

# Spelling Bee: A Study on the Motivation and Learning Strategies Among Elementary and Junior-High Student Competitors

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## Summary

The spelling bee is among the oldest educational competitions in the United States of America, dating back to as far as the 1700s. With an increasing number of young English language learners from diverse socio-economic backgrounds, it has become increasingly important to adequately support this young generation in building a solid foundation in spelling and vocabulary, leading to greater literacy. The spelling bee, an educational competition of spelling and vocabulary, can be an exciting, enriching experience. In order to understand how to support these young minds, we examined the study tools that elementary and junior-high level spellers use to prepare for the spelling bee and the factors that affect their engagement. By surveying spellers, this study investigated the role of student motivation and the use of various learning strategies in preparation for competition in spelling bees. Supplementing the broad range of techniques and strategies, the findings suggest that learning and fun are the major motivating factors for spellers who exhibit continued participation in spelling bees. Spellers preferred digital materials over paper-based reference materials and valued the flexibility of learning with their self-planned approaches. The results have broad implications, such as in educational course design and instruction, in which taking individual uniqueness into account can allow for differentiation and individualized learning tailored to student needs.

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## Introduction

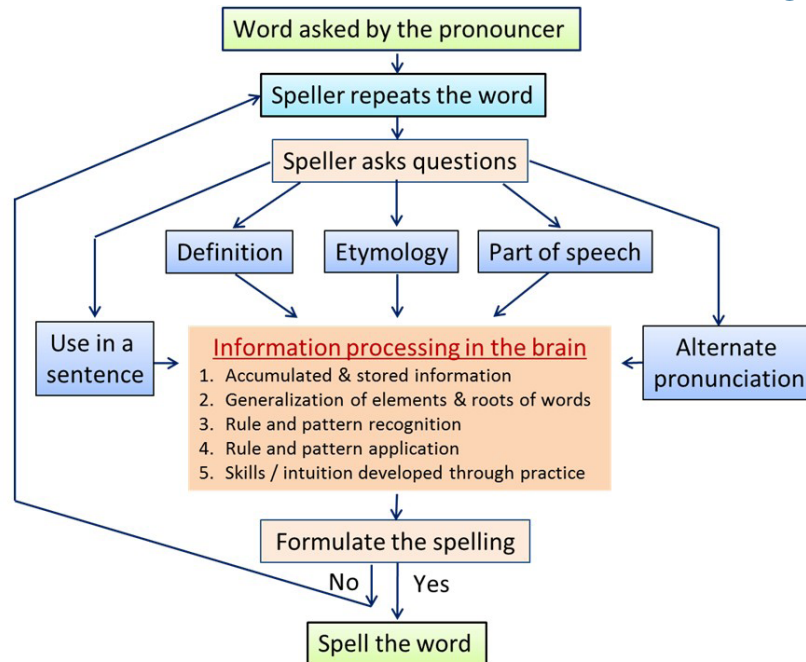
The spelling bee has been in existence in America since the 1700s, when it was an integral part of colonial education where contestants established their orthographic prowess by out-spelling their peers. The first nationwide bee was held in Cleveland, Ohio, on June 29, 1908, and the first 'National Spelling Bee' was held in 1925 (1, 2). Over the years, the spelling bee has become not only a quintessentially 'American' event, but also one

that involves knowledge of the delicate intricacies of the English language and the rich history of the words that comprise it.

Neuroscientists and psycholinguists have highlighted the brain's extensive capacity for learning language, which extends as far as an infant's ability to distinguish between multiple languages and interpret contextual cues to know which language is appropriate in a given setting (3). Furthermore, research indicates that children benefit cognitively, linguistically, and culturally from learning more than one language (4). Literacy among elementary and junior-high school students is instrumental in encouraging learning, allowing students to delve into information of their own interest. Especially among students for whom English is a second language (5), spelling bees may be a fun and educational activity that promotes childhood learning and growth of language skills.

