CICSD

# Undergraduates' Knowledge and Interest in the Doctorate of Philosophy Degree for Communication Sciences and Disorders

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In 2002, a joint ad hoc committee between the American Speech-Language-Hearing Association (ASHA) and the Council of Academic Programs in Communication Sciences and Disorders predicted that by 2017, there would be a severe shortage of professionals in communication sciences and disorders (CSD) who hold a doctorate of philosophy degree (PhD) (Ingham, Oller, & Wilcox, 2002). Evidence for the shortage has come primarily from data comparing the age and number of doctoral students who are in training with the age and number of doctoral-level faculty members who are currently employed in CSD academic programs (Ingham et al., 2002).

Results from Oller, Scott, and Goldstein's (2002) demographic survey of 56 CSD programs indicated that the number of CSD doctoral-level faculty who are in their 30s was less than half that of those in

ABSTRACT: **Purpose:** The American Speech-Language-Hearing Association has projected a shortage of professionals in communication sciences and disorders (CSD) who hold a doctorate of philosophy degree (PhD) (Ingham, Oller, & Wilcox, 2002). Efforts have been made to remediate this problem by increasing awareness of the shortage and promoting the PhD to students. The present study examined undergraduate students' knowledge and interest in the PhD in CSD. **Method:** Nine hundred eighty-five undergraduate CSD students from across the nation participated in a web-based survey inquiring about their perceptions, knowledge, and interest in the PhD in CSD. Two types of knowledge were analyzed: demonstrated and perceived. These were compared to each other and the participants' general educational backgrounds, direct experiences, and interests. **Results:** The undergraduate students' demonstrated knowledge about the PhD was quite low. Their demonstrated and perceived knowledge levels were related to factors within their educational backgrounds and experiences. Their level of interest in achieving a PhD was related to their perceived knowledge of the degree but not to their demonstrated knowledge. **Conclusion:** Undergraduate students have limited knowledge and interest in the PhD. It is suggested that individual CSD programs attempt to address the projected shortage of CSD professionals who hold a PhD by actively building student interest in the PhD across the undergraduate curriculum.

KEY WORDS: doctoral shortage, survey

either their 40s or 50s. Similarly, Small et al. (2009) reported that the number of current doctoral students in their 20s is similar to the number of doctoral-level faculty that Oller et al. identified in their 30s. These findings suggest that there will not be enough new doctoral-level faculty to fill the positions that will be available when the faculty members who are currently in their 40s and 50s retire. Compounding this concern are reports that state that up to 90% of CSD programs are currently unable to fill open faculty positions with qualified PhD-holding candidates (Hull & Coufal, 2009).

There are a number of negative consequences that may occur if this projected shortage of CSD professionals with a PhD is not resolved. Bernthal (2001), Ingham et al., (2002) and Oller (2003) described problems for academic programs, clinical training, client services, and the field in general. Without enough doctoral-level faculty, CSD programs may not be accredited by ASHA, which can lead to fewer programs and decreases in the number of CSD graduates. Departments might also downsize the number of students accepted into their graduate programs because they do not have enough faculty to teach and supervise them, which could result in decreases in university funding toward programs and fewer clinicians working in the field. If there are fewer students in CSD programs, research related to audiology and speech-language pathology would likely also decline. Ultimately, clients would not receive the services that they require. Likewise, Oller et al. (2002) warned that if measures to resolve the issue of the projected shortage in faculty are not taken, immense restructuring of the discipline will be required.

A number of proposals to address the projected doctoral shortage have been outlined. One common feature to these proposals is the idea that increasing students' and clinicians' knowledge about the PhD and its professional duties will result in more people who are interested in pursuing the degree. To date, however, there are no published data that directly examine either (a) the experiences that shape individuals' knowledge of the PhD or (b) the relationship between knowledge about the degree and interest in pursuing it. The present investigation examined these issues through a survey of more than 900 undergraduate students in CSD programs. The students were asked about their factual knowledge of the PhD (i.e., demonstrated knowledge), their perceptions of their knowledge about the PhD (i.e., perceived knowledge), background information about their training and experiences, and their interests in someday pursuing a PhD.

The decision to pursue a PhD in CSD can be difficult and complex. It requires potential candidates to explore issues such as their aspirations for getting the degree, their interests in research and teaching at the university level, their motivation for continuing the formal educational process, and financial concerns. In addition, knowledge of a subject plays an important role. For example, it would be incumbent on a student who is considering a doctoral degree to learn information about the degree's requirements, time to completion, program specifications, job opportunities, and expected salaries.

