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Decision Making in English as an Additional Language: Surprises and Advantages

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Abstract

Do adult learners of English make different and sometimes better decisions in English than their monolingual peers and teachers? It is likely, possible, and probable. Using evidence from classroom decision making studies, with over 500 participants, we demonstrate that often adult English learners (henceforth adult Active Bilingual Learners/Users of English [ABLE]) make more accurate decisions in English than first language English speakers, when given time and the ability to utilize their whole linguistic repertoire (i.e., translanguaging). We specifically look at differences in decisions that involve 1) common adverbs of frequency (rare, possible, likely, frequently, etc.) and 2) system 1 (implicit) vs. system 2 (analytical) thinking in cognitive reflection tests, such as math story problems. Understanding these surprising differences and advantages in decision making in English as an Additional Language (EAL) has important practical implications for test preparation and daily instruction for adult ABLE students, and potentially as well for ABLE youth in K-12 schools.

Keywords

bilingual decision making, cognitive reflection test, active bilingual learners/users of English (ABLE), system 1 & system 2 thinking, verbal probabilities

1. Introduction

As humans we make around 35,000 decisions every day. The decisions that students make influence how their teachers view them, interact with them, and what teachers expect from them. Yet, it seems reasonable to assume that emergent bilingual (henceforth *Active Bilingual Learners/Users of English [ABLE]*, Przymus et al., in press) students of all ages not only process words and linguistic structures

differently in their non-native languages (L2) than native speakers, but that this may also lead to differences in behavior and decision making. In order to study the effect of language competency on decision making, Brooks (2016) introduced the term bilingual decision making, stating "bilingual decision making combines applied linguistics and decision making with an emphasis on cognitive behavioral approaches to explore the decision making of native (L1) and non-native (L2) speakers in the same contexts" (p. 10).

A greater understanding of the intersection of emergent and active bilingual processes and school-based decision making in English is important for informing instruction, historically based on monolingual processes, that may result in providing ABLE students with more time and valuable access to their first language. The literature on L2 reading and decision making and our studies below demonstrate that taking the time to decode, semantically map with one's full linguistic repertoire, and process text/decisions in an additional language can lead to making different and sometimes better decisions in English (Frenck-Mestre, 2005). Even though the literature on translanguaging has become more ubiquitous over the past decade, leading to greater ideological and pedagogical openness to allowing students to use their full linguistic repertoire in instruction, English-only ideologies still dominate the U.S. and many international educational contexts (Otheguy, García, & Reid, 2019; Przymus, 2016). This is especially true for adult ABLE students studying at institutions of higher education, where often English-only practices are strictly enforced (Mazak & Carroll, 2016; Shvidko, 2012). In this article, we report on our recent studies that address the differences in decision making in English as an Additional Language (EAL) among adult ABLE students versus L1 English speakers regarding verbal probability and cognitive reflection tests and posit that understanding these differences may improve the educational outcomes and identity development of adult ABLE students. By demonstrating the advantages of bilingualism in decision making, we provide evidence for dismantling English-only language policies that cause multilingual students to "feel that their multilingual skills are relegated to the margins of schools" (Daniel et al., 2019, p. 2).

In this paper, we center the importance of bilingual decision making on classroom decision making and ask, do adult ABLE students make different and sometimes better decisions in English than their L1 English-speaking classmates and teachers? It is *likely, possible, and probable*. In a 2016 verbal probability study with college-age Intensive English Program (IEP) students and L1 English-speaking college students, Brooks found a marked difference between L2 English speakers' and L1 English speakers' understanding of the words, *rare, very unlikely, unlikely, possible, likely, probable, good chance, frequent, usually*, and *very probable.* The implications for understanding and addressing this are great, considering the ubiquitous usage of these words in statistics, probability, and story problems. In a different study, again with college-age IEP students, Brooks (2016) found that L2 English speakers scored higher on Cognitive Reflection Tests, indicating that if allowed sufficient time, L2 English speakers may utilize a different/more analytical system (System 2) to make decisions, compared to the more intuitional process (System 1) used by L1 English speakers.