In recent years, nearly 11 million students participated in school spelling bees worldwide (6). The spelling and vocabulary skills these students cultivate allow them to develop an understanding of and a confidence in the English language. The spelling bee, in this way, is an important and prominent educational institution, serving to promote literacy in young English learners. Contrary to popular belief, the spelling bee is not about rote memorization of words. Experienced spellers analyze words, accumulate and store information, learn word roots, and recognize language patterns (7). With organized preparation and a long-term commitment (8), spellers learn to internally conduct a review process for words that they are asked in a bee (**Figure 1**). This process not only allows them to verify their recollection of the spelling of a word they have studied, but also enables them to etymologically piece together a new word based on the patterns they have learned - even in the high-pressure competition of National Spelling Bees.

To understand the influence of various factors in students' overall educational success, researchers have previously studied topics such as the utilization of technology in schools, the effect of student motivation on learning, and the role of parental influence on performance. Studies find that when students use technology as a learning tool, they engage more actively in classroom activities, accomplish more complex tasks, and improve skills in research, attention, and collaboration (9). In addition, a technology-rich



**Figure 1:** A step-by-step approach for spelling a word (algorithm of spelling) in spelling bee competitions.

learning environment promotes project-based work and cooperative learning approaches, which increase self-esteem and self-motivation, both of which improve student expectations, behavior, and performance (10). Studies also find a positive correlation between parental motivation and both student achievement and student persistence (11).

The purpose of this research was to investigate the trends in study methodologies (web-based vs. paper materials), learning strategies (parent-guided vs. self-designed), and motivational factors (learning, fun, prize money, parents, friends/others) across spellers of different grade levels and these factors' impact on spellers' participation in spelling bees.

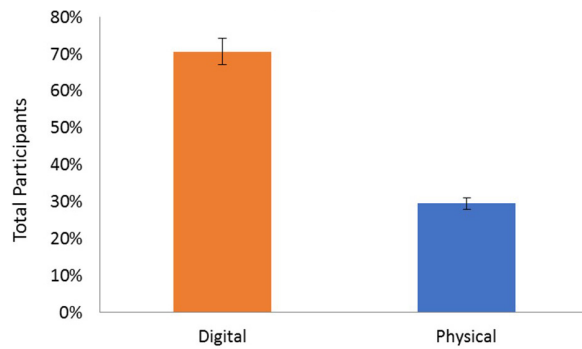
In this study, the following hypotheses were tested. Hypothesis 1: Student preference in study methodology leans towards digital dictionaries over traditional paper dictionaries, because research indicates that electronic resources encourage participation and engagement. Hypothesis 2: Students prefer the flexibility to learn in their own personal learning styles, as research indicates that students prefer seeking knowledge through self-motivated pathways. Hypothesis 3: Parental encouragement is the main motivational factor behind a student's participation in the spelling bee, since research indicates that parental involvement in children's education is an important factor in their success. Participants in this study were largely from the Greater Houston Area in Texas, with a few from Louisiana and Florida. Surveys were distributed to assess their preference in technology

tools, physical environments, and other methodologies. Spellers indicated that they were eager to learn not only how they could perform better in competitions, but also how to enrich their knowledge in general.

## Results

### Study Methods (Resources and Technology)

Both print and digital media can offer valuable resources to spellers. To understand spellers' utilization of technology resources, respondents were asked which of the following devices (cell phone, tablet, and desktop/laptop) they owned, how many, and whether or not they had used them for spelling bee purposes. Almost all spellers (98%) had at least one electronic device in the household. Among them, 80% of spellers had a desktop or laptop computer, 78% had a tablet, and about half (51%) owned a cell phone. The most popular device used for spelling practice was a computer; 85% of respondents with access to a computer, and 60% of respondents with access to a tablet, had used it for spelling practice. Among cell phone users, 58% had utilized it as a spelling tool. When asked how often they visit public libraries or bookstores, a large number of spellers (47%) said they visit public libraries or bookstores every few weeks, 22% said once a week or more, and 12% said a few times a year. When asked how often they visited a library or bookstore specifically for spelling bee purposes (to study or look for materials), a majority of spellers (51%) said they did at least a few times a year. Among them



**Figure 2:** Participants were asked what form of dictionary they preferred to use. A majority (71%) said they preferred the digital dictionary and 29% said they preferred the paper dictionary.

