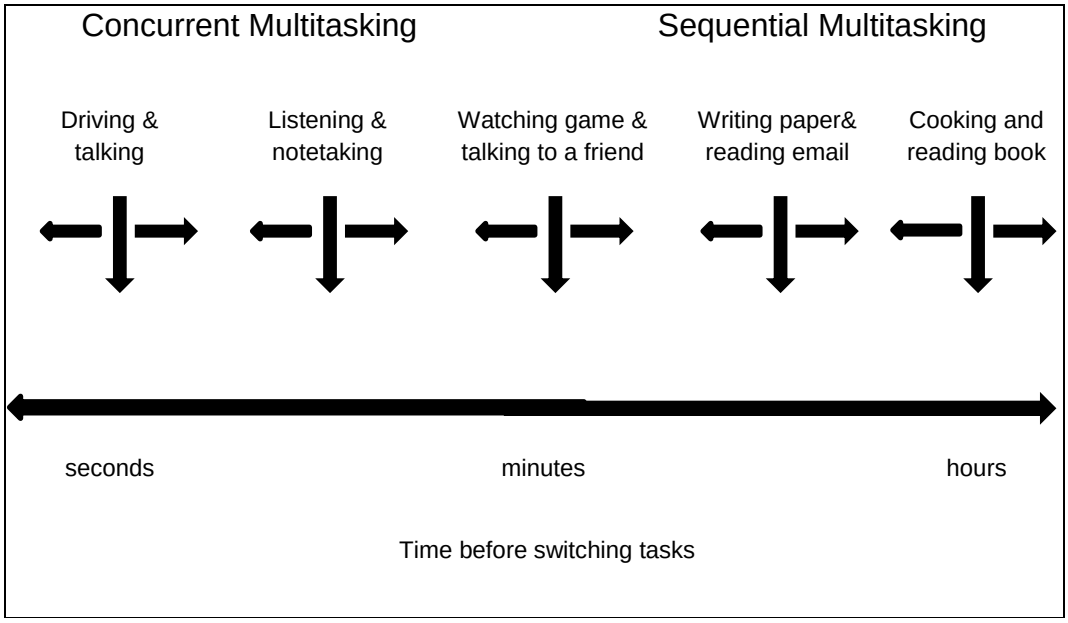


*Figure 1*. The Multitasking Continuum. Arrows demonstrate that there is not a concrete distinction between concurrent and sequential multitasking activities, but that the switch times vary based on where they fall on the continuum. Adapted from "Toward a Unified Theory of the Multitasking Continuum: From Concurrent Performance to Task Switching, Interruption, and Resumption," by D. Salvucci, N. Taatgen and J. Borst, 2009, *Chi '09,* p. 1820. Copyright 2009 by the Association for Computing Machinery.

As can be seen from the figure above, multitasking is, in many cases, nothing less than a series of switches between activities, with varying amounts of time elapsing between those switches (Salvucci et al., 2009). In order to emphasize that multiple tasks completed within a given time frame are not actually occurring simultaneously, the term *task switching* is often employed in lieu of the word multitasking (Borst et al., 2010; Rosen, Carrier, & Cheever, 2013; Wylie & Allport, 2000).

## Continuous Partial Attention

Where cognitive psychology concerns itself with the actual processes occurring in the brain when one engages in concurrent, sequential, and overlapping tasks, the concept of *continuous partial attention* describes the state of a modern world absorbed in technical gadgets (Stone, 2009). "Linda Stone…coined the term continuous partial attention to describe the modern predicament of being constantly attuned to everything without fully concentrating on anything" (Kuhl, 2013, p. 22).

Continuous partial attention is not to be thought of as a model of multitasking, but rather as a state of hyperawareness and seeking constant connection. Stone (2009) explains that the goal of multitasking is to attempt to accomplish a great deal of work in a short amount of time, whereas continuous partial attention is a phenomenon which results when people relay back and forth between online tasks and activities for the purpose of remaining in constant connection with others. Stone (2009) states:

> …we want to connect and be connected. We want to effectively scan for opportunity and optimize for the best opportunities, activities, and contacts, in any given moment. To be busy, to be connected, is to be alive, to be recognized, and to matter.
>
> We pay continuous partial attention in an effort NOT TO MISS ANYTHING. (n.p.)

This phenomenon, also referred to as *fractured attention* (Turkle, 2015), and more commonly, *media multitasking* (Angell, Gorton, Sauer, Bottomley, & White, 2016; Toit, 2013), has not escaped the notice of MIT professor Sherry Turkle. In her 2012 TED talk, Turkle addresses the irony of being in constant connection with others, yet also keeping everyone at arm's distance. People yearn to be connected,

she explains, but also desire to remain in control of the interaction. Technology enables one to communicate and reply when and where one wishes, void of all of the difficult, unrehearsed, unedited emotional entanglements which accompany sustained face-to-face communication. In a lecture or board meeting, users of multimedia have the power to alleviate boredom or ignore that which they deem irrelevant by directing their attention wherever and whenever they choose, flitting between those in the room and, on multiple platforms, those beyond the walls. While this power is alluring, Turkle warns that fractured attention "sacrifice[s] conversation for mere connection" (TED, 2012, 7:15) and fails to facilitate deep conversation that goes beyond discrete points of information. Furthermore, as continuous partial attention becomes a lifestyle for many, not only are people losing the art of conversation, the capacity for deep, sustained thought is also compromised, and this is of great concern for educators (Rose, 2010; Turkle, 2015).

Rose (2010) observes that in order to capture the attention of students exhibiting continuous partial attention, many educators attempt to compete with the devices students bring to class by creating fancier multimedia based lessons. The problem with this approach, she notes, is that the solution is only temporary until newer, flashier technologies come along; teachers must continually resort to new gimmicks in an effort to maintain student attention. Turkle (2015) would agree and argues that, instead of caving to the temptation to compete "for student attention with ever-more extravagant technological fireworks" (n.p.), teachers ought to challenge their students to embrace the challenges of classroom lulls and momentary boredom. Instead of seeking to fill those moments with more information and more superficial connection, students need to understand that it is in those moments of perceived boredom that they have an opportunity to process information, reflect, and generate

new ideas. When one clicks on a new browser tab or reaches for their mobile phone instead, the opportunity to generate new ideas is lost (Turkle, 2015).

It is not only students who need to be concerned with the effects of continuous partial attention. Teachers are not immune from the temptation to be continually engaged, and a study investigating continuous partial attention among educators found that neither technological prowess, age, nor country of origin correlated with one's tendency for divided attention (Firat, 2013). Instead, it was found that those working in educational technology were most likely to have fractured attention. High exposure to a variety of multimedia sources gives rise to opportunity, which is believed to give way to divided attention (Firat, 2013). As educators in a variety of fields, however, move toward incorporating technology into their lessons, and as the popularity of online education increases, no field of education is likely to remain unaffected.

There are those such as Ulla Foehr and Henry Jenkins who would argue that the ability to quickly switch gears and navigate between multiple platforms is a skill required in the modern world, and that our brains are evolving in such a way as to be able to handle multiple forms of input (as cited in Rose, 2010, pp. 4-5). Educators who support this notion are keen to incorporate technology into the classroom and design lessons that require the students to continually shift attention from activity to activity. Turkle (2015) concedes that this is not something terrible in and of itself, and calls for educators to promote *attentional pluralism*, the ability to jockey between deep attention and fractured attention, depending on what the situation calls for. Without balance, she warns, "you won't be able to focus even when you want to" (n.p.).

Neither Turkle (2015) nor Rose (2010) condemn the use of technology in education, but would likely embrace the notion of Tabless Thursday, an initiative to encourage people to focus while browsing the web by only having one page open at any given time (Greenbaum, 2014). Both Turkle (2015) and Rose (2010) point to the vast amount of research which demonstrates that the human brain operates more efficiently when completing one task at a time, and that task switching incurs costs the multitasker never intended to pay.

## Task Switching and Switch Costs

Engaging in task-switching requires a mental shift known as *task-shift reconfiguration*, which can be likened to the shifting of gears (Monsell, 2003). This cognitive reconfiguration must take place before the next task can be executed. This frequently involves several steps, some of which include the shifting of one's attention, processing what needs to be done next, determining how to go about it, deactivating the previous task, and activating the next (Monsell, 2003). The time which is consumed by these processes is referred to as *switch costs.*

Switch costs have historically been measured in terms of response time following a stimulus when either a) the task type remained the same as the previous one, or b) when the task type changed (Jersild, 1927; Monsell, 2003; Rogers, Robert, & Monsell, 1995). Results of such experiments reveal that in most cases, response time is slower and often more prone to error following a switch in task compared to when the task does not change (Monsell, 2003; Salvucci et al., 2009; Yehene, Meiran, & Soroker, 2005). Additionally, switch costs appear to be caused by the remaining effects of the first task as opposed to the anticipation of the second (Wylie & Allport, 2000).

Most task switching studies conclude that task switching results in switch costs that hinder performance. However, these studies are sometimes criticized because of limitations in terms of external validity; the task switching activities in studies in which participants engage do not often reflect the types of task switching activities in which people engage in real life. In studies, participants are usually directed when to switch tasks whereas in real life, the person engaging in task switching often has an element of choice and control regarding the management of multiple tasks (Carrier, Rosen, Cheever, & Lim, 2015). Furthermore, real-life task switching is often far more complex than the tasks in which participants are asked to engage in a laboratory setting (Carrier et al., 2015).

Perhaps helping to justify the criticism, it has been demonstrated that switch costs can sometimes be mitigated. In trials where participants were given advance notice of a switch that was about to occur, switch costs were often minimized although not always eliminated (Kieffaber & Hetrick, 2005; Monsell, 2003; Wylie & Allport, 2000). The element of practice also plays a role in switch costs; the more a particular task is repeated and becomes automated, the lower the switch costs become (Strobach, Liepelt, Schubert, & Kiesel, 2012). In fact, one study even found evidence that those who regularly and heavily engage in task switching behavior by using multiple media platforms demonstrated lower switch costs than occasional users (Alzahabi & Becker, 2013).

Research investigating ways of minimizing the effects of switch costs could be particularly welcome in the field of education, where recent studies indicate a strong relationship between increased task switching in the classroom and decreased academic performance (Bellur, Nowak, & Hull, 2015; Junco & Cotten, 2012; Junco, 2012; Kirschner & Karpinski, 2010; Rosen et al., 2013). The next section will

provide an overview of the existing research on the effects of task switching on academic performance.

## Task Switching and Academic Performance

The number of studies on the effects of task switching on academic performance has skyrocketed in recent years. While a few studies suggest that engaging in task switching behaviors in the classroom does not impact academic performance (Hargittai & Hsieh, 2010; Hembrooke & Gay, 2003), the overwhelming majority of recent studies investigating the relationship between task switching in the classroom and academic performance show a negative correlation (Bellur et al., 2015; Bowman et al., 2010; Fox et al., 2009; Judd, 2014; Junco & Cotten, 2012; Lee, Lin, & Robertson, 2012; Samaha & Hawi, 2016; Van Der Schuur, Baumgartner, Sumter, & Valkenburg, 2015).

### Music and Background Noise

Research investigating the effects of music on performance has a long history (Henderson, Crews, & Barlow, 1945; Smith & Morris, 1976). Henderson et al. (1945) investigated the effects of popular music and classical music on reading performance. Popular music was found to have a more detrimental effect on reading performance than classical music. The difference in rhythm patterns was believed to be the cause as rhythms in classical music tend to be more subtle and less pronounced than those of popular music. Henderson et al. (1945) concluded that the driving rhythms of the popular music were more difficult to ignore, thereby reducing performance. Presumably instrumental versions of the popular songs were used as no mention of the potential effect of lyrics on performance was mentioned in the study. Smith & Morris (1976) found that lively, stimulating music affected performance more negatively than did calm, sedating music. More recent studies investigating

personality type and the effects of popular music on performance found that both extraverts and introverts performed more poorly with music than in silent conditions, but the introverts were more negatively impacted by the background music than were the extraverts (Furnham & Bradley, 1997; Furnham, Trew, & Sneade, 1999). The differences based on personality, however, are negligible. Corroborating the results of previous research that indicates silent conditions result in better performance than those with music was a recent study investigating the effects of listening to music with and without lyrics on reading comprehension (Perham & Currie, 2014). Participants performed best with no music and poorest when listening to music with lyrics. Those listening to music without lyrics fell between those groups.

Environmental noise has also been found to have a negative impact on learning. High levels of background noise, whether it comes from noise being generated within the classroom or from external sources such as aircraft flying overhead, traffic, or construction, are associated with lower levels of academic performance (Shield & Dockrell, 2008). It should be noted, however, that the presence of white noise, "a steady, unvarying, unobtrusive sound" (the definition of white noise, n.d.), has a positive effect on memory (Söderlund, Sikström, Loftesnes, & Sonuga-Barke, 2010). In addition, white noise can positively affect the performance of those who have difficulty concentrating (Söderlund, Sikström, & Smart, 2007).

**Electronic Devices**

Fried (2008) demonstrated that university students who used laptops in class were more distracted from the lessons than those who did not and a correlation between laptop use and the lowered comprehension of course material and overall lower course grades was found. Another study by Kraushaar and Novak (2006)

tracked student activities on their laptops during class lectures by using a software program that enabled the researchers to remotely monitor the participants' laptop-based activity. Engaging in laptop-based activities unrelated to the course was correlated with lower performance. In-class laptop use has even been shown to have a negative impact on others in the classroom in terms of lecture comprehension; the mere observation of others engaging in social media or online shopping is enough to distract students from a lecture (Sana, Weston, & Cepeda, 2013; Turkle, 2015).

Several studies have investigated the relationship between engaging in text messaging and academic performance (Bowman et al., 2010; Junco & Cotten, 2011; Rosen et al., 2013; Tindell & Bohlander, 2012), the majority of which are associated with lower individual course grades, lower overall grade point average, and the failure to adequately complete homework assignments. In addition, one study found that cell phones ringing in class resulted in interruptions significant enough to reduce performance on a task compared to a silent condition. Consistent with research on switch costs (Monsell, 2003), however, groups that received advance warning about the cell phone ringing performed better than participants who did not receive such a warning (Chen & Yan, 2016).

**How Task Switching Affects Academic Performance**

Theories based in cognitive psychology have been used to explain why engaging in extraneous activities in the classroom correlates with poorer academic performance. *Cognitive bottleneck theory* and *cognitive load theory* are commonly cited throughout the existing body of literature (Borst et al., 2010; Debue & van de Leemput, 2014; Kirschner, Kester, & Corbalan, 2011; Wood et al., 2012).

Cognitive bottleneck theory purports that when the execution of multiple tasks requires the same cognitive resources, a cognitive bottleneck occurs, which

restricts or slows down the processing of information or the completion of tasks (Borst et al., 2010; Wood et al., 2012). The cognitive bottleneck theory supposes that one's cognitive resources are finite and can only handle a limited amount of information at any given time (Cheever, Rosen, & Carrier, 2015), hence the reduction in performance.

Cognitive load theory posits that learning is impacted by three different types of demands, or loads, placed upon the cognitive system (Ayres & Gog, 2009; Cheever, et al., 2015). The first, *intrinsic load*, is the nature of the content. The more demanding the material, the higher the intrinsic load (Cheever, et. al., 2015; Paas, Renkl, & Sweller, 2004). The second is *extrinsic load.* Not related to the innate difficulty level of the material itself, the level of extrinsic load fluctuates based on teaching style and the pedagogical methods employed (Cheever, et al., 2015; Paas et al., 2004). Finally, *germane load* refers to what individual learners bring to the table in terms of personal experiences and background knowledge and the ability to link existing knowledge to new information. The more links that can be established between new content and the learner's schemata, the less germane load will tax the cognitive system (Cheever, et al., 2015; Debue & van de Leemput, 2014; Kirschner, 2002). As there is increased content to deal with, switching between multiple tasks naturally results in an increase in intrinsic load, and depending on the circumstances, extrinsic load as well. Poorer performance can be expected as a result of the extra load being placed on cognitive resources (Bannert, 2002; Cheever et al., 2015).

## Switching Between Languages and Switch Costs

The research conducted on the effects of task switching on cognitive and academic performance tends to take place in monolingual contexts, where both tasks are executed in the same language. However, little research has been conducted on

the effects of task switching on academic performance in bilingual contexts, where participants are required not only to switch tasks, but to switch between languages while doing so as well.

Switching between languages is often referred to as *code switching*, and definitions of code switching typically revolve around the concept of sameness—switching between languages within the *same* sentence or within the *same* conversation or within the *same* context, whether in real life or online (Horasan, 2014; Themistocleous, 2015). Green and Abutalebi (2013) take it one step further and outline those contexts, stating that bilinguals tend to switch between languages in one of three main ways. First is the *dual language* context where bilinguals switch between both of their languages in the same environment. Second is the *single language context*, also referred to as *situational code switching* (Grim, 2008). In this context, the bilingual person uses L1 in one environment and L2 in another. Third is the "*dense code-switching context*" (Green & Abutalebi, 2013, p. 518), where bilinguals mix words from both L1 and L2 in the same sentence (Green & Abutalebi, 2013; Yang, Hartanto, & Yang, 2016).