Below, we build off of Brooks' previous studies to provide more results that we believe give insight into decision making in English as an Additional Language (EAL) and have implications for EFL/ESL/TESOL/IEP settings in the U.S. and in other countries where adult ABLE students are developing English. This is a call to action for educators to better understand how adult ABLE students make decisions and how this greater understanding can lead to better instruction that leverages students' full linguistic repertoires. Might we begin questioning the cultural relevance and validity of standardized tests if we understood that semantic sensitivity for non-native speakers to common adverbs of frequency, such as "rarely" and "usually," significantly differ from L1 English speakers (detailed below in Study 2). How might daily instruction change if teachers realized that, when given more time, adult ABLE students demonstrate an advantage over monolinguals when it comes to divergent thinking, creativity, and cognitive flexibility (Kessler & Quinn, 1980). We demonstrate in Study 1 that bilinguals, when given enough time, actually tend to make better decisions. We provide reasons, pointing to differences in cognitive processing to why this might be the case and then consider the implications for teachers' greater understanding of these bilingual decision making processes for improved instruction, test scores for adult ABLE students, and their overall educational experience.

2. Method

2.1 Research Context and Participants

Participants in all studies below were adult, college-age students at a major university in the Southwest of the United States. L2 speakers were recruited both from the university's Intensive English Program (IEP) and from English composition courses for 1st and 2nd year college students. L1 speakers were recruited from the same English composition courses. Although we recognize that life experiences/background knowledge varied greatly among participants, we did control for time at university/grade level, as all L1 and L2 students were first and second year students, the majority of whom had not declared a major. We believe that the large number of total participants (561; 343 L2 English speakers and 218 L1 English speakers), the diverse nature of languages other than English (Spanish, Chinese, Portuguese, Vietnamese, Japanese, Italian, Arabic, Thai, Korean, Hungarian, Swedish, Finish, Cantonese, Tamil, Korean, Norwegian, French, German, Malay, Mongolian, Nepalese and Portuguese), and the L2 participants' placement in either the university's IEP or entry level English courses make these results significant for relating to the context of teaching adult ABLE students in institutions of higher education across the U.S. and internationally.

2.2 Study 1: System 1 and System 2 Thinking

Human thinking can be divided into two categories. System 1 and system 2 thinking (Kahneman, 2011), which are divided by binary descriptions. System 1 is unconscious, implicit, and automatic. System 2 is conscious, explicit, and controlled. System 1 is rapid, associative, and contextualized. System 2 is slow, rule based, and abstract. Given the latency differences between L1 and L2 speakers, implicit and explicit learning and implicit and explicit knowledge, it very likely that L2 speakers behave distinctly

when measured with system 1 and system 2 thinking.

The Cognitive Reflection Test (CRT) (Frederick, 2005) has been designed to tease apart system 1 and system 2 thinking by observing the behavior it elicits, specifically answers that indicate system 1 thinking or answers that indicate system 2 thinking. In the following cognitive reflection tests we observed differences between L1 and L2 English speakers' system 1 and system 2 decision behaviors. Brooks designed the following two experiments (timed) and (non-timed) to measure decision making behavior in English and take into account the impact of time, an important consideration for many instructors who often utilize time-based activities and assessments.

2.2.1 Timed Condition: Participants, Methods, Data Collection, and Results

There were 215 participants: 125 L1 English-speaking and 90 L2 English-speaking participants. Of the 90 L2 participants, there were Chinese (*n*=65), Spanish (*n*=11), Vietnamese (*n*=2), Japanese (*n*=2), Italian (*n*=2), and one participant each of Thai, Korean, Hungarian, Swedish, Finish, Cantonese, Tamil, and Portuguese speakers.