20% visited libraries or bookstores for spelling every few weeks, and 16% said every few days. Only 10% of all spellers surveyed said they had never visited a public library or bookstore for the purpose of finding spelling bee materials. When asked how often they searched for spelling materials online, 27% said every few days, 18% said every few weeks, 37% said a few times a year, and only 2% had never searched for spelling materials online.

To determine a student preference between digital and print media as a study tool, spellers were asked about their opinion regarding the dictionary – one of the instrumental resources for the spelling bee. The students were asked whether they had access to a paper copy of the dictionary at home, and how important they felt having a paper copy of the dictionary was for competing in the spelling bee. They were also asked whether they had access to the subscription-based Merriam-Webster Unabridged online dictionary, and how important they felt having access to a full digital dictionary was for the spelling bee. The majority of respondents (79%) said they own a paper dictionary, while 45% of respondents had a paid subscription to the Merriam-Webster Unabridged Online Dictionary. On a scale of 1 to 5 (1 being unimportant and 5 being of utmost importance), owning a paper dictionary had an average importance rating of 3.92, and 69% of spellers rated it a 4 or 5. Having access to an online dictionary had an average importance rating of 4.22, with 82% of spellers rating it a 4 or 5. The majority of spellers surveyed said they preferred using a digital dictionary (71%) compared to using a paper copy of the dictionary (29%) (**Figure 2**).

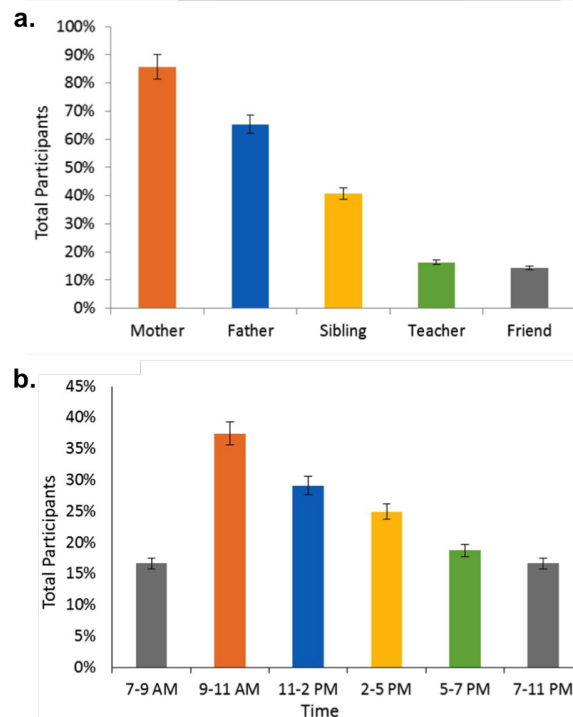
Hypothesis 1, regarding dictionary preference, was statistically analyzed using a chi-square test with one degree of freedom, which resulted in a chi-squared statistic of 17.64 and a  $p$ -value = 0.0001. The low  $p$ -value indicates that the preference of an online dictionary to a physical dictionary is statistically significant. As the

preference was greater for the digital dictionary than the physical dictionary, Hypothesis 1, that student preference in study methodology leans towards digital dictionaries over traditional paper dictionaries, was supported.

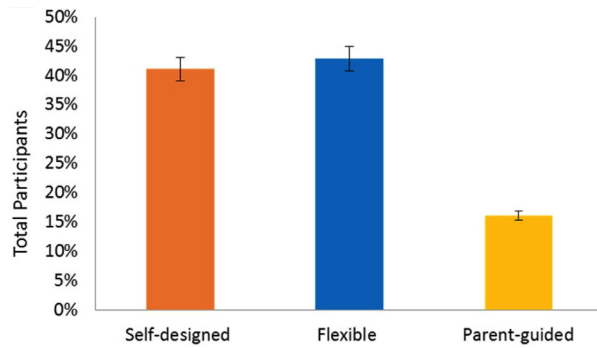
### Learning Strategies and Styles

Parents play an instrumental role in helping students study: 86% of respondents said their mothers helped them study, while 65% said their fathers helped them study. A few spellers got studying help from their siblings (41%), while smaller percentages said a teacher (16%) or a friend (14%) helped them study (**Figure 3a**). Spellers were asked, “During what time of day are you most focused?” The largest percentage of spellers (38%) said they were most focused from 9 to 11 AM. From then, the overall speller focus decreased steadily until night at 7 to 11 PM; the times of day when spellers were least focused (17%) were early morning (7 to 9 AM) and late at night (7 to 11 PM) (**Figure 3b**).