Most studies related to L1-L2 language switching are less concerned with the effects of switching between L1 and L2 in natural settings as described above, and are more focused on measuring the actual switch costs, that is, how quickly one can name an image or number on a card or computer screen in one language versus another. There are several studies which have investigated the switch costs involved when speakers are asked to switch between languages (Bobb & Wodniecka, 2013; Campbell, 2005; Gollan & Ferreira, 2009; Hartanto & Yang, 2016; MacNamara, Krauthammer, & Bolgar, 1968; Prior, 2012; Thomas & Allport, 2000). One of the original studies on the switch costs of L1-L2 language switching established that

switch costs between tasks were lower when no switch in language was required compared to when a switch in language was required (MacNamara et al., 1968). While a valuable finding in and of itself, as observed by Meuter and Allport (1999), this particular study did not differentiate between switches taking place from L1 to L2 compared to switches taking place from L2 to L1.

Meuter and Allport (1999) set out to determine which condition incurred the highest switch costs among bilinguals self-identified as proficient in both of their languages: switching from L1 to L2 or switching from L2 to L1. In all trials, the results were the same. Switch costs increased when switching from L2 to L1. The participants in this study, although proficient in both languages, were unbalanced bilinguals who were stronger in L1 than L2. It is theorized that unbalanced bilinguals must actively suppress the production of L1 while functioning in L2. This suppression is believed to be responsible for the increased switch costs when transitioning from L2 to L1 (Bobb & Wodniecka, 2013; Meuter & Allport, 1999).

Switch costs incurred when bilinguals switch between languages may also partially depend on the contexts in which they typically use their two languages. Bilinguals who frequently switch between languages in the same context were found to experience lower switch costs compared to those bilinguals who typically operate in one language in one context and the other language in another context (Green & Abutalebi, 2013; Hartanto & Yang, 2016). This difference may possibly be accounted for by considering that practice and repetition has been demonstrated to reduce switch costs (Meuter & Allport, 1999; Prior & Gollan, 2011; Strobach et al., 2012).

The criticism put forth by Carrier et al. (2015) regarding the artificial nature of many task switching experiments should also be taken into consideration when

evaluating the effect of language switching on switch costs as not all language switching conditions result in switch costs (Gullifer, Kroll, & Dussias, 2013). In a study in which language switching took place mid-sentence, no switch costs are all were noted. The presence of context may enable bilinguals to effortlessly switch between languages in real-world contexts (Gullifer et al., 2013).

## Educational Impacts of Task Switching while Switching Languages

In addition to evaluating the actual switch costs involved in real-world contexts, the impact of not only task switching, but task switching while language switching on academic performance is worthy of investigation. Rose (2010) states that "research on the implications of media multitasking for education is scant" (p. 5). In a world where the number of English medium universities is exploding in countries where the majority of the population does not speak English as a native language (Dearden, 2014), there is also a need to investigate the effects of task switching on academic performance when learners not only task switch in class or while studying, but also switch between languages while doing so.

## Conclusion

The aim of this chapter was to provide an overview of the existing academic literature pertaining to multitasking, continuous partial attention, and task switching, and their effects on academic performance. As this study pertains to investigating these concepts with an added bilingual component, studies on language switching and L1-L2 switch costs were also highlighted.

# CHAPTER III: METHODOLOGY

## Introduction

The purpose of this study is to compare the effects of task switching on L2 reading comprehension when a) the reading activity in L2 is disrupted by a secondary task in L2 and b) the reading activity in L2 is disrupted by a secondary task in L1. To this end, the following research questions were asked.

1. How do B2 level English language learners at a Turkish university perform on reading comprehension tasks in L2 while:

a) recorded conversations in L1 and L2 are playing in the background?

b) engaging in spoken interaction with bilinguals in L1 and L2?

c) engaging in electronic written interaction with bilinguals in L1 and L2?

2. If differences in performance are found, what possible factors contribute to the differences?

Chapter three will expound upon the research design, highlighting the sample, setting, data collection instruments, and procedures of this study. An overview of the analysis process will also be provided at the end.

## Setting and Sample

This study was conducted at Bilkent University School of English Language (BUSEL), which is an English preparatory school at Bilkent University, a private English-medium university in Ankara, Turkey.

Before beginning their programs of study, students accepted to Bilkent University must demonstrate an English proficiency level of B2 as described in the Common European Framework of References for Languages (Council of Europe, 2001)

> Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options (p. 24).

To demonstrate this level of proficiency, students must pass a minimum threshold score determined by Bilkent University on one of the following English proficiency exams: IELTS (International English Language Testing System), TOEFL (Test Of English as a Foreign Language), or COPE (Certificate of Proficiency in English). While IELTS and TOEFL are internationally recognized English proficiency exams, COPE is an in-house proficiency exam developed and administered at BUSEL. Bilkent students who cannot demonstrate adequate proficiency in English study in BUSEL for one to two years to improve their English. These students are primarily native speakers of Turkish and typically range from 18 to 22 years of age.

There are six courses offered to students at BUSEL: Beginner, Elementary, Pre-Intermediate, Intermediate, Upper-Intermediate, and Pre-Faculty. Most of the materials used at the Pre-Faculty level are at a B2 level, which help prepare the students for the COPE exam. Participants for this study were selected from among students studying at the Pre-Faculty level at BUSEL due to time constraints within the institution.

Most courses at BUSEL run for either four or eight weeks. However, many Pre-Faculty level students are enrolled in 16-week courses that run over the course of an academic semester. The participants for this study were selected from the 16-

week Pre-Faculty courses due to the long time frame in which the participants would be available to the researcher. First, in order to conduct this study at BUSEL, the researcher needed to obtain permission from both the ethics committee at Bilkent University as well as the university's Centre for Instructor Development, Education and Research (CIDER) committee, a process which took over two calendar months. Furthermore, the data collection needed to take place on three consecutive mornings; it was easiest to avoid any institutional conflicts such as pre-scheduled quizzes and exams by selecting participants from among the 16-week Pre-Faculty courses.

## Procedures

A mixed methods research design was developed for this study (Dörnyei, 2007), which took place in three stages. The purpose of the first stage was to select the participants for the study. In the second stage, quantitative data was collected under experimental and control conditions. In order to explore the results of the quantitative data, interviews were conducted in the third stage and the transcripts analyzed. This qualitative data provided insight into the results and served as justification for several conclusions drawn in this study.

### Stage One: Selection of the Participants

The purpose of the first stage was to select the sample from among the 16-week Pre-Faculty students at BUSEL. At the start of the second semester of the 2015-2016 academic year, all Pre-Faculty teachers at BUSEL were informed about this study, and teachers willing to have their students participate distributed consent forms to their students and administered Task A, a multiple choice reading comprehension task, in their individual classrooms under test conditions. The students were seated in rows, were quiet, and did not have access to their books or telephones. In all of the 28 participating classes, the students were informed of the

purpose of the study and 325 students signed consent forms (see Appendix A). Only the papers of the students providing consent were collected and graded.

The results of Task A administered in stage one helped the researcher determine which segments of the BUSEL Pre-Faculty student body were most similar. The researcher graded Task A and a normality test and one-way ANOVA was run using the computer program Statistical Package for the Social Sciences (SSPS). Across all 28 groups, the mean score was 3.83. Individual classes with mean scores ranging from 3.6 to 4.0 were presumed to be the most homogenous since they were closest to the mean score of the entire group. Eleven classes fell into this range. However, only six groups were needed to participate in stage two of the study. Therefore, one-way ANOVA was done with these eleven groups. From these eleven groups, those with the lowest standard deviations were approached first and asked to continue with stage two of the study. Due to scheduling conflicts, two of the groups with the lowest standard deviations were unable to continue in the study. From among the eleven groups, the group with the lowest number of participants and the two groups with the highest standard deviations were also eliminated from the study. This left six groups of similar—although not identical—levels to undergo the experimental conditions in stage two of the study.

**Stage Two: Data Collection**

76 participants from six groups were slated to continue in stage two of the study. However, 13 of these participants were absent during the data collection of stage two, and the scores of four others were eliminated due to their not being native speakers of Turkish. Therefore, data from 59 native Turkish speakers were collected during the second stage of this study.

During the second stage, two one-page reading texts in English accompanied by 8 multiple choice comprehension questions each were administered to the six groups of participants under various experimental conditions. The tasks that were administered are referred to as Task B and Task C in this study and will be described in further detail in the instruments section. In order to limit the number of extraneous variables affecting the results, all six experimental groups completed Tasks B and C within three days of each other, all in the same location, at the same time of day, in the same amount of time, and in the same order. All participants were seated in rows in a conference hall on campus. After being given directions specific to their experimental conditions, they were given 15 minutes to complete Task B and an additional 15 minutes to complete Task C. The experimental conditions for each group are outlined in the table below.

Table 1

*Administration times and tasks for experimental groups.*

| Group | # of Participants | Time | Condition for Task B | Condition for Task C |
|---|---|---|---|---|
| 1 | 13 | Monday 10:00 | Background Conversation (English) | Background Conversation (Turkish) |
| 2 | 11 | Monday 11:00 | Background Conversation (Turkish) | Background Conversation (English) |
| 3 | 8 | Tuesday 10:00 | Speaking (English) | Speaking (Turkish) |
| 4 | 9 | Tuesday 11:00 | Speaking (Turkish) | Speaking (English) |
| 5 | 7 | Wednesday 10:00 | Texting (English) | Texting (Turkish) |
| 6 | 11 | Wednesday 11:00 | Texting (Turkish) | Texting (English) |

Despite having gone through a careful selection process following the administration of Task A, the possibility that the participants could be of slightly

different ability and/or motivation levels remained. Because these factors could potentially be responsible for differences in scores and not the experimental conditions themselves, it was decided to administer two tasks to each participant instead of just one. If, for example, only Task B had been administered to one group with a conversation in English playing in the background, and the same task had been administered to another group with a conversation in Turkish playing in the background, it would have been unknown if any differences in performance were related to the experimental conditions or to possible differences in the participants.

In addition, it was decided to reverse the experimental conditions for groups 1 and 2 (background conversation in English and Turkish), groups 3 and 4 (speaking in English and Turkish), and groups 5 and 6 (text messaging in English and Turkish). To clarify, group 1 completed Task B with English playing in the background and then completed Task C with Turkish playing in the background. Group 2, however, completed Task B with Turkish playing in the background and completed Task C with English playing in the background. This pattern was applied in the same way with the other groups and conditions for the following reason. If all of the English conditions had been applied to Task B and all of the Turkish conditions to Task C, for example, it would not have been known if any differences in the scores should be attributed to the experimental conditions or to the tasks themselves. Although Tasks B and C were both taken from the same English proficiency exam preparation book and should therefore be of the same difficulty level, the topics of the readings, vocabulary knowledge, and/or the background experiences of the participants could potentially result in one task being more accessible to the participants than the other. In order to avoid such concerns, the conditions for each pair of groups were reversed.

**Experimental conditions.** In order to simulate how the participants perform on measures of reading comprehension in L2 while overhearing conversations in L1 and L2, two non-scripted audio recordings were made, one in English and one in Turkish. The participants in group #1 and group #2 were informed that they would hear conversations in the background. They were told that they did not need to listen to the conversations and were instructed to do their best on the reading tasks. These background conversations were recorded by four different teachers of English at BUSEL. Two of the teachers (native speakers of Turkish) were asked to role-play, in Turkish, a teacher giving oral feedback to a student about his writing performance, and the other two teachers (one native speaker of English and one native speaker of Turkish) were asked to do the same in English. These pre-recorded conversations were organic and not scripted in any way, and reflected the type of background conversations typically overheard by students in the classroom. The conversations ensued for the duration of the reading tasks.

To assess how students perform on reading in L1 while also engaging in face-to-face conversation in L1 and L2, two semi-scripted dialogues were created to simulate the type of casual spoken interaction that might take place between two students in the classroom. One script was in English and the other in Turkish (see Appendices B and C).

The participants in group #3 and group #4 were assigned to sit next to one of several bilingual native Turkish speakers voluntarily serving as speaking partners. Following introductions, the participants were informed that they were to think of the speaking partners as classmates, and that they would be interrupted by their speaking partners while working on Tasks B and C. The participants were informed that they were required to respond in a meaningful way in the language in which they were

addressed. Following these instructions, the participants completed Tasks B and C. As the participants completed each reading task, the volunteers engaged the participants in a series of six semi-scripted oral questions. The timing of each interruption was scheduled intermittingly across the 15 minute duration of the each reading task and, give or take a difference of 30 seconds, the timing of each interruption was standard across each participant-volunteer pair. The volunteers were permitted to veer slightly from the script in order to maintain natural spoken exchanges, but asked not to exceed six interruptions per task, the same number of interruptions the text messaging groups would experience.

Native speakers of Turkish were chosen to facilitate the spoken portion of the experimental conditions to eliminate the concern that participants might be more focused on the novelty of native speakers of English addressing them in Turkish than on the content of the conversation. Since the participants are used to hearing English being spoken with a Turkish accent, the accent of the volunteers was not a concern for the spoken exchanges taking place in English.

In order to determine how the participants performed while task switching between reading in L2 and writing in L1 and L2, two semi-scripted conversations were written to simulate the type of electronic written communication the participants might engage in while working on L2 activities in the classroom. One script was in English and the other in Turkish (see Appendices D and E). Each participant in group #5 and group #6 was assigned to sit next to one of several bilingual volunteers competent in both English and Turkish. As in the speaking conditions, the participants were informed that they were to think of the speaking partners as classmates. After introductions were made and instructions given, the participants shared their telephone numbers with their partners and opened

conversations on the text messaging application, WhatsApp. The participants were informed that they had to reply to a text message within two minutes of its receipt and that they were required to respond meaningfully to each message in the language in which it was sent. Six text messages were scheduled to be sent intermittingly by the volunteers across the duration of each reading task and, with differences of up to half a minute, the timing of each interruption was standard across each pair.

Similar to the speaking conditions, volunteers were permitted to veer slightly from the script in order to preserve the authenticity of the exchanges and were instructed not to send more than six messages in total. To protect the confidentiality of the participants, once Tasks B and C were completed, the volunteers immediately deleted the participants' telephone numbers and WhatsApp conversations from their telephones.

**Control groups.** Following the grading of Tasks B and C, it became immediately apparent that there was a discrepancy between the difficulty level of the texts. For this reason, three of the eleven groups with a mean score between 3.6 and 4.0 on Task A that had initially been eliminated from the study were approached again and invited to serve as a control group. 36 participants from three groups completed Tasks B and C in silent testing conditions. Half of these 36 participants completed Task B in 13 minutes and Task C in 15 minutes while the other half completed Task B in 15 minutes and Task C in 13 minutes. This was to create two control groups, one of which reflected the total amount of time the experimental groups spent completing each task (15 minutes), and one which reflected the approximate amount of time the experimental groups spent actively engaged in the reading tasks, minus the secondary disruptions they experiences (13 minutes).

**Stage Three: Interviews**

In an effort to gain insight into what factors may have contributed to the results, a set of questions was designed by the researcher (see Appendix F). Consent was obtained from two volunteers who were involved during all of the interactive data collection sessions (speaking and text messaging), and they were interviewed about their observations of the participants throughout the data collection process (see Appendix G). These interviews were then transcribed using the transcription software program, Dragon NaturallySpeaking (see Appendices H and I).

## Instruments

Three one-page reading texts and accompanying multiple choice comprehension questions were selected from the book, *First Certificate Practice Tests* (Osbourne, 2009). These three texts are referred to Task A, Task B, and Task C throughout this paper and are similar to each other in terms of length, reading level, style, question type, and number of questions (see Appendices J, K, and L). Task A was used in stage one of this study for the purpose of participant selection. Tasks B and C were used in stage two for the purpose of data collection.

Tasks from this book were selected because, in terms of reading level, style, text length, and question type, they are reflective of part two of the reading section of the COPE exam the participants are expected to pass. Students are advised to spend 30 minutes completing this section of the COPE exam, which includes two narrative texts and accompanying multiple choice comprehension questions. For this reason, participants were allotted 30 minutes to complete Tasks B and C, 15 minutes each.

Tasks A, B, and C were presumed to be of equal difficulty due to their inclusion in the same English proficiency exam preparation book. Eight reading tasks from *First Certificate Practice Tests* (Osbourne, 2009) were piloted in the previous academic year with a group of ten upper intermediate students. Three tasks were

eliminated after piloting due to the results being inconsistent with the remaining five tasks. Two more tasks were eliminated when it was discovered they had been adapted and administered in several of the Pre-Faculty classes two weeks before data collection was scheduled to begin.