Participants were presented three survey questions that they answered on computers or smart phones. Responses took three to five minutes to complete. All responses submitted via computers or smart phones were collected with a Qualtrics survey for later analysis. The three survey questions, listed below, are commonly used cognitive laboratory experiment questions used to measure cognitive reflection (Frederick, 2005), cheating (Nagin & Pogarsky, 2003), and social behavior and decision-making (Brooks, 2015, 2016). They can first be found, how we use them in the block quote below, in Frederick's (2005, p. 27) study on cognitive reflection and decision-making:

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____ days

If it takes 5 machines 5 minutes to make 5 things, how long would it take 100 machines to make 100 things? __ minutes

A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

Results

In the timed condition, more L1 speakers than L2 speakers were able to complete the task quickly enough to have their scores recorded. This would indicate that L1 speakers employed a system 1 thinking more than L2 speakers. System 2 thinking is prompted by limitations in executive resources, such as parsing, remembering new words, and semantically mapping/selecting words across one's whole linguistic repertoire, which is lexically greater in multilinguals. This suggests that system 2 thinking is more time intensive compared to L1 English speakers not having to cognitively spend time on both the meaning of new words and the math problem to solve and thus being more likely to employ system 1 thinking.

Of all the participants who finished the task quickly enough to be scored, L2 English speakers scored

higher than L1 English speakers (0.28 to 0.23; the Cognitive Reflection Test (CRT) scoring is from 0 – 3, see table 1). In the timed condition and in every analysis, L2 speakers***performed as well or better*** than their L1 counterparts.

Table 1. Cognitive Reflection Test Scores

	N	CRT
L1	125	0.20
L2	90	0.28
All	215	0.23

2.2.2 Non-Timed Condition: Participants, Methods, and Results

There were 166 participants: 59 L1 and 107 L2 participants. Of the 107 L2 participants, there were Chinese (*n*=67), Arabic (*n*=19), (Spanish (*n*=6), Korean (*n*=3), Japanese (*n*=2), Portuguese (*n*=2), Norwegian (*n*=2), and one participant each of French, German, Malay, Mongolian, Nepalese, and Vietnamese speakers.

Participants were presented the same three survey questions (shared above) that they answered on computers or smartphones. Responses took three to five minutes to complete.

Results

Although no time requirement, in theory, may reduce participants' need to rush, we still observed L1 speakers finishing quicker than L2 speakers. This result strengthens our hypothesis that time in parsing and remembering new words, and semantically mapping/selecting words across a broader multilingual lexicon forces L2 speakers into a slower, more analytical System 2 processing. In the non-timed condition and in every analysis, L2 speakers ***performed as well or better*** than their L1 counterparts.

Of all the participants, non-native speakers scored higher than native speakers (0.83 to 0.68; the CRT scoring is from 0 – 3, see table 2).

Table 2. Cognitive Reflection Test Scores

	N	CRT
L1	59	0.68
L2	107	0.83
All	166	0.78

Implications for understanding this difference in system 1 and system 2 thinking, between adult ABLE students and their monolingual peers, is certainly meaningful for better understanding these students in the higher education context and could be significant for teachers in K-12 schools. L2 speakers may

more likely be influenced by a bilingual mode of processing, greater activating semantic, phonological, lexical, and syntactic processes that include linguistic features across named languages (i.e., translanguaging). This might manifest as slower processing time in class work that involves decision making. The three survey questions used in the above two experiments are quite similar to story problems used in math classes and the instruction of much content across the curriculum in schools. These is further taken up in the discussion section below, but first we report on another study, this time measuring the difference in the semantic understanding of very common words used in education.

2.3 Study 2: Verbal Probabilities (Adverbs of Frequency)

Do EAL speakers make decisions that are measurably different from L1 English speakers? One way to explore this question is through the expression of probability in words. Adverbs of frequency describe the rate of occurrence of an event and are quite meaningful for the overall understanding of a sentence and for setting the context of a given situation. Adult ABLE students in IEP/ESL/EFL classes often learn these as “always,” “sometimes,” and “never” correspond to 100%, 50%, and 0%. In decision sciences, these words are called “verbal probability expressions” (VPEs). Rare, very unlikely, and unlikely are examples of VPEs.