The majority of spellers surveyed (82%) said they learned well visually, with 64% stating they were purely visual learners. Some spellers (24%) said they were auditory learners, and 16% said they were tactile learners. Spellers were then asked to rate three methods of studying on a scale of 1 to 5 based on how well they would learn from the activities: reading



**Figure 3:** (a) Participants were asked, “who helps you study?” Among the responses, 86% said “mother” and 65% said “father”. (b) Participants in the survey were asked “during what time of the day are you most focused?”.



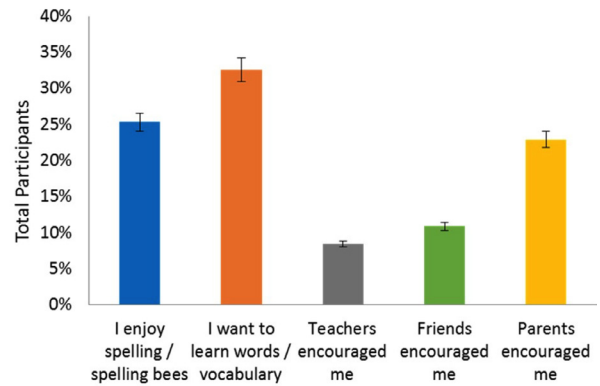
**Figure 4:** Participants were asked which method they would rather use to study: flexible (43%), self-designed (41%), or parent-planned (16%).

a study list, writing down words to review, or watching an instructional spelling video. Most spellers (60%) said they would prefer studying by using an equal amount of paper and digital materials. The activity that spellers said would be the most helpful for learning was reading a study list, with an average rating of 4.16 (83%). Writing down words to review had an average rating of 3.92 (78%), and watching a spelling video had an average rating of 3.19 (64%). Spellers were then given a choice of three activities and asked to determine which method of studying they would rather use: a) a self-designed approach where he or she (the speller) would be the one choosing the direction of what to study as well as the materials to use, b) a flexible approach in which the speller would be allowed to learn in his or her own learning style given a framework and specific materials such as online quizzes, videos, handouts/tutorials, etc., or c) a more structured, guided approach where their parents would plan out what to study. The guided approach (i.e. parental planning) was least desired (16%), while the self-designed and flexible approaches together had an 84% preference rate (**Figure 4**).

Hypothesis 2, regarding student study methodology, was statistically analyzed using a chi-square with two degrees of freedom, which resulted in a chi-squared-statistic of 13.58 and a  $p$ -value of 0.001. There was a greater preference for the self-designed and flexible approaches than for the parent-guided approach, and the low  $p$ -value indicates that this preference was statistically significant. Therefore, Hypothesis 2, that students prefer flexibility and learning using their own strategies/styles, was supported.

### Motivation

To understand what motivated young students to do extracurricular activities, respondents were asked to rate five factors on a scale of 1 to 5 on how important each factor was in deciding whether or not they wanted to participate in an activity. The two highest-rated aspects



**Figure 5:** Participants were asked for their motive for competing in the spelling bee.

were if the activity would help them in their learning (average rating 4.39, 87.8%) and how fun the activity was (average rating 3.90, 78%). Next was if their parents wanted them to do it (average rating 2.96, 59.2%), and if they would receive prize money (average rating 2.55, 51%). The least important factor was if someone else they knew had participated (average rating 2.49, 49.8%). Spellers surveyed also participated in other competitions: 60% participated in math competitions, 57% participated in sports, 47% participated in science competitions, and 47% participated in other educational competitions. To assess the influence of media promotion of an educational event on student participation in that event (such as the spelling bee), spellers were asked how many times they had watched the Scripps National Spelling Bee on TV. The majority of all respondents (66%) had watched the spelling bee on television for two years or more (2 years: 35%; 3+ years: 31%), and only 28% said they had not previously watched the bee on television. To understand specifically why students chose to participate in spelling bees, participants were asked to choose their primary motive for competing in the spelling bee. One third of spellers said they chose to participate because they were interested in learning new words or expanding their vocabulary. A quarter of spellers said they competed in spelling bees because they enjoyed spelling, and 23% of spellers said they participated in the spelling bee because their parents encouraged them to. Fewer spellers chose encouragement to participate in the spelling bee from their friends/family members (11%) or their teachers (8%) as a motive for doing spelling bees (**Figure 5**).