A set of interview questions designed by the researcher (see Appendix F) was used to collect data from two of the volunteers who assisted in the data collection process. These questions were designed to elicit any similarities and differences the volunteers observed in the participants throughout the data collection process in terms of English versus Turkish and speaking versus texting.

## Analysis

Following the data collection process, Tasks B and C were graded. A one-way ANOVA test to compare all groups was conducted, and an Anderson-Darling Normality test was run for each set of conditions. The results indicated a normal distribution for each condition, and no outliers were indicated within the sample. Content analysis was carried out on the two interview transcriptions, and common responses and emerging themes were noted.

## Conclusion

This chapter explained the setting and the background of the participants involved in this study. It also highlighted the methodology of this study by carefully detailing the procedures and instruments used during the data collection process. An in-depth analysis of the quantitative and qualitative data obtained will be provided in the following chapter.

# CHAPTER IV: DATA ANALYSIS

## Introduction

The purpose of this study is to compare how scores on reading comprehension tasks are affected by switching between two activities within and between languages. Two main scenarios with three subsections are included in this study. The first scenario measures reading task scores when both the reading task and a secondary task are being performed in one's second language (L2); the participants switch between tasks but remain in L2. The second scenario measures reading task scores when the reading task is performed in L2, but the secondary task is performed in one's native language (L1); the participants switch between tasks in addition to switching between L2 and L1. The subsections denote the nature of the secondary tasks: hearing a conversation in the background, speaking with someone face to face, and receiving and sending text messages.

Two reading comprehension tasks in English taken from the same English proficiency exam preparation book (Osbourne, 2009) were used to collect data, with each group of participants completing each task (Tasks B and C) under different experimental conditions. Under experimental conditions, participants were given 15 minutes for Task B and an additional 15 minutes to complete Task C. In order to compare the results of the experimental conditions to a control group, two additional groups of participants completed Tasks B and C under testing conditions. One control group was allotted 15 minutes per task, as the experimental groups were given. Considering that the experimental conditions forced the participants to divert their attention away from Tasks B and C in spurts, for approximately two cumulative minutes, another control group was allowed 13 minutes per task under testing

conditions. To obtain insight into extraneous variables potentially affecting participant scores, two facilitators of the data collection process were interviewed. An in-depth analysis of the data was then conducted in order to answer the following research questions:

1. How do B2 level English language learners at a Turkish university perform on reading comprehension tasks in L2 while:

a) recorded conversations in L1 and L2 are playing in the background?

b) engaging in spoken interaction with bilinguals in L1 and L2?

c) engaging in electronic written interaction with bilinguals in L1 and L2?

2. If differences in performance are found, what possible factors contribute to the differences?

This chapter is organized into three sections. The first section will discuss the initial analysis of the data. The second section will present the findings of the quantitative data, and the third section will provide an analysis of the findings in light of the qualitative data that was collected during the interviews.

## Initial Analysis

Right from the beginning of the analysis, it was clear that there was a discrepancy between Tasks B and C in terms of the performance of the participants. All across the board, in all experimental conditions and in both control groups, the mean scores were higher on Task C than on Task B, despite similar scores being obtained during the piloting of these materials. The small sample size of 10 participants used during piloting compared to the larger sample size of this study, where there were 59 participants undergoing experimental conditions and 36 participants comprising the two control groups, likely accounts for this discrepancy.

Table 1 on page 28 outlines the conditions for the six experimental groups completing Tasks B and C.

In order to eliminate the effects of the discrepancies between Tasks B and C, the results were combined in the following manner. The scores from group #1 on Task B and the scores from group #2 on Task C were combined into a new group henceforth referred to as Background Conversation (English). In the same way, the scores from group #1 on Task C and the scores from group #2 on Task B were combined into a new group now referred to as Background Conversation (Turkish). This same process was repeated with group #3 and group #4 to create two new groups, Speaking (English) and Speaking (Turkish). Two more groups, Texting (English), and Texting (Turkish), were also created when the scores of group #5 and group #6 were combined in the same manner as groups #1 and #2.

In order to reflect the way the scores were combined into new experimental groups, so were the scores of the control groups combined. Participants completing Tasks B and C in 13 minutes were combined into one group referred to as Control Group (13 minutes) and the scores of the control groups completing Tasks B and C in 15 minutes were combined into a separate group called Control Group (15 minutes).

## Quantitative Data Analysis

The statistics software program, Minitab, was used to analyze the data following the initial analysis and the combining of groups as outlined in the previous section. Eight groups in total were included in the analysis: Control Group (13 minutes), Control Group (15 minutes), Background Conversation (English), Background Conversation (Turkish), Speaking (English), Speaking (Turkish), Texting (English), and Texting (Turkish). An Anderson-Darling Normality test was

run for each set of conditions, which indicated normal distributions for each condition (see Appendix M). In addition, the normality tests produced descriptive statistics highlighted in Table 2 below.

Table 2

*Descriptive Statistics*

| Condition | *n* | *M* | *SD* |
|---|---|---|---|
| Control (13 minutes) | 36 | 4.67 | 1.57 |
| Control (15 minutes) | 36 | 4.56 | 1.61 |
| Background Conversation (English) | 24 | 4.75 | 1.45 |
| Background Conversation (Turkish) | 24 | 4.13 | 1.65 |
| Speaking (English) | 17 | 4.88 | 2.09 |
| Speaking (Turkish) | 17 | 4.76 | 1.25 |
| Texting (English) | 18 | 4.61 | 1.29 |
| Texting (Turkish) | 18 | 4.22 | 1.8 |

**Control Groups**

The mean scores of Control Group (15 minutes) and Control Group (13 minutes) indicate that the two groups were not likely fully equal. It was expected that the control group that had been given more time to complete the tasks would perform better than the control group given less time. However, this was not the case. The mean score for Control Group (15 minutes) was 4.56 with a standard deviation of 1.61 whereas the mean score for Control Group (13 minutes) was 4.67 with a standard deviation of 1.57. The group being given less time felt possibly felt more pressure to perform due to the time constraints. As mild stress is known to increase performance on cognitive tasks (Singh et al., 2012), this is a possible explanation.

Furthermore, it was expected that the control groups would outperform all of the experimental groups as a plethora of previously conducted studies indicate that academic performance suffers when students are engaged in more than one task at a time (Fried, 2008; Junco & Cotten, 2012; Kirschner & Karpinski, 2010). Surprisingly, this was not always the case. Both control groups outperformed some

of the experimental groups, but they were also outperformed by the remaining experimental groups. Possible reasons for these unexpected results will be highlighted in the qualitative analysis portion of this chapter.

Throughout the remainder of the analysis, it was decided to use the results of Control Group (13 minutes) and disregard the results of Control Group (15 minutes) for two main reasons. One, the amount of time Control Group (13 minutes) spent on Tasks B and C are more reflective of the amount of time the participants in the experimental conditions devoted to Tasks B and C. Two, the mean scores in Control Group (13 minutes) were slightly higher and the standard deviation slightly more narrow than in Control Group (15 minutes). Since it had been anticipated that the control groups would have had higher mean scores than all of the experimental groups, the control group with the higher of the two means was selected for inclusion in the analysis of the data.

**Experimental Groups**

As can be seen from the descriptive statistics in Table 2, a pattern between all of the English and all of the Turkish conditions emerged. For each set of conditions (background conversation, speaking, and texting), the scores obtained when the participants did not switch between languages and remained in L2 are higher than when they were required to switch back and forth between L2 and L1. While a consistent pattern, the differences were not statistically significant, as demonstrated by the results of a one-way ANOVA test comparing all seven conditions ($F(6, 147) = 0.670$, $p = 0.674$). As there were no statistically significant results, only the descriptive statistics will be discussed in the remainder of this chapter.

**Background conversation.** The conditions where the difference between the L2 and L1 is most pronounced is Background Conversation (English) compared to

Background Conversation (Turkish). The results show that for Background Conversation (English), the mean score out of 8 was 4.75 with a standard deviation of 1.45. For Background Conversation (Turkish), the mean score was 4.125 with a standard deviation of 1.65. The mean score for the Control Group (13 minutes) was 4.66 with a standard deviation of 1.56.

These scores indicate that the participants were more negatively impacted by the background conversation in L1 than by the background conversation in L2. As Ludden (2016) states, "It's virtually impossible to tune out speech in your native language" (n.p.). This is possibly the reason behind this discrepancy and why the participants received the lowest scores overall when overhearing a conversation in L1 the background for the duration of the 15-minute task. Another explanation may be that the background conversation condition differed from the other experimental conditions in that the background conversation did not occur in spurts like the other distractions. While the participants were not intentionally interrupted or required to actively engage with anyone in the background conversation condition, the conversation was ongoing throughout the duration of Tasks B and C, simulating what happens in the classroom when a teacher provides oral feedback to one student about an essay or another piece of writing while the rest of the students are working independently.

**Spoken interaction.** In the speaking conditions, the scores were almost identical. Speaking (English) had mean score of 4.88 with a standard deviation of 2.08, and the mean score for Speaking (Turkish) was 4.76 with a standard deviation of 1.25. The mean score for the Control Group (13 minutes) was 4.66 with a standard deviation of 1.57. Even though the mean score for the Speaking (English) group was slightly higher than that of the Speaking (Turkish) group, task switching between

reading and speaking did not seem to place a burden on the participants at all, regardless of the language involved.

Perhaps this is due to the fact that the modalities being engaged while reading, a receptive skill, and speaking, a productive skill, do not result in as much overlapping brain activity, thereby making it easier to carry on two tasks in parallel (Salvucci et al., 2009).

**Written interaction.** More notable than the difference in the speaking conditions was the difference in the texting conditions. The participants scored higher when remaining in L2, but the reading scores suffered slightly when they were required to dip in and out of their L1 while engaging in text messaging. The results indicate a mean score of 4.61 for the Texting (English) group and a standard deviation of 1.29. For Texting (Turkish), the mean score was 4.22 with a standard deviation of 1.8. The mean score of the Control Group (13 minutes) was 4.66 with a standard deviation of 1.56. Unlike the other conditions, the control group scored higher than both of the written interaction groups, possibly indicating that switching between reading, which is a receptive skill, and engaging in text messaging, which requires both receptive and productive skills, consumes more time or cognitive resources than switching between reading and speaking (Salvucci et al., 2009).

## Qualitative Analysis

In order to gain insight into the quantitative results presented above, two fully bilingual native speakers of Turkish who interacted with a total of eight different participants each during the spoken and written interaction portions of the data collection were interviewed. Because only the researcher was present for data collection with the background conversation and control groups, no interview data is available for those conditions.

The interviewees were asked the same set of questions regarding their observations of and interaction with the participants during data collection. Following the transcription of the interviews, the two transcripts were placed side by side. Responses to the questions were compared. Responses which were similar were highlighted in one color, and responses which differed were highlighted in another. Responses which were similar and did not contradict were presumed to be representative of the entire group. Relevant concepts that came up in the interviews but were not responses to a direct question are labeled as miscellaneous. Figure 2 below highlights the results of the content analysis that was carried out using the interview transcripts (see Appendices F and G).

Table 3.

*Content Analysis of the Interviews*

| **Topic** | **Interviewee #1** | **Interviewee #2** | **Conclusion** |
|---|---|---|---|
| Length of spoken responses | Shorter in English; asked for clarification in English | Longer in English; One word responses in Turkish; full sentences in English | Discrepancy: Individual participant differences may account for this |
| Spontaneity of spoken responses | More spontaneous in Turkish, but almost the same—not much difference in English | Slightly longer response time in English; approximately 1 second longer | Consistent response: Almost no difference between L1 & L2; L1 slightly more spontaneous |
| Relevance of spoken responses | All appropriate in English and Turkish except for one who did not wish to be interrupted | All responses were appropriate | Consistent response: with one exception. Language made no difference in the relevance |
| Length of written responses | Longer in Turkish; used texting abbreviations in Turkish but not in English | Longer in Turkish; used texting abbreviations in Turkish but not in English | Consistent response: Abbreviated words in L1 but produced longer replies in L1 |

Table 3 (con't)

*Content Analysis of the Interviews*

| **Topic** | **Interviewee #1** | **Interviewee #2** | **Conclusion** |
|---|---|---|---|
| Lag time: receiving and sending texts | Longer in English overall;<br>Lag longer with males compared to females | Longer in English | Consistent response:<br>It took the participants longer to send a reply in L2 |
| Relevance and appropriacy | All responses were appropriate | All responses were appropriate | Consistent response:<br>Language made no difference in the relevance |
| Miscellaneous | Participants did not want to be interrupted | Participants expressed frustration at being interrupted | Consistent response.<br>Implication:<br>Participants likely misunderstood the nature of the experiment and wanted to perform well, indicating possible social desirability bias, which resulted in limited external validity. |
| Miscellaneous | | All participants read the text, set down their phones, continued working on the reading, then went back to the phones to reply | Extra task switching caused by the participants. |

The interview analysis indicates that many of the participants did not wish to be interrupted. This is significant because the nature of this research design was meant to serve as a simulation of the task switching that occurs on a regular basis in the language classroom at the institution where this data was collected. Instead, it appears that many participants behaved as though these tasks were exams, expressing frustration and annoyance at being interrupted. The participants possibly believed obtaining good scores in the experiment would reflect well on them as learners or

alternatively, would vindicate their task switching habits in the classroom. In either case, it is likely that the participants exhibited social desirability bias in an attempt to obtain good scores. Having young teachers pose as classmates added an element of artificiality to the entire process. This may have caused the participants to go into exam mode instead of feeling as relaxed as they do in the regular classroom. It is important to note that the participants in the control group were not seated next to a teacher, and perhaps did not take the tasks as seriously or behave as competitively as the experimental groups. These issues of artificiality speak to the limited external validity of the study, and may explain why the control group did not score as well as some of the participants in the experimental conditions.

Despite the control group possibly not taking the reading tasks as seriously as the experimental groups, the fact that the control group performed better than the group involved in sending text messages in Turkish as well as the group overhearing a conversation in Turkish is an interesting finding. The content analysis also reveals that even though the participants sent replies to text messages in Turkish more quickly than they sent replies in text messages in English, they scored lower when switching between L2 and L1 compared to remaining in L2. These findings will be discussed in further detail in the discussion section of chapter 5.

## Conclusion

This chapter presented the analysis of the data collected for the present study. First, the initial analysis and organization of the data was discussed. Then, a quantitative analysis of the data was presented. Finally, the findings were evaluated through the lens of qualitative analysis. The results show a distinct pattern of L2-L1 task switching correlating with lower scores on measures of L2 reading comprehension compared to the effects of L2-L2 task switching. As the differences

were not statistically significant, the results are not generalizable, but the fact that there was a consistent pattern across all three sets of conditions is enough to consider this topic for future research. This will be discussed in detail in the following chapter.

# CHAPTER V

## Introduction

The purpose of this study was to investigate the effects of task switching within one's second language (L2) and between L2 and one's native language (L1) on measures of reading comprehension in L2. To this end, the following research questions were asked:

1. How do B2 level English language learners at a Turkish university perform on reading comprehension tasks in L2 while:

a) recorded conversations in L1 and L2 are playing in the background?

b) engaging in spoken interaction with bilinguals in L1 and L2?

c) engaging in electronic written interaction with bilinguals in L1 and L2?

2. If differences in performance are found, what possible factors contribute to the differences?

Data collection took place in three stages in order to address these questions. In the first stage, 28 classes of pre-faculty level English language learners from Bilkent University School of English Language (BUSEL) in Ankara, Turkey were approached and invited to participate in this study. A multiple-choice reading comprehension task (Task A) was administered by the classroom teacher under testing conditions. The mean score across all 28 groups was 3.83. Nine classes that obtained mean scores between 3.6 and 3.8 continued in stage two of the study. In the second stage, six of these eleven classes completed two additional reading comprehension tasks (Task B and Task C) under experimental conditions. The remaining three classes served as the control group, completing Tasks B and C under exam conditions. During stage two, several bilingual volunteers fluent in both

Turkish and English helped facilitate the data collection process. In the third stage of this study, two of these volunteers were interviewed individually by the researcher regarding their observations of the participants in stage two. These interviews served as a qualitative lens through which to view the quantitative data, aiding in the analysis of the results.

## Findings and Discussion

In this section, the findings of the study for all of the experimental conditions will be presented. In addition, a new term will be introduced to describe the phenomenon that occurs when one engages in a combination of multimedia based task switching and code switching.

### Experimental Conditions

Ludden (2016) asserts that it is difficult to tune out one's native language and this is likely the reason the group experiencing background conversation in L2 performed better than the group overhearing conversation in L1. Perham and Currie (2014) have demonstrated that music with lyrics has a more detrimental effect on reading performance than music without lyrics. However, the language of the lyrics, whether comprehensible to the listener or not, appears to make no difference; both produce results that are equally as poor. If the comprehensibility makes no difference, the conclusions of Hendersen et al. (1945) ought to be considered, however dated they may be. Hendersen et al. (1945) concluded that the rhythms of popular instrumental music were more difficult to tune out than those typically heard in classical music. Comprehensibility aside, the familiarity of the rhythms, pitches, and intonations of one's L1 may partly account for the language being more difficult to ignore.