In his earlier work with adult ABLE students, Brooks (2015) specifically addressed how “probability can be expressed numerically (“75%”) or verbally (“probable”)” (p. 62). What Brooks (2015, p. 62) learned from interacting with these students and situating this interaction within the literature on verbal probabilities is that,

Verbal probability expressions are preferred more than numerical probability expressions because of their ease of use (Kuipers, Moskowitz, & Kassirer, 1988), their ability to express a wider range of possibilities (Zwick, 1988), and the fact that using verbal probabilities, rather than numerical probabilities, costs decision- makers very little in terms of accuracy (Hamm, 1991a; Wallsten, Budescu, & Erev, 1988).

For study 2, Brookscreated a list of commonly used VPEs and asked L1 and L2 participants to provide numbers for every VPE in two different scenarios.

2.3.1 Participants, Methods, Data Collection, and Results

There were 180 participants: 34 L1 English-speaking and 146 L2 English-speaking participants. Of the 147 L2 participants, there were speakers of Portuguese (*n*=50), Arabic (*n*=49), Spanish (*n*=34), Chinese (*n*=11), and one each of three additional languages.

Participants were presented with 10 sentences that differed only by the verbal probability expression. Like the above study, participants submitted answers via computers or smartphones and these responses were collected on a Qualtrics survey for later analysis. Results from VPEs used in a “monthly event” question and a “daily event” question are below.

Question #1: Monthly Event

If it is "rare" for Sandra to go jogging, how many times per month does Sandra go jogging?

Please write a number between 0-100 next to the word. The number you write indicates how often

(percentage) you believe the word indicates. For example, if you see “always” you may write 100 and if you see “never” you may write0.

Question #1 results: Monthly event.

On average, L2 English-speaking participants gave higher numbers than L1 participants in all 10 sentences with VPEs (see table 3). Of the 10 VPEs, two expressions -- very unlikely (*p=.001)* and unlikely (*p*=.008) revealed significant differences between L1 and L2 speakers. One explanation for the varying numbers given to the same words is that L2 speakers use their second language to give themselves more chances to be correct. If the word “rare” is given a probability of 5.64% by L1 speakers and 7.03% by L2 speakers, it may indicate that L2 speakers use words more broadly to give themselves a better chance to make a culturally-appropriate decision in a new context.

Table 3. Bilingual Verbal Probability Test (Adverbs of Frequency for Monthly Event)

Probability Expression	L1 mean	L2 Mean	Difference
Rare	3.00	6.74	3.74
Very Unlikely	3.33	8.24	4.91
Unlikely	5.60	10.94	5.34
Possible	21.67	31.32	9.65
Likely	25.23	32.52	7.29
Probably	25.73	32.64	6.91
Good Chance	28.53	37.35	8.82
Frequent	30.33	36.78	6.45
Usually	29.33	39.99	10.66
Very Probable	32.40	41.65	9.25

Question #2: Daily Event

If it is "**rare**" for Sam to log onto Facebook, how many times per day does Sam log onto Facebook?

Please write a number between 0-100 next to the word. The number you write indicates how often (percentage) you believe the word indicates. For example, if you see “always” you may write 100 and if you see “never” you may write 0.

Question #2 results: Daily Event.

On average, L2 English-speaking participants gave higher numbers than L1 participants in all 10 sentences with VPEs (see table 4). Of the 10 VPEs, the two expressions --rare (*p=.005)* and very unlikely (*p*=.050) -- revealed significant differences between L1 and L2 speakers. This very similar result provides stronger evidence of language processing differences between L1 and L2 speakers.

Table 4. Bilingual Verbal Probability Test (Adverbs of Frequency for Daily Event)

Probability Expression	L1 mean	L2 Mean	Difference
Rare	5.64	7.03	1.39
Very Unlikely	3.09	6.99	3.90
Unlikely	6.48	11.49	5.01
Possible	23.33	29.73	6.40
Likely	32.12	33.44	1.32
Probably	25.88	32.24	6.36
Good Chance	35.85	38.14	2.29
Frequent	35.48	40.83	5.35
Usually	39.45	40.91	1.46
Very Probable	37.73	39.90	2.17

Considering how frequently these kinds of words are used in daily classroom work, homework, teacher instructions, math story problems, and on assessments, knowing about these differences is critical in improving the education of adult ABLE students. We now turn to a discussion regarding each study (Study 1: Cognitive Reflection Tests and Study 2: Verbal Probabilities) and raise important implications that we see for this work.