Hypothesis 3, regarding student motivations, was statistically analyzed using a chi-square test with four degrees of freedom, which resulted in chi-squared statistic of 21.4, and a  $p$ -value = 0.0001. The low  $p$ -value indicates that the difference in preference among the motivational factors is statistically significant. As choices (a) I enjoy spelling/spelling bees, and (b) I want to learn



words/vocabulary, were chosen more often than choice (c) parent/teacher/friend encouragement, Hypothesis 3 was not supported: parental encouragement is not the main motivational factor; rather, how fun something is and whether it will aid in learning or offer educational benefit appear to be the preferred motivational factors.

## Discussion

### Study Methodologies

Spellers and young learners in general use a blend of paper and digital resources to help them study, and should be supported through access to both types of resources. Libraries and bookstores offer valuable resources to those starting out in the spelling bee, including books and movies on the spelling bee itself, the experiences of past spellers, and tips and tricks to understand how words work – all in addition to the endless good words, both for spelling and vocabulary, within the pages of everything from storybooks to encyclopedias. Most importantly, libraries promote literacy by immersing young learners in an environment of words and ideas, all free for them to capture once they pick up a book and start reading. It may be easy for beginner spellers to approach and learn from the wealth of resources within a library before attempting to tackle the vast multitude of materials online. It requires a trained eye to effectively sift through countless digital resources and efficiently utilize various websites for spelling bee materials and study purposes. However, the internet offers ease of access, as opposed to having to physically go to a library to check out books and bring them home. The majority of spellers asserted the ease of use and helpful qualities of digital resources, such as the online dictionary (**Figure 2**). Supported by the fact that a large majority of students use computers and other electronics to help them study, both access to and support for digital resources is beneficial for spellers. Such measures can be implemented in the classroom and beyond, where usage of technology can be promoted by integrating it into lessons, while the steadfast institutions of school and public libraries should also be supported as valuable sources of information. This is supported by previous research, which has found that the integration of technology in various levels of education leads not only to improved performance, but also to better classroom dynamics including increased student motivation and engagement (9, 10).

### Learning Strategies and Styles

Individuals learn through various methods and by performing various activities, which can be considered learning strategies. For example, reading a study list, watching a spelling video, writing down words, reading out loud, quizzes, tutorials, and getting study help from

parents, siblings, teachers, and friends, are all learning strategies. Students can tailor their learning strategies to meet their specific needs and their ability to process and apply information while spelling. One factor that could be used to optimize learning experiences is the time when students report being most focused. The largest percentage of spellers said they are most focused between 9 and 11 AM, which draws a contrast to the starting time for most elementary, junior, and high schools – around 7 or 8 AM. School administrators and educators might reevaluate this timing to optimize student learning; starting school a couple hours later may result in a higher average focus level through a school day of the same length and can increase student performance (12). At the early stages of their spelling journey, spellers may utilize surface learning: attempting to piece together disjointed bits of information, such as short word lists they memorized or definitions and usage examples they browsed. As spellers progress, however, they transition to deep learning, developing and utilizing learning strategies that most effectively help them retain and apply what they learned, as proposed in an analysis of deep and surface learning (13). These experienced spellers put in longer hours directed towards satisfying their curiosity and fully understanding what they study. Gathering experience and expertise up to this level, however, requires a concerted effort with both effective and desired learning strategies. Students learn better when they are allowed to learn in their own fashion, and the majority of spellers said this would be through a flexible approach to learning (**Figure 4**). While parental encouragement and support is a very important factor, a student's ideal learning may occur either under their own approach or through an interactive curriculum where their parents can help formulate study materials or create a framework, rather than planning out every aspect of their studying.