Furthermore, the less familiar L2 may be more akin to white noise, which not only does not typically affect performance negatively, but may even improve it in certain circumstances (Söderlund et al., 2007). This may be one reason why the group hearing L2 in the background performed even better than the control group. However, considering there was no interview data for this portion of the research, coupled with the fact that the scores were so similar, further investigation is warranted before making such a claim.

Supposing the participants were more prone to attending to the background conversation in L1 compared to L2, the participants would have been engaging not only in reading comprehension in L2, but also in auditory comprehension in L1. According to the theory of cognitive load (Cheever, et al., 2015; Paas et al., 2004), switching attention back and forth between the reading task and the background conversation would have increased the intrinsic load of the activity, thereby reducing performance.

The results of the spoken interaction portion of the study indicate that he group engaging in spoken interaction in L2 scored slightly better than the group engaging in L1. Two of the volunteers who engaged the participants in these conversations during the data collection process agreed that the responses given in both L1 and L2 were fully appropriate and relevant and almost equal in terms of spontaneity, but there was not agreement regarding the length of responses. One volunteer indicated that the responses she received were shorter in L1 because clarification was sought in L2. The other indicated that the participant she worked with provided one-word responses in Turkish (e.g. “Nerede?” [Where?] in L1, compared to “Where do you want to meet?” In L2). Clearly there were differences

between individual participants, but as the scores were so similar, the differences were likely insignificant.

The similarity in scores may be explained by the context of the sample group; the participants typically switch back and forth between L1 and L2 in the classroom as the majority of their classmates share the same L1. As the participants are used to switching between L1 and L2 while speaking, it is possible that the element of practice reduced the switch costs (Meuter & Allport, 1999), thereby reducing the difference in scores. Furthermore, this notion is supported by Yang et al. (2016), who demonstrated that the costs for switching between languages are reduced for bilinguals who typically switch between languages within the same environment versus those who use one language in one environment and use the other language in another.

Like the other experimental conditions, the results between the English and Turkish conditions while engaging in electronic written communication were similar, with the Texting (English) group performing slightly better than the Texting (Turkish) group. Under texting conditions, the control group performed better than both of the L1 and L2 experimental groups. Threaded cognition, which supports the cognitive bottleneck theory, supports this finding ( Borst et al., 2010; Borst & Taatgen, 2007). When the same mental resources are required for more than one activity, it is impossible to complete these activities simultaneously. Reading a passage on a piece of paper requires the same cognitive resources as reading a text message on a mobile telephone, both physically and intellectually. This results in the sequential execution of the tasks, and eliminates any possibility of their completion occurring in parallel (Alzahabi & Becker, 2013; Salvucci & Taatgen, 2008). The participants likely experienced a cognitive bottleneck while attempting to process

both the reading comprehension passages and the text messages, which resulted in the control group performing better than both of the experimental groups.

Furthermore, one interviewee noted that the participants often looked at their text messages immediately upon receipt, set down their phones, continued working on the readings, and then went back to compose and send a reply. It had been expected that the participants would disengage from the reading to deal with the text message (switch #1) and then disengage from the text messaging to go back to the reading task (switch #2). However, this is not what happened. In many cases, whether the texting involved English or Turkish, several participants disengaged from the reading task to read the text message (switch #1), disengaged from the text message to continue working on the reading task (switch #2), disengaged from the reading task again to write a reply (switch #3), and disengaged from writing a reply to continue working on the task (switch #4). This behavior consumes extra time and incurs extra switch costs, which may be another reason why text messaging is the only condition in which the control group outperformed both the Turkish and English experimental groups.

Another layer of the switch costs must also be taken into consideration when considering the differences between the scores between the Turkish texting and English texting groups. In the L2 texting group, several participants tended to engage in four separate switches in activity for each text message received. However, in the L1 group, not only were there four separate switches in activity, but each switch in activity also involved a switch in language. These activity switches coupled with the language switches are possibly responsible for the lower scores in the Turkish texting condition, and this is supported by previous research which has been conducted regarding L1-L2 switch costs. In single word naming trials, unbalanced bilinguals

have been found to incur greater switch costs when switching between L2 and L1 (Altmann & Gray, 2008; Bobb & Wodniecka, 2013). It is thought that unbalanced bilinguals must work to suppress the production of L1 when functioning in L2, and that this suppression is responsible for the increase in switch costs.

In terms of the length of the text messages, both interviewees agreed that the messages the participants sent in Turkish were longer, more detailed, and included more follow-up questions than the messages the participants sent in English, which were often single question words, despite text-speak abbreviations such as "slm" as opposed to "selam" being used in Turkish and not in English. They also both indicated that the lag time between when the messages were sent to the participants and when a reply was received from differed between the languages; despite longer messages and having more to say in Turkish than in English, the lag time was noticeably shorter when the messages were sent in Turkish compared to English. As one interviewee stated, "…They came up with shorter responses [in English] in a longer period of time." Obviously, unbalanced bilinguals have the ability to communicate more extensively in their native tongues. This study has demonstrated that, when given the opportunity to engage in text messaging, the B2 level participants wrote far more extensively in L1 than in L2. As such, the language development of second language learners engaging in off-task behaviors in L1 during L2 language lessons may be hindered. The emotional gratification obtained by text messaging, even when it leads to a decrease in academic performance, has been shown to be difficult to pass up (Rosen et al., 2013), and it's possible that this study only began to scratch the surface in terms of understanding the effects of L1 texting on academic performance in L2. Based on the feedback of the interviewees, it was evident that the students saw the task as a challenge and wanted to perform well.

Some participants even expressed annoyance at the volunteers who were engaging them in the extraneous speaking and texting activities, as these activities were inhibiting the participants' abilities to work on the reading comprehension tasks. The behavior of the participants indicates that they took the reading comprehension tasks quite seriously. In the classroom under normal circumstances, however, such students are far less likely to repress the desire for emotional gratification obtained by texting and may spend much more time engaging in extensive text message chats with family and friends in L1 instead of focusing on their English lessons in L2.

In schools where cell phone use in class has been banned, scores are higher compared to schools that enact no such ban (Beland & Murphy, 2016). While this may be compelling enough for some school administrators to alter their school's mobile phone policies and ban them immediately, such action is short-sighted, especially in the English language classroom. Access to the internet has increased exposure to the target language and learning text-speak in English has taught students to be concise in their writing, a skill which can be developed and carried over into formal writing (Irina, 2012). In addition, electronic dictionaries save learners time, and online programs such as Socrative and Kahoot enable the shyest of students to actively participate and engage in the lessons anonymously.

**Compartmentalized Code Switching**

With an increasing presence of electronic mobile devices, a new phenomenon has emerged among language learners and other bilinguals. This phenomenon has been identified and labeled *compartmentalized code switching* by the researcher. The concept of compartmentalized code switching is a hybrid of media multitasking and code switching.

Modern technology enables people to compartmentalize interaction and switch back and forth between many distinct environments and conversations. This is commonly referred to as media multitasking (Van Der Schuur et al., 2015), and frequently takes place in the classroom. See Figure 3 below.

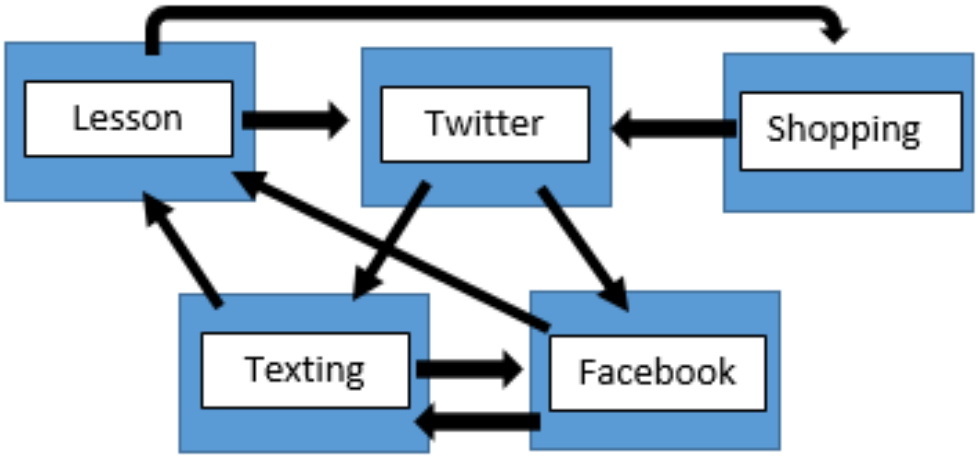


*Figure 2.* Media multitasking in the classroom. Visual representation of learners engaging in media multitasking in the classroom.

Classic definitions of code switching assume a speaker's presence in the same physical or virtual environment for the duration of a conversation, while switching between two or more languages, whether virtually or in person (Horasan, 2014; Themistocleous, 2015). Other definitions account for *situational code switching,* where one language is used in one context and another language used in another (Grim, 2008). See Figure 4 below.

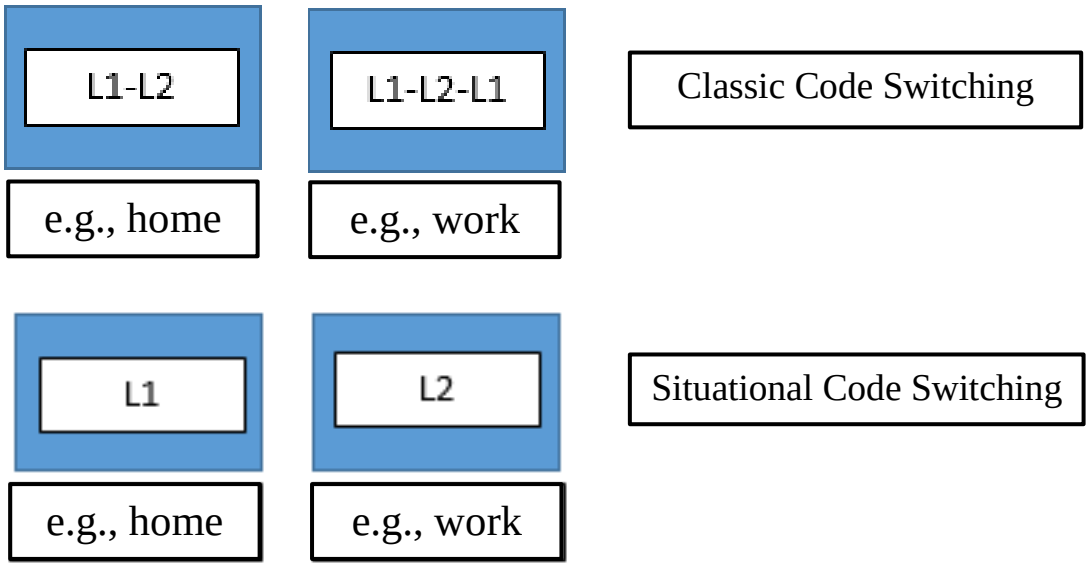


*Figure 3.* Models of code switching. Shows the difference between classic and situational code switching.

When media multitasking and situational code switching intersect, as often happens in the language classroom, a new model of code switching emerges, as represented in Figure 5.

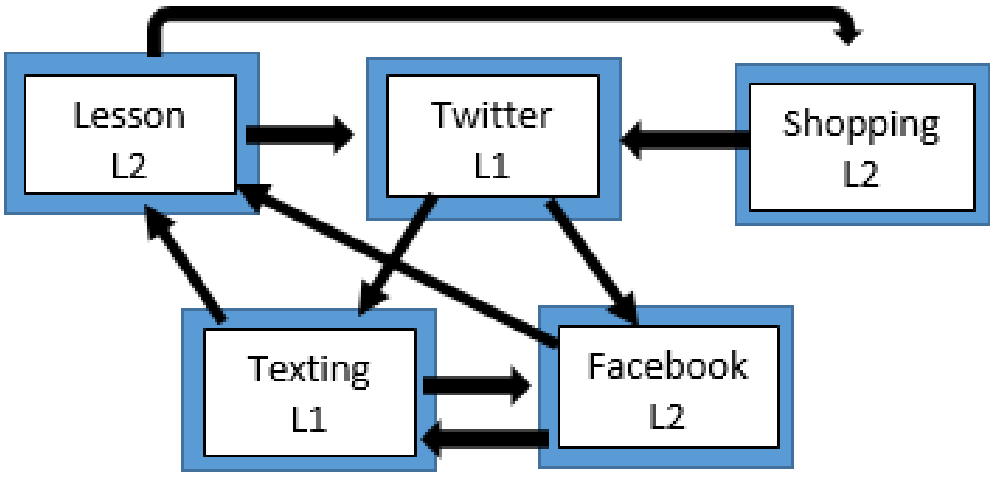


*Figure 4.* Model of compartmentalized code switching. Compartmentalized code switching is a blend of media multitasking and situational code switching.

Suppose a person writes a text message in L1 in a virtual environment such as WhatsApp then switches to the physical environment to read a portion of a text in

L2 and answers a question related to the text in L2. Then suppose the person moves into a virtual environment such as an online shopping site and places an order in L2. The person then moves to Twitter and posts a comment in L1, then moves to yet another virtual environment, Facebook. After reading a comment on Facebook in L2 and posting a reply in L2, the person returns to the WhatsApp conversation and reads and replies to a message in L1.

The phenomenon illustrated in Figure 5 is distinct from classic definitions of code switching and reflects what happens in many language classrooms around the world. The proposed term, compartmentalized code switching, is needed to describe language switches that occur when one switches back and forth between multiple virtual environments.

## Pedagogical Implications

In terms of allowing mobile phone use in the classroom, language teachers and educational institutions must carefully weigh the costs and benefits. Enacting complete bans would disservice the learners, but allowing free access without implementing some sort of control is likely to lead to lowered success among language learners. Methods of evaluating class participation that encompass more than spoken contributions and completed homework assignments should be considered (Meyer, 2009), ensuring that one student's off-task behavior does not negatively impact other learners (Sana et al., 2013; Turkle, 2015).

In addition, the findings of this study indicate that the experimental group that suffered the most was the group which experienced the background conversation in L1. When language learners are working independently, teachers need to be careful not to be an inadvertent source of distraction by helping other students in the classroom. When working with students individually, it may be appropriate to pull

students out of the classroom and into the hallway in order not to disturb the rest of the class, especially if the interaction requires the use of L1. Whenever possible, it is important for teachers and learners alike to communicate in the target language as communication in L1 may distract the other learners in the classroom.

Most importantly, perhaps, is the importance of helping learners become self-aware of their own task switching habits, which may eventually imprison them in a world of continuous partial attention. In the context where this study was conducted, the students are in English classes for 25 hours a week, and for up to two years, they are exposed to no other courses or subject areas. Language teachers in such preparatory schools cannot afford to teach their subject matter only; it is essential for time to be set aside at the beginning of every course to guide students in exercises of self-awareness regarding fractured attention and their own media use. Students need to become cognizant of *why* they are quick to disengage from a lesson and engage in multiple other platforms, at the expense of their learning. This not just for learners of the English language, but it is especially so considering that every single year, countless young university students graduate from high school and find themselves enrolled in the language preparatory programs of English medium universities all around the world. Raising learner awareness about task switching and the resulting fractured attention will not only help ensure language learners engage more deeply in class and learn the language better, but as a result of their better language skills and ability to keep distractions at bay, they will be more successful in their departments as well.

## Limitations of the Study

There are also several limitations worth noting that indicate that this study was exploratory in nature only, and that the results do not produce findings that can

be generalized. The first limitation is in regards to the sample. Not only was there a limited number of participants, the sample lacks diversity. All of the participants have the same L1 and are enrolled in the same private university in Ankara, Turkey. While there are some scholarship students from a variety of socioeconomic backgrounds enrolled in this university, most of the students come from affluent families. In addition, information regarding the scholarship status of the participants was not collected. It is unknown if a larger, more diversified sample would have impacted the findings.

Furthermore, some participants who took part in stage 1 were absent during stage 2. As the groups for stage 2 were selected based on the results of the mean score of each class in stage 1, the absenteeism coupled with the small sample size likely resulted in experimental groups that were no longer truly equal. A larger sample size of hundreds could have prevented fluctuations, but this was not feasible in the context in which this study was conducted.

Across all conditions and control groups, the results of Task C were higher than those of Task B. Either tasks B and C were not of equal level or there was something about Task C that made it more accessible to the participants, either culturally or linguistically. Combining the scores based on the experimental conditions was a way in which to mitigate this problem, but it was certainly not an ideal scenario. The data combined in this manner demonstrated a statistically insignificant trend, with the participants in the Turkish conditions getting lower scores than those in the English conditions. However, it is important to learn if the same trends are observed when scores are analyzed in a more traditional manner.