3. Discussion

3.1 Study 1: System 1 vs. system 2

People process information quickly and they process information less quickly. For ABLE students of any language there are built-in distinctions compared to L1 English speakers. For example, in eye-tracking studies, L2 readers typically take longer to read the same information (Frenck-Mestre, 2005). Longer processing time may indicate differential processing or decision making that deviates from L1 speakers' decisions. *What might this mean for the classroom?*

We believe that realizing that adult ABLE students take longer to decode words, read, and process information has important implications for the classroom that are significant both for ABLE students in institutions of higher education, but also for ABLE youth in K-12 schools. It may not be a stretch to claim that many teachers might view the longer processing time and slower reading of ABLE students as a problem. However, our studies above point to the advantages of taking time to process story problems and content and how tapping into slower, more analytical, system 2 thinking can lead to greater academic success. We believe that educators understand that an appropriate accommodation and differentiation of instruction provided to ABLE students should be extended time, but these results

reframe this intervention from a problem to be solved to potentially a resource to be harnessed. In full disclosure, Przymus (Author 1) answered 10 cents (the wrong answer) for the bat and ball cognitive reflection test above and realized that as a Spanish/English bilingual, but also an L1-English speaker, Przymus parsed the English words quicker and used a less analytical, system 1 thinking, the first time he took the test. ABLE students, at all ages, could benefit from being given more time to process problems and their L1 English-speaking peers could benefit from learning how to approach decisions in a more analytical (system 2) manner of thinking.

3.2 Study 2: Verbal Probabilities

Study 2 highlights how English as an Additional (EAL) speakers give themselves more chances to be right, when making decisions regarding probability and frequency of events. We posit that because of the risk involved (being misinterpreted, being judged as less intelligent, etc.) in speaking in an additional language, EAL speakers hedge more on the meaning of verbs of probability, such as likely, possible, and probable and on adverbs of frequency, such as rarely, frequently, usually, causing their understanding and use of these terms to differ from how L1 English-speaking peers and teachers understand and use these ubiquitous terms. Ironically, an intentional hedging on the semantics of these terms, meant to increase their chances to be right in communication, may act to cause problems for these students at school, as their understanding of these terms continue to differ from their L1 English-speaking peers and teachers. *What might this mean for the classroom***?**

A greater understanding of how ABLE students process these terms could lead teachers to explicitly teach these terms, explicitly teach how they are understood and used by L1 English speakers, and highlight these terms on daily classroom work, homework, and on high stakes tests. From the K-12 context in the U.S., a quick corpus analysis of the State of Texas Assessments of Academic Readiness (STAAR) test, finds many questions with these words of verbal probability and adverbs of frequency, such as

Which of the following *usually* causes income from a job to be higher? (italics ours).

A The job has a title.

B More education is required for the job.

C People must be interviewed for the job.

D An ad for the job was placed on the internet.

Likely, the word *usually* is not a focus of preparation for such questions, but could lead an ABLE student to process, analyze, take longer, and answer the question differently. For adult ABLE students in IEPs or in other higher education classrooms, these words are a ubiquitous part of understanding the occurrence of everyday events, both mundane and of high import-both informal/social and formal/academic.