### Motivation

Student motivation for participating in any extracurricular activities was separated into the following factors: how fun it is, prize money, if they knew someone who had participated, if their parents wanted them to do it, and if it would help them learn or offered an educational benefit. Of these, learning and fun received the highest ratings. Student motivation specifically for participating in the spelling bee was separated into the following factors: they enjoy spelling, they are interested in learning new words and expanding their vocabulary, or they receive encouragement from parents, teachers, friends, and family. Among these, the highest rated were the desire to learn new words and expand vocabulary (33%) and an enjoyment of spelling bees (25%). The majority of participants had also watched the televised spelling bee.

Watching a high-pressure, televised competition adds to the excitement for many beginning spellers, encouraging them to try their hand at this interesting activity with the opportunity for cash prizes along a fun and educational journey. Popularizing an educational competition is thus beneficial for the promotion of literacy in young learners.

This study shows that spellers largely choose to compete in the spelling bee because they have fun and are interested in learning new words and expanding their vocabulary (Figure 5). While it was observed that spellers considered parental encouragement to be an important factor, it was not the primary motivational factor. This shows that young students like those participating in spelling bees are eager to learn and embrace the challenge of an educational competition. These factors were also important in deciding if they would participate in other extracurricular activities. Survey results show that spellers also enjoyed participating in other competitions apart from spelling bees. For example, a majority of students participated in math competitions and/or sports. Finally, this study showed that the most motivated students gained the most incremental learning.

### General

The graphs show responses from all 51 participants. The structured format of the survey and its response options prevented analysis of detailed free responses from participants. Variation of responses due to participant diversity in terms of income, ethnicity, or race was not measured in this study. Additionally, the survey data was non-randomly sampled, and the responses may have been influenced by extraneous factors (e.g., the presence of a peer or parent). A larger scale study could investigate the generalizability of the results in terms of participants' demographics and abilities. Furthermore, it may be beneficial to also include an objective measure of learning in additional studies so that learning effectiveness can be measured.

Despite the limitations, these findings underscore the importance of motivating students by creating an atmosphere where learning is fun. Coaches might consider taking time to emphasize to spellers and young students in general the value of learning, time management, self-efficacy, self-expectations, and other beneficial strategic techniques. The results from this research are not just limited to the spelling bee. They are equally applicable in other academic competitions as well as in a general classroom setting. If students have fun while doing the work, and if technology is incorporated, then student motivation and performance in the classroom may increase. If students perform better in elementary school and junior high, they are more likely to continue their education. Specific research to

investigate this long-term effect was beyond the scope of this study. Additional research can be conducted to investigate how the characteristics of education and educational activities affect student engagement, learning capacity, and long-term motivation.

### Methods

#### Survey

The study used a paper survey administered to and completed by spellers. The survey consisted of 22 questions of three different question types: multiple choice, ranking, and rating (see Appendix). Surveys were distributed to 51 elementary and junior-high students during a spelling bee workshop at the Friendswood Public Library and during the Houston regional competition of the South Asian Spelling Bee. The responses from spellers from Louisiana and Florida were also included. Surveys were administered in two ways: in-person (96%, anonymous) and email (4%, personal invitation). The participants were mostly from the greater Houston area (94%), along with spellers from Louisiana (4%) and Florida (2%). The spellers surveyed were in grades 2nd through 8th, as spelling bee eligibility lasts through 8th grade. The largest numbers of spellers were in 6th grade (33%), 5th grade (20%), and 4th grade (18%). Respondents had 1–6 years of spelling bee experience. The largest cohort (35%) of respondents were in their first year of spelling bee participation, 25% were in their second year, and 18% were in their third year, with another 14% in their fifth year of spelling. Spellers in their fourth and sixth years (4%) comprised smaller percentages. Among the 51 students surveyed in this study, 27 (53%) were male and 24 (47%) were female. A two-sample t-test indicated that the difference between male and female participants was not statistically significant ( $p = 0.557$ ,  $df = 100$ ), confirming that the survey population was gender-balanced. It was also observed that among the 93 champions of the Scripps National Spelling Bee from 1925–2015 (14), 46 were male (49.5%) and 47 were female (50.5%). A two-sample t-test ( $p = 0.911$ ,  $df = 17$ ) indicated that this difference was not significant. In this study, “the dictionary” refers to the official dictionary of the National Spelling Bee, *Webster’s Third New International Dictionary, Unabridged*. The “online dictionary” refers to the online version of *Merriam-Webster Unabridged* available at <http://unabridged.merriam-webster.com/> (15). None of the participants were compensated for taking part in the study.