The number of questions for each reading task was also limited to eight. Because of the low number of items that were tested, the fluctuations between the

participants were minimal. Using one single task with a greater number of questions may have produced different results.

Because the conditions of the experiment had to be controlled as much as possible, the participants were removed from their typical classroom environment and seated in a large conference hall to ensure that everyone was in the same environment. For most of the participants, this was a novelty as they had never been in this hall before. In addition, the students were not as familiar with the researcher as they were with their regular classroom teachers. For these reasons, not to mention that this study required the use of consent forms, there was an air of formality about the entire process. The rigor required for scientific research limited the way in which the procedures accurately simulated everyday task switching activities which take place in the language classroom, where the students are more relaxed and more likely to freely engage in off-task behaviors.

Some participants even missed the spirit of the experiment and took the tasks very seriously, not as a simulation of typical classroom activities. It is unlikely that the participants take daily classroom tasks that do not directly contribute to their grades as seriously as they took this experiment conducted outside of the classroom under controlled conditions. Both of the interviewees reported that the participants did not want to be interrupted and tried to provide answers that were as short as possible in order to get back to work on the reading comprehension tasks. This is problematic in terms of the study, as at the local level, this type of hyper focus on the primary task is observed during exams, but not during everyday lessons, where off-task speaking with classmates is common, sometimes to the exclusion of the primary task.

## Suggestions for Future Research

The researcher asserts that the phenomenon illustrated in Figure 5 is distinct from existing models of code switching and that there is a need for a new term—compartmentalized code switching—to describe language switches that occur when one switches back and forth between multiple virtual environments. This assertion warrants further consideration and study so that this phenomenon can be properly classified and carefully defined.

The findings of this study indicate that L2-L1 task switching results in lower reading comprehension scores than L2-L2 task switching across all experimental conditions. However, as the results are not statistically significant, it is suggested that the same questions be investigated again to see if the results are duplicated and if a statistically significant trend is established.

Furthermore, a study is needed in which the effects of L1-L1, L2-L2, and L2-L1 task switching are all compared. As multiple studies have already established that L1-L1 task switching negatively affects academic performance (Judd, 2014; Junco & Cotten, 2012; Karpinski et al., 2012), it would be beneficial to the field of language teaching to know if L2-L1 task switching affects performance more negatively than L1-L1 task switching. If it does, it would indicate an urgent need to address the issue of task switching and continuous partial attention among second language learners by studying the efficacy of different awareness raising activities, metacognitive strategies, and reflection techniques (Rose, 2010).

Another angle for future research could include the investigation of task switching across a variety of languages to see if the findings hold true not just for Turkish learners of English but learners of other backgrounds as well. Turkish and English come from completely unrelated language families. It is currently unknown

how the effects of task switching between languages of different language families impacts academic performance compared to the effects of task switching between languages that are linguistically similar. The research design for this study could be modified so individual language teachers in a variety of contexts could conduct action research in the classroom with their own students under various experimental conditions.

## Conclusion

Existing research into the effects of task switching on academic performance has indicated that secondary tasks generally impede the first task, and that learners who engage in off-task behaviors in class or while studying will suffer academically (Bowman, et al., 2010; Fried, 2008; Junco & Cotten, 2012). This study was conducted to see if the academic impact, specifically the effects on reading comprehension, was even greater among second language learners who tend to switch between L2 and L1 while task switching in the English language classroom.

Although the findings in this study indicate that switching between tasks as well as switching between languages results in lower scores on measures of L2 reading comprehension when compared to participants simply switching between tasks but remaining in L2 the whole time, it must be reiterated that the differences were statistically insignificant and no claims can be made about the effects of task switching between languages on academic performance based on this one single study. It is hoped that this study will serve to spur others on to further investigate this topic.

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# APPENDICES

## APPENDIX A—Participant Consent Form

Dear Pre-Faculty Students,

My name is Lorie Tan, and not only have I been an English teacher at BUSEL for the past 11 years, I am also a Bilkent student just like you. I am completing my master's degree in Teaching English as a Foreign Language on main campus and I am conducting a study as part of my program. Of course teachers help students learn, but the opposite is also true. Through the years, my students have helped me learn many things as well, and I'd like to invite you to help me learn even more by participating in my study.

When you look around campus, you probably see many students talking to each other and using their cell phones while working or studying. This has become quite normal for the multitasking generation, and many digital natives like yourselves report that they are quite good at multitasking.

How about you? Are you good at multitasking? Let's put your abilities to the test! Many studies have been conducted on multitasking, but these studies don't look at what happens when people multitask in a foreign language or perform one activity in one language and a different activity in another language. This is what I want to research, and I need your help.

Participation in this study is completely voluntary; no one will force you to participate, and you can drop out at any time. The study will be conducted in two parts:

Part one: You will complete a short reading comprehension task in English in your classroom (15 minutes under test conditions).

Part two: Your entire class may be selected to participate in part two. If your class is selected, you will complete two more short reading comprehension tasks in English, but you will have to multitask at the same time. Your class might be asked to do one of the following things:

a) Listen to conversations in English and Turkish while reading
b) Talk to a teacher in English and Turkish while reading
c) Read and send text messages (via WhatsApp) to a teacher in English and Turkish while reading

Your personal information will be disposed of at the end of this study, and your telephone number and WhatsApp conversation will be deleted from the teacher's

telephone as soon as the reading tasks are completed. If you are willing to participate, please complete the form below. Thank you very much!

Sincerely,

Lorie Tan

**********

I, _____, would like to participate in the multitasking study described above. I understand that my participation is voluntary and that I can drop out at any time. I know that all personal, identifying information will be disposed of at the end of this study. I understand that my telephone number and all communications taking place through WhatsApp will be deleted as soon as the reading comprehension tasks have been completed.

I have access to a smart phone with wifi capabilities and WhatsApp.
Check one:
( ) Yes
( ) No

_____ _____

Signature Date

_____

Class Code

## APPENDIX B—Speaking Script (English)

Start 14:00 I'm sorry, but my pencil just broke. Do you have a pencil sharpener I can borrow?

Okay, thanks.

Start 13:00 I don't understand this word. Can you explain what it means? (Text 7: ***obvious*** in paragraph 2; Text 8: ***imagination*** in paragraph 2)

- Hmmm….ok, I understand. Thanks a lot.

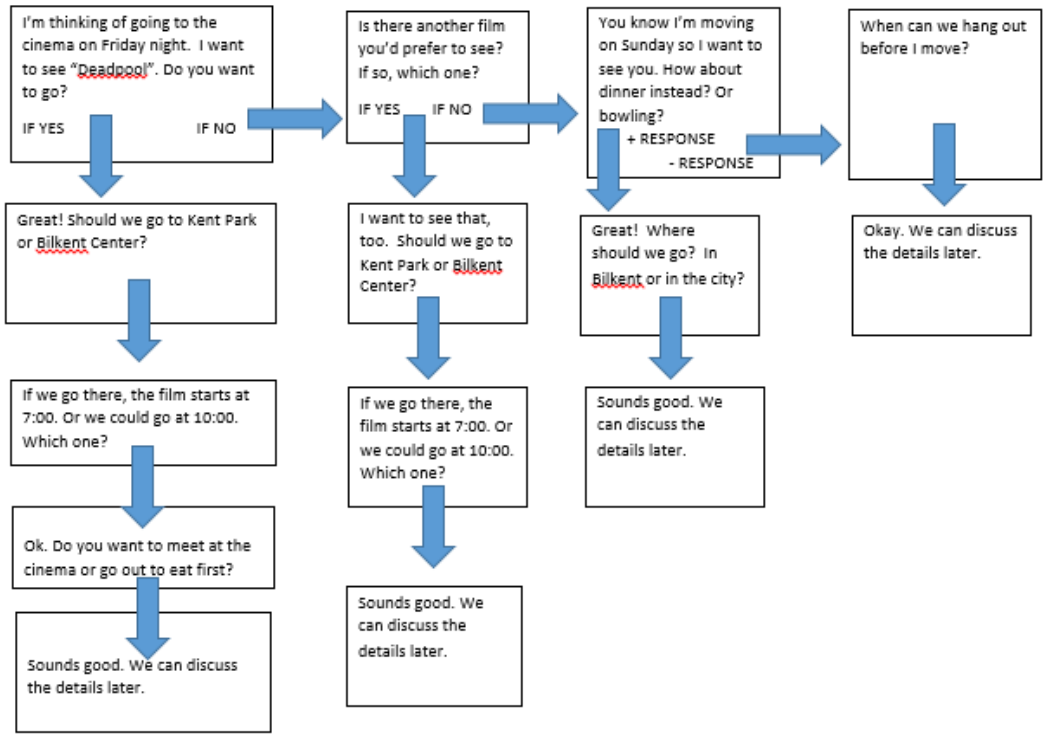
Start 11:00 Dialogue (see flow chart)

Start 5:00 What is our class code? I forgot to write it on my paper…..Thank you.

Start 4:00 When is our CAT exam? (pause for response). Maybe we should get together and study. I need to practice vocabulary. What do you need to work on?

Start 2:00 Have you finished yet?

- (If yes) Me, too. I thought it was an interesting reading. Did you like it?
- (If no) Me, neither. How many questions do you have left? (wait for response). Okay, let's finish.



## APPENDIX C—Speaking Script (Turkish)

Start 14:00 Bu kelime ne. Türkçesi ne acaba? (Text 7: ***escape*** in the title; Text 8: ***ambition*** in the title). (pause for response)

- (Text 7) Ama "escape" bilgisayarda bir tuş değil mi? Başka anlama mı geliyor? (pause for response) Hıııımmm anladım. Teşekkürler.
- (Text 8) O zaman "ambitious" ve "ambition" arasında ne fark var? Sanırım tam anlamadım (pause for response) Hıııım tamam. Doğru. Teşekkürler.

Start 12:00 Silgimi unuttum. Sende var mı? (pause for response)….Tamam sağol.

Start 11:00 Turkish Dialogue (see flow chart)

Start 5:00 Bugün bu parçalardan kaç tane yapacağız? (pause for response)

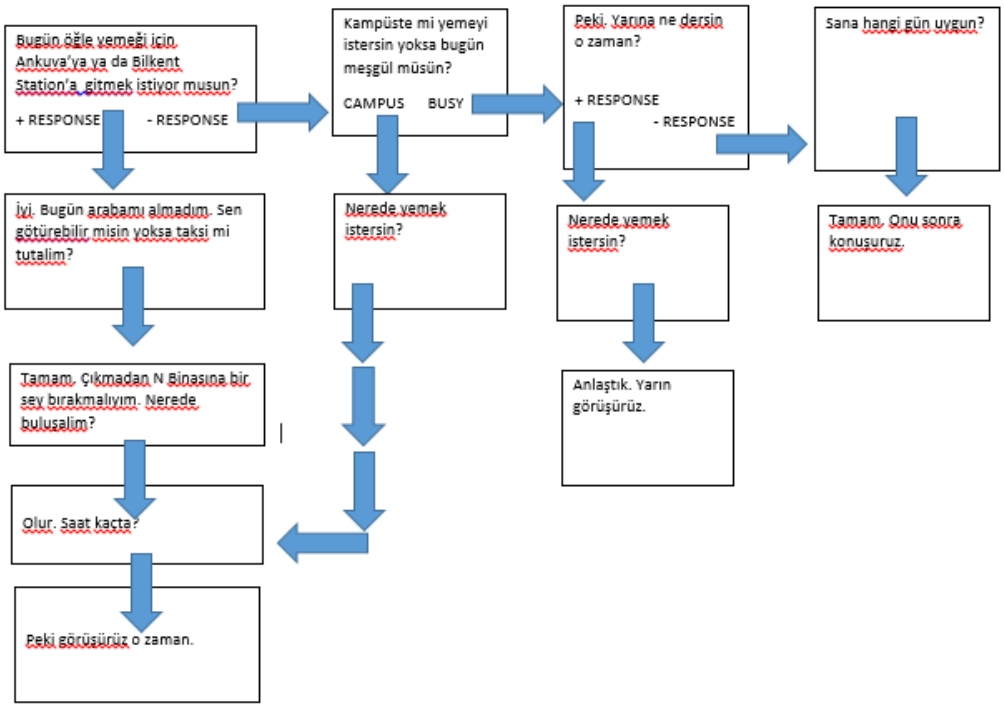
- Bir tane daha mı? Tamam.
- Bu son mu? Tamam.

Start 4:00 Yarın quiz var değil mi? (pause for response). Saat kaçta? (pause) Ne çıkacak sence? (pause) Umarım kolaydır.

Start 2:00 Bittirdin mi?

- (If yes) Ben de. Sence sorular kolay mıydı?

(If no) Kaç soru kaldı? (wait for response) Tamam süstüm artık, bittir.



## APPENDIX D—Texting Script (English)

TEXTING TIMELINE

14:00—Send first message

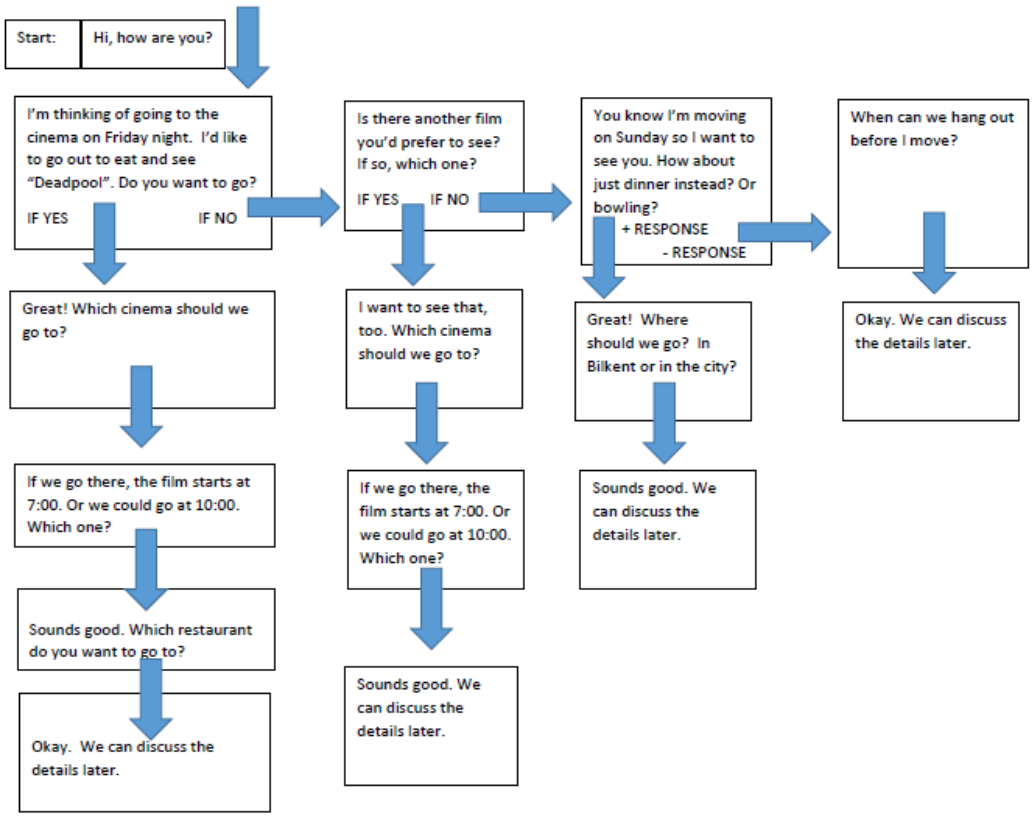
12:00—Send second message

10:00—Send third message

7:00—Send fourth message

5:00—Send fifth message

3:00—Send sixth message



## APPENDIX E—Texting Script (Turkish)

TEXTING TIMELINE

14:00—Send first message

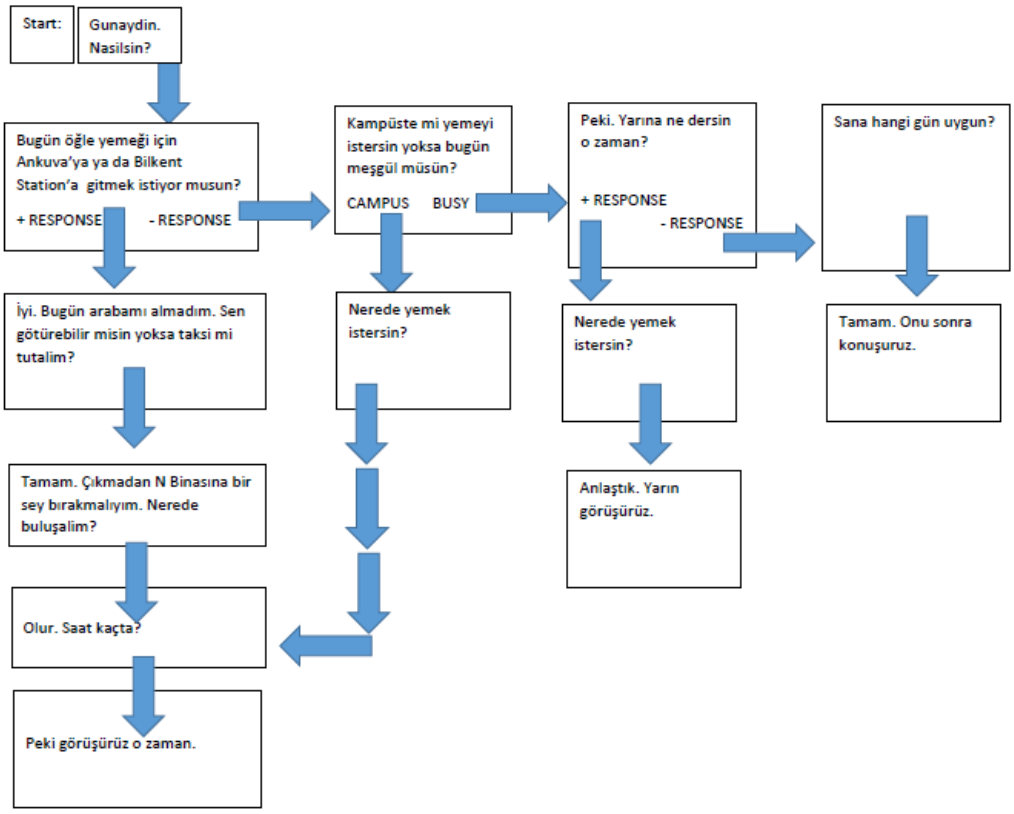
12:00—Send second message

10:00—Send third message

7:00—Send fourth message

5:00—Send fifth message

3:00—Send sixth message



## APPENDIX F—Interview Questions

In terms of length of response and expansion of ideas, how would you describe the participant responses when they were speaking in English compared to when they were speaking in Turkish?