3. Conclusion

In this paper we have combined theory from cognitive linguistics and psycholinguistics on bilingual

decision making to help understand decision making in English as an Additional Language and to inform better instruction for adult active bilingual learners/users of English (ABLE) students. The aims of this article have been to provide an understanding for how and why adult ABLE students make different and sometimes better decisions in English, compared to L1-English speakers, and how this can inform more appropriate daily instruction and test preparation. Understanding these processes will help educators better leverage possible bilingual decision making benefits for adult ABLE students and perhaps inform better instruction and test preparation for all students. Applying a cognitive and psycholinguistic lens to adult ABLE students' longer processing time and slower reading, gives teachers a needed and deeper understanding of how ABLE students learn; an understanding that shifts away from this behavior seen first as a problem and potentially leading to this behavior as a resource that taps into a more analytical and successful manner of thinking. Our studies above, describing bilingual behavior and decision making, provide teachers with a greater insight into the choices ABLE students of all ages might make, based on a bilingual mode of processing that utilizes a whole linguistic repertoire and a self-preservation behavior of limiting risk in responses that include verbal probability and adverbs of frequency. We hope this paper causes teachers to question assumptions about ABLE students' behavior and decisions in English as one of their additional languages, and search to learn how to tap into these students' linguistic funds of knowledge to leverage these differences for improved instruction, assessment, and educational realities.

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References

Brooks, Z. (2015). Bilingual decision making: a verbal probability study. *Journal of Second Language Acquisition and Teaching*, *22*, 62-82.

Brooks, Z. S. (2016). *Bilingual decision making: Verbal probability, ethics, and cognition* (Doctoral dissertation, The University of Arizona).

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic perspectives*, *19*(4), 25-42. https://doi.org/10.1257/089533005775196732

Frenck-Mestre, C. (2005). Eye-movement recording as a tool for studying syntactic processing in a second language: A review of methodologies and experimental findings. *Second Language Research*, *21*(2), 175-198. https://doi.org/10.1191/0267658305sr257oa

Hamm, R. M. (1991). Selection of verbal probabilities: A solution for some problems of verbal probability expression. *Organizational Behavior and Human Decision Processes*, *48*(2), 193-223.

https://doi.org/10.1016/0749-5978(91)90012-I

Kahneman, D. (2011). *Thinking, fast and slow*. Farrar, Straus and Giroux: New York.

Kuipers, B., Moskowitz, A. J., & Kassirer, J. P. (1988). Critical decisions under uncertainty: Representation and structure. *Cognitive Scienc*e, *12*(2), 177-210 https://doi.org/10.1207/s15516709cog1202_2

Mazak, C. M., & Carroll, K. S. (Eds., 2016). *Translanguaging in higher education: Beyond monolingual ideologies*. Multilingual Matters. https://doi.org/10.21832/9781783096657

Nagin, D. S., & Pogarsky, G. (2003). An experimental investigation of deterrence: Cheating, self-serving bias, and impulsivity. *Criminology*, *41*(1), 167-194. https://doi.org/10.1111/j.1745-9125.2003.tb00985.x

Otheguy, R., García, O., & Reid, W. (2019). A translanguaging view of the linguistic system of bilinguals. *Applied Linguistics Review*, *10*(4), 625-651. https://doi.org/10.1515/applirev-2018-0020

Przymus, S. D. (2016). Challenging the monolingual paradigm in secondary dual-language instruction: Reducing language-as-problem with the 2–1-L2 model. *Bilingual Research Journal*, *39*(3-4), 279-295. https://doi.org/10.1080/15235882.2016.1220995

Przymus, S. D., Faggella-Luby, M., & Silva, C. (In press) It's only a matter of meaning! From English Language Learners (ELLs) and Emergent Bilinguals (Ebs) to Active Bilingual Learners/Users of English (ABLE). *Identity, Language, and Diversity (I-LanD) International Journal*. 2020/2 Special Issue.

Shvidko, E. V. (2012). *Students' Perspectives on Language Use Outside the Classroom in an Intensive English Program.*

Wallsten, T. S., Budescu, D. V., & Erev, I. (1988). Understanding and using linguistic uncertainties. *Acta Psychologica*, *68*(1), 39-52. https://doi.org/10.1016/0001-6918(88)90044-3

Zwick, R., & Wallsten, T. S. (1988). Combining stochastic uncertainty and linguistic inexactness: Theory and experimental evaluation. *International Journal of Approximate Reasoning*, *2*(2), 112. https://doi.org/10.1016/0888-613X(88)90103-X