#### Statistical Analyses

All statistical analyses were performed using Minitab 17. Charts and graphs were made using Microsoft Excel. Chi-square goodness-of-fit statistics measure how

the observed distribution of data fits with the expected distribution. The degrees of freedom (df) factor into the calculations of the probability of independence ( $p$ -value). A  $p$ -value lower than 0.05 indicates a very low probability that the distribution was due to chance, hence rejecting the null hypothesis.

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Appendix A

Survey Questions

General Questions:

1. Date: \_\_\_\_\_
2. Session location: \_\_\_\_\_
3. Gender:  Male  Female
4. Grade Level: \_\_\_\_\_
5. How many years have you been participating in spelling bees? \_\_\_\_\_

Study Methodologies (Resources and Technology):

6. Which of the following devices do you own and how many?  
 Cell phone  
 Tablet  
 Desktop/laptop  
 Which of these devices have you used for spelling?
7. How often do you visit a public library or bookstore?  
 Once a week or more frequently  
 Every few weeks  
 Once a month  
 A few times a year
8. How often have you visited one of the above locations for spelling materials?  
 Once a week or more frequently  
 Every few weeks  
 Once a month  
 A few times a year
9. How often do you search for electronic (download) spelling materials online?  
 Once a week or more frequently  
 Every few weeks  
 Once a month  
 A few times a year
10. Do you own a paper copy (hard copy) of the dictionary? [Yes/No]  
 How would you rate the importance of having the paper copy?  
(1 being unimportant, 5 being absolutely important)  
1                      2                      3                      4                      5
11. Do you have a subscription to the Merriam-Webster's online dictionary? [Yes/No]  
 How would you rate the importance of having the online dictionary?  
(1 being unimportant, 5 being absolutely important)  
1                      2                      3                      4                      5
12. Preference: online vs physical dictionary [circle one]

Learning Strategies / Styles:

13. Learning Style: I prefer to study  
 All on paper (notes/materials)  
 Mostly paper materials, a little computer usage  
 On both paper and the computer equally  
 Mostly on the computer, with some paper materials  
 All digitally
14. I am most focused at this time of day: [pick one (preferred), or a maximum of two]  
 Early Morning (7 AM – 9 AM)  
 Morning (9 AM – 11 AM)  
 Midday (11 AM – 2 PM)  
 Afternoon (2 PM – 5PM)  
 Late Afternoon (5 PM – 7 PM)



- Night (7 PM – 11 PM)
15. Who helps you study (check any that apply)
- Mom
  - Dad
  - Sibling(s)
  - Teacher
  - Friend
16. What type of learner do you think you are?
- Visual (reading to understand)
  - Tactile / Kinesthetic (touch and feel to understand/bodily movement help to remember)
  - Auditory (hear to understand)
17. Rate the following activities on a scale of 1-5 based on how well you think you would learn from them (1 being not well, 5 being very well)
- Watching a spelling video
  - Reading a study list
  - Writing down words for study
18. Which of the following styles of participation do you feel most interested in doing activity with?
- An self-designed activity where you are the one choosing the direction of what to study
  - A more focused approach where your parents plan out for you what to study
  - An activity in which you are given the material to engage in your own manner (online quiz, video, handout / tutorials)

Motivation:

19. Rank the following aspects from 1 (least important) to 5 (most important) in deciding whether or not you want to participate in an activity.
- How fun it is
  - Prize money
  - Someone you know did it
  - Your parents want you to do it
  - It will help you learn / with your education
20. What was your primary motive for doing the spelling bee?
- You enjoy spelling
  - You're interested in learning new words / expanding your vocabulary
  - Your teachers encouraged you to do the spelling bee
  - Your parents encouraged you to do the spelling bee
  - Your friends and family members encourage you
21. Have you watched the Scripps National Spelling Bee on television? (check all that apply)
- This year, 2015
  - Last year, 2014
  - In previous years
22. Do you participate in any other competitions?
- Math
  - Science
  - Other (educational)
  - Sports