To what degree would you say the length of responses varied from participant to participant when speaking in English?

To what degree would you say the length of responses varied from participant to participant when speaking in Turkish?

Overall, how would you describe the spontaneity of the responses in English compared to Turkish?

Would you say the spontaneity of the responses varied significantly between languages within individual participants?

To what extent were the responses relevant and appropriate? Did you observe any differences between the relevance of the responses in English compared to Turkish?

In terms of length of response and expansion of ideas, how would you describe the participant responses when they were texting in English compared to when they were texting in Turkish?

To what degree would you say the length of responses varied from participant to participant when texting in English?

To what degree would you say the length of responses varied from participant to participant when texting in Turkish?

Can you describe the lag time for me? What I mean by that is, the time between sending a text message and receiving a response. Overall, would you say the response time was shorter in one of the languages compared to the other?

Would you say there was a significant difference in lag time within individual participants—that is, was their response time shorter in one language compared to the other?

To what extent were the responses relevant and appropriate? Did you observe any differences between the relevance of the responses in English compared to Turkish?

## APPENDIX G—Interview Consent Form

I, _____, assisted in the facilitation of the data collection process in a study for Lorie Tan's master's thesis. Having made observations throughout this data collection process, I now consent to become a participant in the study by sharing my thoughts and observations through an interview. I understand that the interview will be recorded and that portions of the interview may be quoted or referenced in the thesis. I also understand that my name and any other identifying personal information will be kept strictly confidential.

_____ _____

Signature Date

## APPENDIX H—Interview Transcript #1

Interview with Volunteer One

RESEARCHER: Thank you for agreeing to be interviewed.

VOLUNTEER ONE: No problem.

RESEARCHER: I asked for your input since you worked with several participants one on one in all of the experimental groups dealing with spoken and written interaction. Also, as a fluent—

VOLUNTEER ONE: No, not me.

RESEARCHER: Yes, and as a fluent and mostly balanced bilingual…

VOLUNTEER ONE: Thank you.

RESEARCHER: …I believe you will be able to accurately report on the similarities and differences between the participant responses in L1 and L2.

VOLUNTEER ONE: Okay. I'll try.

RESEARCHER: Thank you. So let's start with the spoken interaction. So in terms of length of response and expansion of ideas, how would you describe the participant responses when they were speaking in English compared to when they were speaking in Turkish? Now this is just an overall impression.

VOLUNTEER ONE: Uhhhhh…the, the English, uhh, they, I think there were shorter answers. Like shorter but more to the point.

RESEARCHER: Okay.

VOLUNTEER ONE: Uhhhhh, and I remember the guy on my right asking some questions to make sure that he understood what I was asking.

RESEARCHER: So he asked for clarification in English.

VOLUNTEER ONE: Yeah, yeah.

RESEARCHER: But not in Turkish.

VOLUNTEER ONE: I mean in English, yes, but not…in so many words.

RESEARCHER: Hmm…

VOLUNTEER ONE: [For example] "Do you mean this?" by showing the word. Mostly, yeah. And um, the first guy I think…

RESEARCHER: Mmm hmm

VOLUNTEER ONE: Uh he was a little bit interested in so I'm not sure not sure what his results would say on paper but I didn't get the feeling that he was uh like into the material or, or he didn't seem to care what I was asking him at all. So In terms of that, I, lengthwise I can't say anything for him. But other than that, when I compare Turkish with English, the, the, they again, the answers were shorter, to the point with Turkish. Um…

RESEARCHER: Wait. They were shorter with Turkish?

VOLUNTEER ONE: No, they were shorter with English…

RESEARCHER: Oh okay.

VOLUNTEER ONE: Than with Turkish. Umm, I can't be sure because it's been awhile

RESEARCHER: Mmm hmm

VOLUNTEER ONE: But with English, they seemed to be a kinder, like more polite.

RESEARCHER: Hmmmm.

VOLUNTEER ONE: But with Turkish, not so much.

RESEARCHER: Interesting.

VOLUNTEER ONE: Yeah. And one of them in the second uhhh set of practice I think. One of them did start laughing out loud when I said "Okay, you can go on now" because he was clearly offended and started laughing because he was, not because it was funny but because he was angry and

RESEARCHER: Angry because…

VOLUNTEER ONE: Oooh NOW you are letting me…because I've…

RESEARCHER: Cause you were interrupting him.

VOLUNTEER ONE: Yeah, I kept interrupting him because that's what I was supposed to be doing.

[laughter]

VOLUNTEER ONE: Uhhhh but the thing that he was, he answered the questions, but it was uhhhhh out of kindness or maybe he [unintelligible]

RESEARCHER: Mm hmm

VOLUNTEER ONE: But from the way he was talking to me, I could understand like from the way he looked at me and from the tone of his voice he didn't like me very much. You know?

RESEARCHER: You mean he didn't like you or he didn't appreciate being interrupted?

VOLUNTEER ONE: He didn't like me interrupting him.

RESEARCHER: Okay.

VOLUNTEER ONE: That's definitely it.

RESEARCHER: Okay.

VOLUNTEER ONE: I'm not sure if it's.

RESEARCHER: Okay. Thank you. All right. I have another question for you then.

VOLUNTEER ONE: Oooh, just one more thing.

RESEARCHER: Sure.

VOLUNTEER ONE: Now that I remember, one of the guys did tell me not to ask questions at all.

RESEARCHER: Hmmmm.

VOLUNTEER ONE: But after the third interruption he said, I'm supposed to be doing this, please ask me later.

RESEARCHER: So it sounds like he missed the whole point.

VOLUNTEER ONE: Maybe. Or maybe he did understand but he he seemed a bit more competitive

RESEARCHER: Hmm

VOLUNTEER ONE: to me because he gave very short answers…

RESEARCHER: I see.

VOLUNTEER ONE: Both in Turkish and English. And he tried his very best to ignore me.

RESEARCHER: Mmmm hmm.

VOLUNTEER ONE: But I was better to ignore him.

[laughter]

RESEARCHER: You kept pressing on anyway.

VOLUNTEER ONE: Yeah

RESEARCHER: Okay, alright. You kind of touched on…

VOLUNTEER ONE: I know, I know.

RESEARCHER: It's okay. I'll just ask them anyway in case anything else comes to mind.

VOLUNTEER ONE: That's why I was hesitant through the answers because….

RESEARCHER: No, I appreciate it because they're spontaneous and natural. So I'll ask the questions anyway in case anything else comes to mind. So to what degree would you say the length of responses varied from participant to participant when speaking in English? So you worked with a couple of students who were [unintelligible].

VOLUNTEER ONE: Right, well, with one, it's as if they are here, well, with the first one, ummm, not not I can't really say anything, as I said he wasn't really all that interested. But this one, with both Turkish and English he was very short because he really wanted to do like answer the questions and and I assumed he, he wanted to be successful.

RESEARCHER: Mm hmmm. So you would say that there wasn't really a difference in this particular student.

VOLUNTEER ONE: Yes. With the two students, no. The other two, I'd say… Not really, not really. I can't compare them. Like, this one talked more than the other but with Turkish English though. There was a difference yes.

RESEARCHER: Okay, can you describe that difference?

VOLUNTEER ONE: Like umm, in English it's kind of repetitive. In English they were shorter in the answers but, in Turkish longer, but I got the feeling, like, they were not very polite. I'm not sure if it's relevant.

RESEARCHER: would you say that there was a significant difference?

VOLUNTEER ONE: Mmmm, I'm not comfortable with, like, significant, but there was to me, there was a distinct difference.

RESEARCHER: Okay.

VOLUNTEER ONE: I hope that helps.

RESEARCHER: That's fine. So let's move on from the length of the responses…

VOLUNTEER ONE: Okay.

RESEARCHER: …because I think we really covered that.

[Laughter]

RESEARCHER: So overall, how would you describe the spontaneity…

VOLUNTEER ONE: Hmmm.

RESEARCHER: …of their responses in English compared to the spontaneity of their responses in Turkish?

VOLUNTEER ONE: Let me… Let me think. You know, I don't think there was that much of a difference. Because what they were trying to do was just get the question out of the way and they tried to keep at it. In that sense I don't think they, they, they thought about what to say. So no. I'm going to go with no.

RESEARCHER: Okay. And you would say that's true for the individuals as well as overall? In terms of spontaneity?

VOLUNTEER ONE: I didn't…you know I told you I took some notes…I don't remember writing down any such thing because I would have noticed.

RESEARCHER: So it didn't really strike you as being any different.

VOLUNTEER ONE: No.

RESEARCHER: Okay and let me see…hmmm…We already covered that…To what extent were the responses relevant and appropriate, and did you notice, did you observe any differences between the relevance of the responses in English compared to Turkish? In terms of content.

VOLUNTEER ONE: Right, okay. So again with the one I told you that he didn't seem to care, some of his answers were not the answers to my questions.

RESEARCHER: Hmmm.

VOLUNTEER ONE: So do you remember we were supposed to be asking the definition of a word? I asked if he knew what that word meant. He said [in Turkish] "Aynen, aynen" [exactly, exactly].

RESEARCHER: Hmm. He really didn't want to be disturbed.

VOLUNTEER ONE: I think that's why I really remember him.

RESEARCHER: You worked with how many students that day?

VOLUNTEER ONE: That day…

RESEARCHER: Four right?

VOLUNTEER ONE: That day four, yes.

RESEARCHER: Was he the only one who gave you responses in that manner?

Volunteer: Yes.

RESEARCHER: So the other three students…

VOLUNTEER ONE: The other students answered the questions in Turkish and English, although with the guy I just told you about, he tried to shut me up. He uhhhh…insisted on interrupting. He didn't give me answers. And he tried to, you know, answer the [reading] questions the best he could. But [when speaking] very short answers, and with, it was clear that he didn't want to be there sitting next to me.

RESEARCHER: Okay. Thank you. Let's move on to the written interaction…

VOLUNTEER ONE: Okay.

RESEARCHER: …the texting the following day. And the questions are very similar. In terms of length of response and expansion of ideas, how would you describe the participant responses when they were texting and English compared to when they were texting in Turkish?

VOLUNTEER ONE: Length?

RESEARCHER: Length, yes.

VOLUNTEER ONE: Uhhhh, overall that's difficult to answer. Like, overall I think that the Turkish, they seemed to ask more follow-up questions.

RESEARCHER: Hmmmm.

VOLUNTEER ONE: So that speaks to the length…

RESEARCHER: Yes, yes of course.

VOLUNTEER ONE: …but I think they were very different individually. There were, there were two girls and, if I'm not wrong, two males, two females. One of the male students…I don't think he was…I'm not sure he understood the rules because he kept saying, "Hocam, hocam" [Teacher, teacher], which I didn't correct.

RESEARCHER: So he didn't understand that you were posing as a student and…

VOLUNTEER ONE: For me it felt uncomfortable because I was trying to be informal and friendly, and he kept saying "Hocam, hocam," so it was weird in a way.

RESEARCHER: Did you feel that all the students had a similar response?

VOLUNTEER ONE: No, just that one.

RESEARCHER: Just him.

VOLUNTEER ONE: Just that one. And then, like after we finished the first round, I think I told him, "We're supposed to be friends."

RESEARCHER: Mmm hmm.

VOLUNTEER ONE: And then in the second round, it wasn't weird.

RESEARCHER: Okay. He just needed some clarification.

VOLUNTEER ONE: Yes, but I think because he thought he was supposed to be talking to "hocam," his responses were longer with more follow-up questions, more clarifications…

RESEARCHER: I see.

VOLUNTEER ONE: …I think that was kinda why.

RESEARCHER: Mmm hmmm

VOLUNTEER ONE: But with the girls though, it wasn't that, the messages, they weren't in like, whole long chunks, they were short, but more, I don't know how you say it, but they sent me a line… And then…

RESEARCHER: A stream of very short messages.

VOLUNTEER ONE: Yes, but just the girls.

RESEARCHER: Interesting.

VOLUNTEER ONE: Why I don't know…

RESEARCHER: There's another study right there.

VOLUNTEER ONE: Yeah.

[Laughter]

VOLUNTEER ONE: But I found it very interesting at the time because you know we were supposed to be on the look[out] for the time and I was trying to get ready for the second one [text message] except they kept sending messages and I wasn't sure what to do.

RESEARCHER: Mmm hmmm.

VOLUNTEER ONE: So, one boy was like, writing a lot of chunks [unintelligible], the other was very informal, very to the point, and he wasn't like, he told me, "I can't do that" because I have other plans. [I responded], "Can I join in?" So he was all very normal and regular but not in lengthwise. So that's why I can't give you…an overall…

RESEARCHER: right.

VOLUNTEER ONE: …difference.

RESEARCHER: I understand.

VOLUNTEER ONE: You see?

RESEARCHER: That was overall

VOLUNTEER ONE: Mmm hmm.

RESEARCHER: Would you say that there was a difference in the length in English compared to Turkish?

VOLUNTEER ONE: Mmmm... Lengthwise. Let me think. With the girls, I'd say no because, both with Turkish and English, they were short and clear, informal, and it did feel like a friend. But with the male students, I think that was the difference. The English, I remember single question words.

RESEARCHER: Mmm hmmm.

VOLUNTEER ONE: "When?" [or] "What?", not "What time?"

RESEARCHER: Mmmm hmm.

VOLUNTEER ONE: So I'd say, with male students, so not with the girls.

RESEARCHER: Okay.

VOLUNTEER ONE: Yeah.

RESEARCHER: Can you describe the lag time for me? What I mean by that is the time between your sending a message…

VOLUNTEER ONE: Mmmm

RESEARCHER: …and receiving their response. So, overall would you say the response time was shorter in one of the languages compared to another?

VOLUNTEER ONE: With this one I'm leaving out the, the boy who sent me chunks because that obviously, there was…

RESEARCHER: He was calling you "Hocam".

VOLUNTEER ONE: Yeah. And…

RESEARCHER: Fair enough.

VOLUNTEER ONE: …and he didn't even shorten the words in any way.

RESEARCHER: Mmm hmmm.

VOLUNTEER ONE: So I thought that was weird. But with the other ones, I think, I can't be sure, but I think with the girls they were short and, and they were, it's not

like they were complicated sentences. I'd say that even if they were different, I didn't notice it or I don't remember.

RESEARCHER: It was minimal if there was one [difference]. Okay.

VOLUNTEER ONE: Yes. If I have to say either yes or no, with the other one, I'm going to say yes because I I seem to remember waiting for answers because I, after the first round, I copied the, my questions elsewhere so it was like copy-paste, copy-paste, so I remember waiting for some answers so that I can paste my other question, you know?

RESEARCHER: Mmm hmmm, mmm hmmm.

VOLUNTEER ONE: So, I think that has to be the other guy.

RESEARCHER: Okay. So the lag time, would you say, which language was longer or shorter?

VOLUNTEER ONE: Hmmm… I'd say in English. It was longer.