Knowledge is not the only factor that individuals consider when making decisions. Also included are perceptual factors, such as opinions, attitudes, and beliefs. These factors are based not on factual data but on prior experiences and judgments. The personality traits of doctoral-level faculty, the culture of academia, and one's self-confidence are perceptual factors that may influence an individual's decision to pursue doctoral study. Perceptual factors have not been expressed as often or as precisely as the direct experiences in decision making have. Schuele (2004) posed a few personality questions for potential PhD candidates to consider before pursuing a PhD. Many professionals who achieved a PhD were viewed as being motivated, having interest, and being dedicated to completing a PhD. Despite this general description, however, Schuele concluded that there is no one prototypical quality that characterizes students who make the decision to enroll in a doctoral program.

## Proposals to Address the Projected Doctoral Shortage

Ingham et al. (2002) presented six recommendations to address the projected doctoral shortage. These targeted undergraduates, master's students, and practicing speech-language pathologists. The recommendations were to (a) create a structure to continue the momentum in addressing the projected shortage; (b) increase the visibility of the discipline, research opportunities, and promote higher education as a career; (c) target and coordinate data collection and dissemination; (d) develop a centralized mechanism for information exchange; (e) enhance the research training experience; and (f) support a doctoral leadership program. The majority of the suggestions that targeted undergraduates were made within the second and fifth recommendations. The specific actions that were suggested included developing a video about research and academic careers in CSD, incorporating academic career options in materials used to recruit future professionals, showcasing student research and success in academia, and creating a career development program for undergraduates who excel and show interest in academic careers.

Ingham et al. (2002) also suggested the development of curricular models that foster and enhance students' progress from the bachelor's to the PhD. For example, these authors advocated that CSD programs create a more direct path into doctoral education, starting at the undergraduate level. This included a curricular model in which undergraduates who had completed their bachelor's degrees could progress seamlessly into a PhD program (much like those seen in natural science programs). This is different than the traditional model of acquiring a doctorate in CSD, in which students complete their master's degree, work for several years as a clinician, and then return to a doctoral graduate program. Ingham (2003) expressed that the expansion of the bachelor's to doctorate model would be a more natural means of progression to doctoral education. She considered the bachelor's to doctoral model to be especially powerful for undergraduates who are interested in research because it would allow them to sustain their interests.

Although interest in research can be an important tool for motivating undergraduates to earn a PhD, just talking about research may not be enough (Scott & Wilcox, 2002). Direct research experiences can offer students the opportunity to experience the research aspect of an academic career in CSD (Busacco, 2002). Mueller and Lisko (2003) reported survey results from 80 CSD programs about the benefits of undergraduate research and how this could be a step to solving the projected doctoral shortage. They found that 67% of the responding programs offered undergraduate research experience. The CSD programs viewed these opportunities as motivation for undergraduates to pursue a doctorate of philosophy. Mueller and Lisko proposed that having an undergraduate research opportunity motivates students' interest and enthusiasm toward pursuing a career in academia.

A number of advances have been made since these original proposals to address the projected doctoral shortage (McCrea, 2008). The ASHA website, for example, now includes written material and an informative video about academic career options in the field (ASHA, 2006), and ASHA conventions since 1999 have included at least one informative session for students and practitioners who are considering doctoral training. ASHA has also implemented two research/academic mentoring programs for undergraduate and graduate students: the Research in Higher Education Mentoring Program and Student's Preparing for Academic and Research Careers. In terms of curricular change, a number of CSD programs have implemented training models that provide new graduate students with both master's and doctoral training (although it is unknown how many such curricula are currently being offered).

The past proposals and current progress toward addressing the projected doctoral shortage are predicated on the idea that more knowledge and experience will lead to a greater interest in doctoral-level training. Yet there is currently no published information on what undergraduates know about PhDs in CSD. Likewise, little attention has been paid to how students' perceptions of their knowledge may influence their educational choices. Without such information, it is hard to develop proposals that directly target the areas of need. Furthermore, this lack of information makes it difficult to determine if the current actions are reaching students.