RESEARCHER: Mmm hmm.

VOLUNTEER ONE: Which was the first round? English or Turkish? Do you remember?

RESEARCHER: In one group the English was first, in another group the Turkish was first. So the first group, English was first.

VOLUNTEER ONE: In the first group, English was first. Then I should be it because, right! Okay! Okay, now I remember. Because the other guy took so long and I, I thought I'm not going to make it, I need to do something, so I wrote the questions up elsewhere. So that was the English round…

RESEARCHER: Okay.

VOLUNTEER ONE: Yes, that was…

RESEARCHER: It took him longer in English.

VOLUNTEER ONE: Yes, both guys.

RESEARCHER: Both guys…

VOLUNTEER ONE: Yes.

RESEARCHER: …but not the girls.

VOLUNTEER ONE: Not the girls, no. Because, because now I think, you know it's coming back to me now because I think we've been talking about it, because I, I said to myself thank God at least I'm not waiting for them to. Right.

RESEARCHER: Mmm hmm.

VOLUNTEER ONE: That's interesting.

RESEARCHER: Yeah, okay I just want to piggyback on this question because you mentioned it briefly, and I was planning on asking it. Umm…did they use text-speak or did they write out formal words…like the whole...

VOLUNTEER ONE: Right. Apart from the guy who thought I was his, who thought I was supposed to be his teacher, some of them did, yes.

RESEARCHER: Okay.

VOLUNTEER ONE: And on multiple cases.

RESEARCHER: Would you say that plays a role in the time or the length….or did they do it equally in Turkish and English?

VOLUNTEER ONE: You know, I don't really like saying, not with the girls all the time, it feels weird, but their answers were short anyway.

RESEARCHER: Okay.

VOLUNTEER ONE: They did use the, the text language, but I, I don't think that would've changed things a lot.

RESEARCHER: And they used it in both languages?

VOLUNTEER ONE: Uhhhhh, no. They used it in Turkish, but not…in English.

RESEARCHER: Okay.

VOLUNTEER ONE: I should've thought of that, yes. That was a difference, yeah.

RESEARCHER: That's all right. I just have one more question for you.

VOLUNTEER ONE: Go ahead.

RESEARCHER: To what extent were the responses relevant and appropriate in English in Turkish, and did you observe any differences in terms of the relevance?

VOLUNTEER ONE: Ummm, you know, we actually made plans [per the scripted text]. It felt real, so I'm going to say with both languages, if I were really their friends, I know what time, when, or what to do…

RESEARCHER: Mmmm hmmm.

VOLUNTEER ONE: …after the class, or after lunch, I don't remember. So, in terms of relevance, I'd say, I didn't, I don't remember noticing any difference in that sense.

RESEARCHER: All right. Thank you so much!

VOLUNTEER ONE: No problem. It was fun.

## APPENDIX I—Interview Transcript #2

Interview with Volunteer Two

RESEARCHER: All right, thank you for letting me interview you today. I wanted to ask you some follow-up questions because you worked with several of the participants one-on-one….

VOLUNTEER TWO: Mmm hmm

RESEARCHER: … In all of the experimental groups, dealing with the spoken and written interactions, and also because you're, you're fluent and a mostly balanced bilingual, I believe that you'll be able to accurately…

VOLUNTEER TWO: Thank you.

RESEARCHER: …you'll be able to, you know, tell me about the similarities and the differences in the participant responses between L1 and L2.

VOLUNTEER TWO: Okay then.

RESEARCHER: So let's start with the spoken interaction. In terms of length of response and expansion of ideas, basically the length, how would you describe the participant responses when they when they were speaking in English…

VOLUNTEER TWO: Mmm hmm

RESEARCHER: …compared to when they were speaking in Turkish? Did you notice any patterns?

VOLUNTEER TWO: Actually let me say something at the beginning. They didn't want to be interrupted during the reading activity. It was clear that they wanted to focus on the task and they didn't want to be impolite at the same time, so they tried to answer me as short as possible. So they tried to form utterances as short as possible. Both in English and in Turkish, but in Turkish it was easier for them to come up with short responses because…because of their knowledge and their

fluency in the language. But in English, they didn't know how to form short sentences, and they needed to think about it for a longer period of time but not much.

RESEARCHER: Okay. All right. And to what degree would you say the length of the responses varied from participant to participant, not overall, but among the individuals, when they were speaking in English?

VOLUNTEER TWO: Mmmm hmm…uhhh… They tried to form sentences, utterances, but they were short as well.

RESEARCHER: Okay.

VOLUNTEER TWO: They couldn't form long ones, but if it was about determining the time or the place [to meet], they asked a question rather than saying, "Where do you want to meet?" They didn't say, "Where?" for example. They formed the whole question.

RESEARCHER: I see. Okay, was it basically the same for all of the individuals that you worked with?

VOLUNTEER TWO: Almost, yeah. Uhhh, but to be honest, girls are more talkative and the utterances were longer.

RESEARCHER: Mmm hmm.

VOLUNTEER TWO: and for the Turkish, for example, they said, "Nerede?" [Where?] But for the English version they, they asked, "Where do you want to meet?"

RESEARCHER: Hmmmmm.,,

VOLUNTEER TWO: Or, "Where can we go?" Rather than just using the question word.

RESEARCHER: I see. Okay. And I had the same question for you, but about Turkish.

VOLUNTEER TWO: Okay.

RESEARCHER: To what degree would you say the length of the responses varied from individual to individual when speaking in Turkish?

VOLUNTEER TWO: All of the participants tried to answer me by using only one word or maximum, a few words because they didn't want to be interact — interrupted much.

RESEARCHER: Okay. All right, and overall, how would you describe the spontaneity of the responses in English compared to Turkish?

VOLUNTEER TWO: Uhhh, Turkish was more spontaneous…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: …and it was faster…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: ... than in English, but it didn't take a long time for them to come up with an utterance. However, because probably they were pre-fac[ulty] advanced students, it wasn't too long for them, actually, for them to come up with appropriate utterances…

RESEARCHER: Okay.

VOLUNTEER TWO: …but of course, when they did the same thing in Turkish, it's took shorter time.

RESEARCHER: Okay, thank you. Umm, and again, same question, but I'm going to focus on the individuals. Would you say the spontaneity of responses varied significantly between languages within individual participants?

VOLUNTEER TWO: No, not much.

RESEARCHER: Okay, so however long it took them for English…

VOLUNTEER TWO: Mmm hmm

RESEARCHER: … It took them for Turkish.

VOLUNTEER TWO: Uhhhh…

RESEARCHER: So I'm just talking like one person here.

VOLUNTEER TWO: Yeah.

RESEARCHER: So this person took the same amount of time…

VOLUNTEER TWO: Mmmm hmm. And maybe in one second, and, and for English, it was maybe for two seconds. But not much actually.

RESEARCHER: Okay, so it took about one second to prepare an answer in Turkish and about two seconds to prepare an answer in English.

VOLUNTEER TWO: Mmmm hmmm.

RESEARCHER: Okay.

VOLUNTEER TWO: But I didn't have to wait for a long time for the utterances, even in English as well.

RESEARCHER: Mmm hmm. Okay. And to what extent were their responses relevant and appropriate?

VOLUNTEER TWO: All of them were relevant…

RESEARCHER: All of them, okay.

VOLUNTEER TWO: Mmm hmm. And all of them were appropriate thinking of the situation.

RESEARCHER: So, differences between English and Turkish in terms of relevancy. Yes, no, maybe?

VOLUNTEER TWO: No, there were no differences. Uhhh, all of them can understand my questions. They focused on my questions and they came up with appropriate responses as well.

RESEARCHER: Okay. Then, thank you. Then let's move on then to the texting. All right then, in terms of length of response and expansion of ideas again…

VOLUNTEER TWO: Mmm hmm

RESEARCHER: How would you describe the participant responses when they were texting in English compared to when they were texting in Turkish, so the, the length of the English responses compared to the length of the Turkish responses. Your overall general impression.

VOLUNTEER TWO: Uhhh, maybe the students were different, but they were, they didn't want to spend a lot of, a lot of time on sending the messages, so they tried to come up with only a few words as an answer. Uhhh, and this time, they used longer sentences in the Turkish version.

RESEARCHER: Hmmmm

VOLUNTEER TWO: So, uh, they, they gave some reasons. For example, when I asked the question about whether they wanted to see the movie — I forgot the name of the movie —uhh, they came up with lots of explanations.

RESEARCHER: Mmm hmm

VOLUNTEER TWO: But, in the English version, they just wrote, "No." Or maybe another movie or something like that, but they didn't want to form full sentences. Because, most probably, they didn't feel confident.

RESEARCHER: I see. So, in Turkish, they would, they would say, "No, because blah blah blah blah blah,"

VOLUNTEER TWO: Because, yeah, uh huh, and they provided reasons…

RESEARCHER: Or, "Yes." I see.

VOLUNTEER TWO: …and they asked further questions as well about when we are going to meet or whether we were going to eat something or not.

RESEARCHER: Mmm hmm, so overall, the responses in Turkish were longer…

VOLUNTEER TWO: Yeah.

RESEARCHER: …than in English. Okay, and then…

VOLUNTEER TWO: Not much, of course, but uhhhh…

RESEARCHER: Enough that you notice a difference.

VOLUNTEER TWO: Yes, definitely. Because, uhhh, most probably they wanted to give a reason, they wanted to make explanations since they were fluent in the language, so their responses were definitely longer.

RESEARCHER: Okay. That's valuable information, thank you.

VOLUNTEER TWO: No problem.

RESEARCHER: Ummm, let's see where am I? I lost my spot. Okay, now let's talk about like, individual students, so…

VOLUNTEER TWO: Mmmm hmmm

RESEARCHER: …to what degree would you say the length of the responses varied from participant to participant when texting in English compared to Turkish. So…

VOLUNTEER TWO: Hmmm…yeah…Mmm hmm

RESEARCHER: …you said overall it was longer in Turkish. Would you say that holds true for all of the individuals that you worked with?

VOLUNTEER TWO: Yes, for all of them, and I worked with female students and male students at the same time, and when I think about their responses, their written responses, uhhh, they provide, they came up with longer sentences in the Turkish version.

RESEARCHER: Both males and females?

VOLUNTEER TWO: Both males and females.

RESEARCHER: Mmm hmm. Okay. Another question here. Can you describe the lag time for me?

VOLUNTEER TWO: Mmm hmmm

RESEARCHER: What I mean by that is…

VOLUNTEER TWO: Hmmm

RESEARCHER: …like, the time between when you sent the message…

VOLUNTEER TWO: Mmm hmm

RESEARCHER: …and the time when you received the response. So, again overall, let's talk about overall first. Would you say the response time was shorter in one of the languages compared to the other?

VOLUNTEER TWO: Uhhh, it was shorter in Turkish. And I sent a message, but uhh, I noticed something important. Ummm, in the texting part, they didn't ca—they didn't write their answers immediately. They read it, first of all, and most probably they were reading one of the questions, they didn't want to send a message at that time. After answering, uhhh, after reading the options, or after reading a sentence maybe, they sent the message to me. And, in Turkish, it was faster, but in the English version it took longer time for them to, uhh, came up with the answers, to send their answers.

RESEARCHER: Okay, did you notice a, a similar phenomenon where you say, they received the text, they read it…

VOLUNTEER TWO: Yes.

RESEARCHER: They set it aside, completed the question, and then went back to the text?

VOLUNTEER TWO: Not all the time, not all students as well, not with all the students, but with most of them the first of all read what I wrote to them, and maybe

they were thinking about the text or maybe they were, in the Turkish version it was quicker by the way. In the English version, it took a longer period, maybe they were thinking about how to form their question…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: …or sentences. In my clear now, Lorie?

RESEARCHER: Let, let me just rephrase that question…

VOLUNTEER TWO: Mmm hmm, yeah.

RESEARCHER: … To make sure that I understand you. Okay, so. Umm, you said when you are operating in Turkish, you would send a text they would pick up the phone and read it, put the phone down…

VOLUNTEER TWO: Uh huh, most of the time.

RESEARCHER: Most, most of the time—do something with the reading, then go back and give you an answer.

VOLUNTEER TWO: Yes.

RESEARCHER: Did you no—was that pattern the same in English?

VOLUNTEER TWO: Mmm hmm.

RESEARCHER: they would get the text, read it, set the phone down, continue doing something with the reading…

VOLUNTEER TWO: Yes.

RESEARCHER: …and then…

VOLUNTEER TWO: Again.

RESEARCHER: Okay.

VOLUNTEER TWO: but there's a difference between them because of the Turkish version, I observed them at the same time, and and the Turkish version and they just wrote their message quickly.

RESEARCHER: Mmm hmm

VOLUNTEER TWO: But in the English version, it took a longer time to form the message.

RESEARCHER: Okay. Yeah, that makes sense. And speaking of how much time it, it took them to do that, did the students — the participants — did they use text-speak or did they use fully formed, formal language?

VOLUNTEER TWO: Uhhh, in the Turkish version, they benefitted from the text language…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: But in the English version, they couldn't do all the time because most probably they don't know how to do it.

RESEARCHER: Mmm hmm. So…

VOLUNTEER TWO: They had to write all the letters in the words. But in the English version, instead of writing, "selam," they wrote "slm".

RESEARCHER: Mmm hmm, mmm hmm. Do you think that had something to do with the, length of their messages? They're able to use short forms therefore they make longer sentences, or do you think it is irrelevant?

VOLUNTEER TWO: Uhhh, can you repeat the question, Lorie?

RESEARCHER: Sure. Like, you said they're using, okay. Earlier, you said that their Turkish responses were definitely longer than their English responses…

VOLUNTEER TWO: Yes.

RESEARCHER: …overall…

VOLUNTEER TWO: Mmm hmmm

RESEARCHER: …but you're also saying they used short forms of words in Turkish.

VOLUNTEER TWO: Mmm hmm, yeah.

RESEARCHER: Do you think that that enabled them to have longer responses?

VOLUNTEER TWO: Ahhh, no. Definitely not because, uhhh, they didn't use the short versions of the words for all the words.

RESEARCHER: Mmm hmm

VOLUNTEER TWO: They used it for greetings…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: …and to say, rather than saying, "gorusuruz" [see you later], they, they just write, they just put a symbol and...am I….?

RESEARCHER: Yeah, okay.

VOLUNTEER TWO: So not because of using the short version, because, uh…

RESEARCHER: They just had more to say.

VOLUNTEER TWO: Uh-huh, you're right. They wanted to add lots of details. They wanted to ask lots of questions. They suggested other things, etcetera, etcetera. They wrote—they wanted to add lots of things, and although they wrote longer messages, it took a shorter time for them to send a message. In English, they came up with shorter responses in a longer period of time.

RESEARCHER: Okay, thank you very much. And I just, um, okay we were just talking overall. Now let, let's look at the individuals.

VOLUNTEER TWO: Mmm hmm

RESEARCHER: Would you say among the individual participants there was definitely a shorter response time in one language than the other?

VOLUNTEER TWO: Uh-huh, and in the written version, yes, it was Turkish.

RESEARCHER: It was—

VOLUNTEER TWO: Yeah, they just responded quickly, more quickly…

RESEARCHER: Mmm hmm

VOLUNTEER TWO: …in the Turkish version although their sentences were longer.

RESEARCHER: Okay, so that's true for overall and it's also true for all of the individuals.

VOLUNTEER TWO: For all of the individuals as well, yeah.

RESEARCHER: Okay, and—

VOLUNTEER TWO: And even for male, male students as well. They responded quickly.

RESEARCHER: No difference between males, females in terms of response time, okay.

VOLUNTEER TWO: Yeah.

RESEARCHER: And one last question—

VOLUNTEER TWO: oh, oh, sorry.

RESEARCHER: It's okay.

VOLUNTEER TWO: Can I add some information about one of the male students? He didn't want to respond to me, he didn't want to be interrupted. Uhhh, but of course, uhh, he didn't say—he wrote, "I'm reading a text right now."

[Laughter]

VOLUNTEER TWO: And of course, I pretended not to have got the message. I continued sending messages to him.

[Laughter]

RESEARCHER: Okay.

VOLUNTEER TWO: but, uh, his responses were really, really short. It was clear that he was really, really fed up with it.

RESEARCHER: This just really confirms what you said about the students not wanting to be interrupted.

VOLUNTEER TWO: Yeah, no. You're right.

RESEARCHER: Okay.

VOLUNTEER TWO: They did their best to concentrate on the reading activity, but you know I had to send messages.

RESEARCHER: Okay, so I just have one question for you. So, to what extent were the responses in the texting relevant and appropriate? And did you notice any difference in the relevance of the responses between English and Turkish?

VOLUNTEER TWO: All of them were appropriate and there were no differences in terms of the language. They were, they could answer my questions and they came up with the appropriate responses as well although they didn't want to do it.

[Laughter]

RESEARCHER: Okay, thank you very much. Your responses are very valuable.

VOLUNTEER TWO: Hopefully. Thank you.

RESEARCHER: Thank you.

## APPENDIX J—Task A

The entire text entitled *"Daffodils Everywhere"* and eight accompanying questions taken from *First Certificate Practice Tests* (Osbourne, 2009) comprised Task A.

Below is an excerpt from the text of Task A:

> Two hundred years ago the English poet William Wordsworth wrote 'I wander'd lonely as a cloud', a poem that expresses a basic spirit of early English Romanticism. It was Thursday, 15th April 1802. William and Dorothy Wordsworth, the poet's devoted, journal-writing sister, were walking home to Dove Cottage in the Lake District. The wind was fired, but the Wordsworth siblings were used to striding long distances in foul weather. They were in the woods close to the water side when they first clapped eyes on a field of daffodils 'fluttering and dancing in the breeze' (p. 42).

Below is a sample question from Task A:

> According to the article, Wordsworth's poem
>
> A started the Romantic movement.
>
> B was based on actual experience.
>
> C was written while he was visiting his sister.
>
> D was written after he had been lonely (p. 43).

## APPENDIX K—Task B

The entire text entitled *"Narrow Escape"* and eight accompanying questions taken from *First Certificate Practice Tests* (Osbourne, 2009) comprised Task B.

Below is an excerpt from the text of Task B:

> We had left the hut too late that morning. When we stepped outside, the sky beyond the mountains to our east was already livid with colour. It mant the day would be a hot one, and the warmth would loosen rocks that were gripped by ice (p. 106).

Below is a sample question from Task B:

> Why was it 'too late' by the time they left the hut in the morning?
>
> A It would be uncomfortable climbing in hot weather.
>
> B The livid color of the sky would hurt their eyes.
>
> C Rocks loosened by melting ice could be dangerous.
>
> D They wouldn't be able to walk on the melting ice (p. 107).

## APPENDIX L—Task C

The entire text entitled *"A Girl with Ambition"* and eight accompanying questions taken from *First Certificate Practice Tests* (Osbourne, 2009) comprised Task C.

Below is an excerpt from the text of Task C:

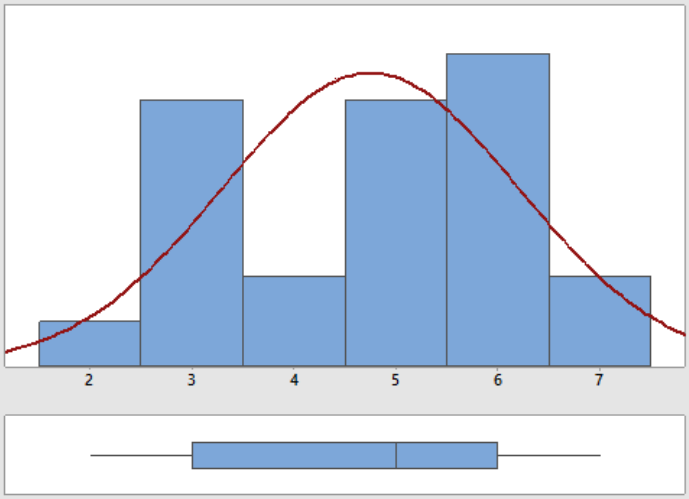
> Holly Sinclair arrives at the north London restaurant where she and I are to have lunch without coat or bag, in jeans and trainers. She looks exactly what she is: a 21-year-old who, thanks to three number-one hit songs, a millionaire husband and blossoming acting career, is having the time of her life. Once she opens her mouth, however, you realise that the person inside her body is actually a middle-aged woman (p. 122).

Below is a sample question from Task C:

> Why does the writer describe Holly as a 'middle-aged woman' in line 8?
>
> A Holly's physical condition is that of an older woman.
>
> B Holly dresses like a middle-aged woman.
>
> C Holly behaves like an older and more sensible person.
>
> D Holly has much more money than most young people (p. 123).

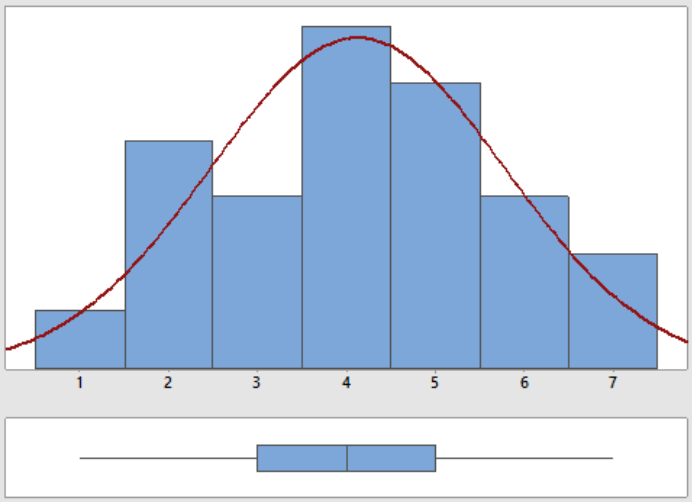
## APPENDIX M—Normality Tests

### Summary Report for backgroundenglish



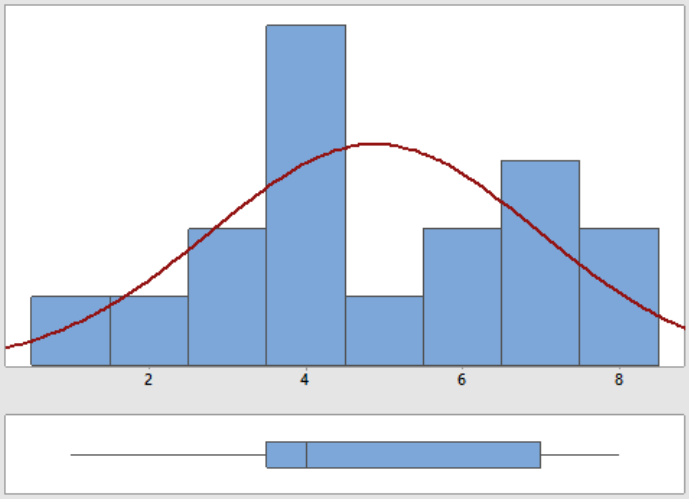

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 1.04 |
| P-Value | 0.008 |
| Mean | 4.7500 |
| StDev | 1.4521 |
| Variance | 2.1087 |
| Skewness | -0.26720 |
| Kurtosis | -1.11798 |
| N | 24 |
| Minimum | 2.0000 |
| 1st Quartile | 3.0000 |
| Median | 5.0000 |
| 3rd Quartile | 6.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 4.1368 | 5.3632 |
| 95% Confidence Interval for Median | |
| 3.8268 | 6.0000 |
| 95% Confidence Interval for StDev | |
| 1.1286 | 2.0370 |

### Summary Report for Background Turk



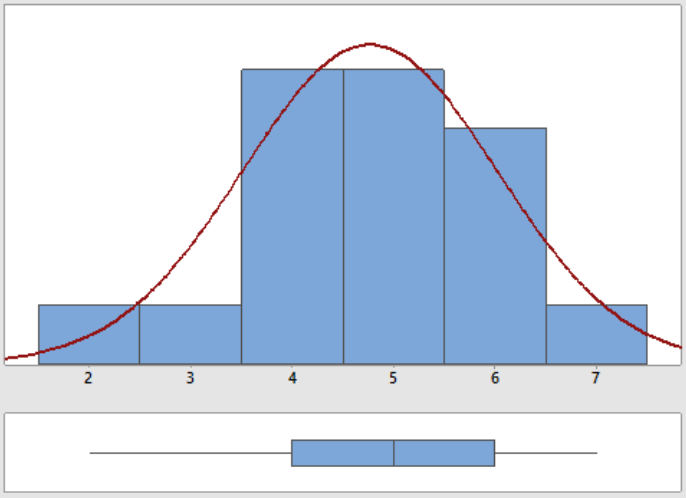

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.45 |
| P-Value | 0.254 |
| Mean | 4.1250 |
| StDev | 1.6501 |
| Variance | 2.7228 |
| Skewness | -0.026722 |
| Kurtosis | -0.705484 |
| N | 24 |
| Minimum | 1.0000 |
| 1st Quartile | 3.0000 |
| Median | 4.0000 |
| 3rd Quartile | 5.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 3.4282 | 4.8218 |
| 95% Confidence Interval for Median | |
| 3.0000 | 5.0000 |
| 95% Confidence Interval for StDev | |
| 1.2825 | 2.3147 |

## Summary Report for speaking En



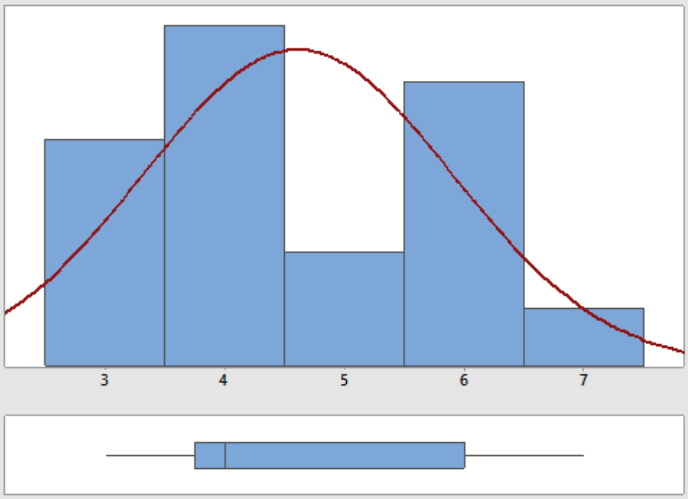

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.43 |
| P-Value | 0.268 |
| Mean | 4.8824 |
| StDev | 2.0881 |
| Variance | 4.3603 |
| Skewness | -0.057177 |
| Kurtosis | -0.894441 |
| N | 17 |
| Minimum | 1.0000 |
| 1st Quartile | 3.5000 |
| Median | 4.0000 |
| 3rd Quartile | 7.0000 |
| Maximum | 8.0000 |
| 95% Confidence Interval for Mean | |
| 3.8087 | 5.9560 |
| 95% Confidence Interval for Median | |
| 4.0000 | 6.9760 |
| 95% Confidence Interval for StDev | |
| 1.5552 | 3.1780 |

## Summary Report for speaking Tr



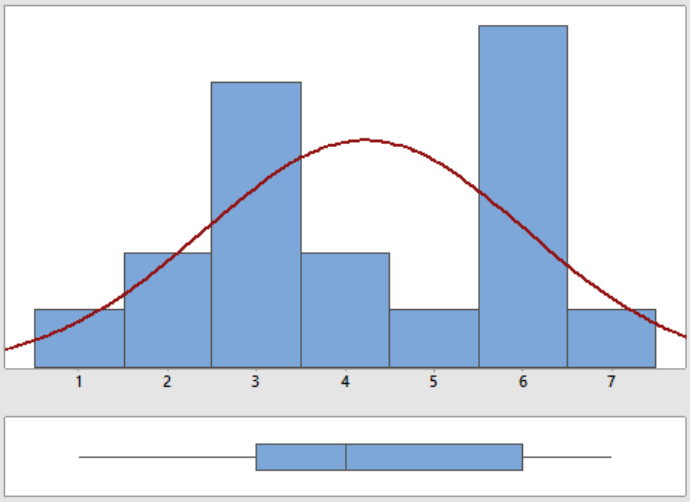

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.53 |
| P-Value | 0.154 |
| Mean | 4.7647 |
| StDev | 1.2515 |
| Variance | 1.5662 |
| Skewness | -0.364642 |
| Kurtosis | 0.208893 |
| N | 17 |
| Minimum | 2.0000 |
| 1st Quartile | 4.0000 |
| Median | 5.0000 |
| 3rd Quartile | 6.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 4.1213 | 5.4082 |
| 95% Confidence Interval for Median | |
| 4.0000 | 5.9760 |
| 95% Confidence Interval for StDev | |
| 0.9321 | 1.9046 |

## Summary Report for txt En



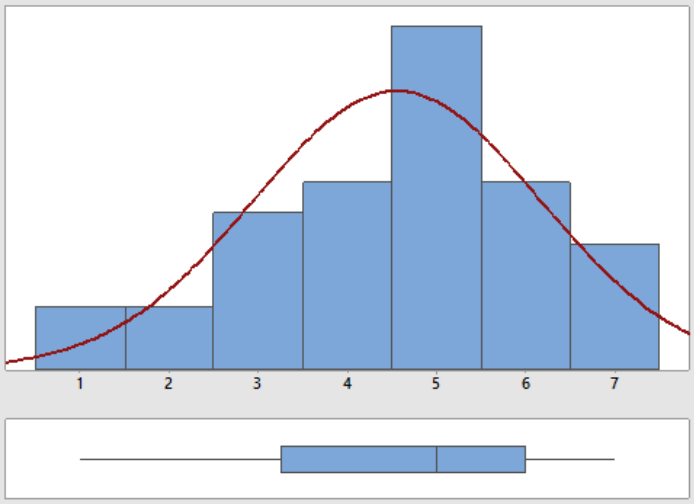

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.91 |
| P-Value | 0.016 |
| Mean | 4.6111 |
| StDev | 1.2897 |
| Variance | 1.6634 |
| Skewness | 0.27914 |
| Kurtosis | -1.21901 |
| N | 18 |
| Minimum | 3.0000 |
| 1st Quartile | 3.7500 |
| Median | 4.0000 |
| 3rd Quartile | 6.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 3.9697 | 5.2525 |
| 95% Confidence Interval for Median | |
| 4.0000 | 6.0000 |
| 95% Confidence Interval for StDev | |
| 0.9678 | 1.9335 |

## Summary Report for txt Tr



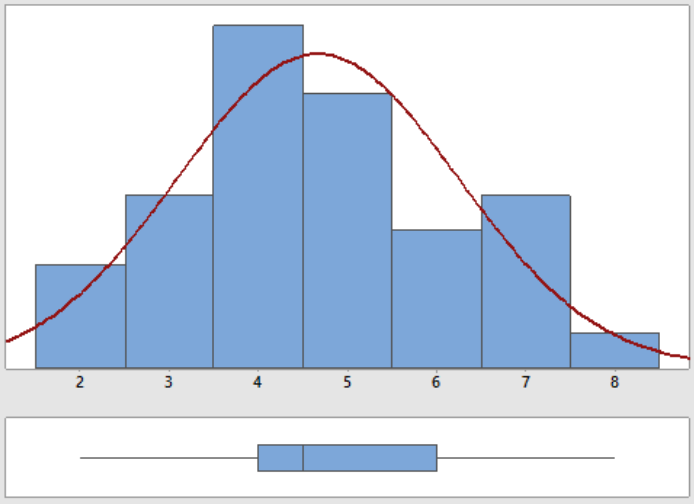

| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.85 |
| P-Value | 0.022 |
| Mean | 4.2222 |
| StDev | 1.8005 |
| Variance | 3.2418 |
| Skewness | -0.10134 |
| Kurtosis | -1.31882 |
| N | 18 |
| Minimum | 1.0000 |
| 1st Quartile | 3.0000 |
| Median | 4.0000 |
| 3rd Quartile | 6.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 3.3269 | 5.1176 |
| 95% Confidence Interval for Median | |
| 3.0000 | 6.0000 |
| 95% Confidence Interval for StDev | |
| 1.3511 | 2.6992 |

## Summary Report for Control Group (15 minutes)




| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.84 |
| P-Value | 0.028 |
| Mean | 4.5556 |
| StDev | 1.6115 |
| Variance | 2.5968 |
| Skewness | -0.474630 |
| Kurtosis | -0.236566 |
| N | 36 |
| Minimum | 1.0000 |
| 1st Quartile | 3.2500 |
| Median | 5.0000 |
| 3rd Quartile | 6.0000 |
| Maximum | 7.0000 |
| 95% Confidence Interval for Mean | |
| 4.0103 | 5.1008 |
| 95% Confidence Interval for Median | |
| 4.0000 | 5.0000 |
| 95% Confidence Interval for StDev | |
| 1.3070 | 2.1021 |

## Summary Report for Control Group (13 minutes)




| Anderson-Darling Normality Test | |
|---|---|
| A-Squared | 0.79 |
| P-Value | 0.036 |
| Mean | 4.6667 |
| StDev | 1.5675 |
| Variance | 2.4571 |
| Skewness | 0.214685 |
| Kurtosis | -0.597483 |
| N | 36 |
| Minimum | 2.0000 |
| 1st Quartile | 4.0000 |
| Median | 4.5000 |
| 3rd Quartile | 6.0000 |
| Maximum | 8.0000 |
| 95% Confidence Interval for Mean | |
| 4.1363 | 5.1970 |
| 95% Confidence Interval for Median | |
| 4.0000 | 5.0000 |
| 95% Confidence Interval for StDev | |
| 1.2714 | 2.0447 |