The closest data that addressed the knowledge that students have of the CSD doctorate were reported by Witter, Pray, and Woods (2009). Their survey of 90 undergraduate students from the state of Michigan examined students' knowledge about the master's and doctoral degrees in speech-language pathology. More than 80% of the undergraduates surveyed perceived themselves to be knowledgeable of the master's degree. In contrast, less than 10% reported being knowledgeable about the PhD.

The present study focused on students' *demonstrated* and *perceived* knowledge about the PhD in CSD. This was examined by surveying undergraduate freshmen, sophomores, junior, seniors, and postbaccalaureate students in CSD programs across the country. We examined the following research questions:

- What demonstrated and perceived knowledge do undergraduate students have about the PhD in CSD?
- How do students' general educational backgrounds relate to their demonstrated and perceived knowledge of the PhD in CSD?
- How do students' prior experiences with the PhD and its common professional duties relate to their demonstrated and perceived knowledge of the PhD in CSD?
- How does undergraduates' demonstrated and perceived knowledge of the PhD in CSD relate to their level of interest in pursuing such a degree?

## METHOD

### Participants

The survey participants were undergraduate students from across the United States. They included freshmen, sophomores, juniors, seniors, and postbaccalaureate students within a CSD program who were considering a career in speech-language pathology, speech-language-hearing sciences, and/or audiology.

Only individuals who were 18 years of age or older were allowed to participate in the study. No identifying information that could link survey responses to a particular participant (e.g., name or e-mail address) was collected. Thus, participants were able to remain completely anonymous throughout the entirety of the survey.

A total of 985 students fully participated in the survey. The participants consisted of 65 freshman (6.59%), 137 sophomore (13.91%), 313 junior (31.78%), 397 senior (40.30%), and 70 postbaccalaureate (7.11%) CSD students (three students responded with "none of the above"). Most of the participants attended CSD programs that were self-described as clinic and research based ($n$ = 446, 45.4%); other participants were enrolled in programs that were clinic ($n$ = 279, 28.4%) or research ($n$ = 14, 1.42%) based. A majority of the CSD departments offered at least a master's-level degree ($n$ = 803, 81.6%). The participants attended universities in 39 states across the United States. The mean self-reported grade point average (GPA) of the participants was 3.54. They reported entering college with mean ACT and SAT scores of 25 and 1039, respectively. The planned career paths for 980 students included 853 (87%) in speech-language pathology, 60 (6.12%) in audiology, 18 (1.84%) in speech-language-hearing science, and 49 (5%) undecided. Additionally, 97.7% of the participants stated that they would want to work clinically as part of their career duties.

## Materials

An Internet-based survey consisting of 52 survey questions was developed (see Appendix). The survey was divided into five sections: background information, PhD knowledge and methods, encouragement and qualities, research and teaching, and future of CSD. The questions in each section were guided by recent efforts to increase undergraduate students' interest in and potential acquisition of the PhD. The questions included items from the Witter et al. (2009) survey. A variety of question styles were used: open-ended questions, partially open-ended questions, closed-ended multiple-choice questions, yes/no questions, and Likert-scale questions.

## Recruitment and Data Collection

The following methods for recruiting participants were approved by the Human Subjects Review Board at Bowling Green State University. Surveymonkey.com, a web-based survey service, was used to present the survey and collect the participants' responses.

Undergraduate students in CSD were contacted through e-mails that were sent to the department chairs and undergraduate coordinators of 257 CSD programs throughout the United States. The chairs and coordinators were given a brief description of the research study and were asked to forward the description to their undergraduate students. The e-mail included a link to the survey, which directed the students to the survey's introduction page. There, potential participants were provided with information about the intention of the study, confidentiality and anonymity protections, potential impacts, risks and benefits, and contact information.

Once the students read through the information and agreed to participate in the study, they could begin the survey. They were instructed to complete the survey in its entirety but were also directed to discontinue participation if they felt uncomfortable at any time. There were no anticipated risks to participants completing the survey. The only benefit included was a list of website links that directed the students to information about the PhD in CSD.

## Analysis

A total of 1,663 people responded to at least some portion of the survey. These responses were initially filtered using the analysis program on Surveymonkey.com. Respondents who did not at least view the entire survey were removed from the sample population, reducing the response pool to 1,044. These respondents were then manually filtered within an Excel spreadsheet. Respondents and their data were deleted if they answered questions in a manner that did not fit the study's parameters (such as selecting, "I do not attend a CSD program.") and/or viewed all survey pages but did not answer beyond the first few background information questions. As a result, 985 participants were included in the final analysis. It is noted, however, that not all of these participants completed all of the survey questions. The number of individuals who responded to each survey item varied from 685 to 981. After narrowing down the respondents, some of the survey responses were transformed into numerical values within the Excel spreadsheet. Once this was completed, the final data were statistically analyzed using the Statistical Package for Social Sciences (SPSS) program version 11.0.4 (SPSS, 2005).

The data used for statistical analysis included numeric values derived from nominal, ordinal, and intervals scales. As a result, four parametric procedures were conducted. The chi-square procedure was applied to analyses that included two nominal variables. In cases where the results of the chi-square analysis

were statistically significant, the significant contributing factors within the analyses were determined by standard residuals (s.r.) that were ≥ |2| (Hinkle, Wiersma, & Jurs, 1998). An independent-samples *t* test was administered for comparisons that included one ordinal and one nominal variable with two levels. The Pearson product–moment correlation was used for analyses with two ordinal/interval variables. Finally, a one-way analysis of variance (ANOVA) was applied to comparisons that included one ordinal/interval and one nominal variable with more than two levels. In cases where the results of the ANOVA were statistically significant, post hoc *t* tests (with Bonferroni adjustments) were administered to determine the source(s) of the differences.

In three separate instances, raw data from the survey were transformed for statistical analysis. The first such case was to determine the students' demonstrated knowledge scores. To do so, four open-ended survey questions from the section on PhD knowledge and method were examined. These questions required the participants to define the PhD, describe the differences between a medical degree and a PhD, explain why people choose to pursue a PhD, and list the job duties of doctoral-level professionals in CSD. The participants' responses for each question were then compared to five defining features of the PhD and a thematic qualitative analysis. The defining features were identified by the researchers based on definitions of the PhD and its uses. According to Collins and O'Brien (2003, p. 99), a Doctor of Philosophy is

> Any academic degree carrying the title of "doctor"; as in Ph.D. (Doctor of Philosophy, M.D. (Doctor of Medicine), LL.D. (Doctor of Laws – honorary), ect. The highest academic degree in a given discipline or profession, based generally on three or more years of graduate work.... For the Ph.D. degree, the dissertation must reflect some original research usually with theoretical and/or rational implications.

ASHA (2011) stated that,

> A Ph.D. is the terminal degree in many fields, and completion of the Ph.D. prepares individuals for careers as researchers, scholars, and teachers. Persons with a Ph.D. in communication sciences and disorders can pursue academic/research careers in colleges and universities or in other facilities where research is a component of their responsibilities. Thus, when a person chooses to pursue a Ph.D., he or she is typically choosing to pursue a career in teaching, research, and other scholarly activities.

Based primarily on these sources, the five features that were identified as relevant to the composition of a PhD in CSD were highest degree, research, teaching, service, and dissertation.

A thematic analysis of the participants' responses to the four open-ended questions about the PhD was conducted to determine (a) if they had included the five defining features identified and (b) any consistent additional features. Two coders, the first author and a graduate student in CSD, conducted the analysis independently. (A coding reliability of 84.67% agreement was determined from a review of 10% of the data.). The coders found evidence of the five features within the data as well as two consistently occurring additional features. These were that individuals who have a PhD in CSD tend to have a higher level of knowledge and that these individuals may have an expertise or specialization in an area of CSD. As a result, each individual participant's responses to the four open-ended questions were scored based on the occurrence of these seven features. For example, a student who stated that the PhD is the highest degree obtainable would have received one demonstrated knowledge point. The occurrence of each feature was allowed to only count for one point (no matter how many times an individual listed a feature), resulting in demonstrated knowledge scores that ranged from 0 to 7.

The second raw data transformation involved the students' discussions about the PhD. Seven options of who the students had previously spoken to about the PhD were reduced to the following four categories: no one, CSD department member(s), individual(s) outside of CSD, or both CSD department member(s) and individual(s) outside of CSD. A similar process took place in the third data transformation. Here, the direct experience scores came from the participants' responses to questions about their involvement in conducting research, taking a research class, being a peer tutor, and being a teaching assistant. For the statistical analysis, the participants' responses were classified as either no research or teaching experiences, research only experience(s), teaching only experience(s), or teaching and research experiences.

## RESULTS

The results reported here were created from the specific survey items that were connected to this study's research questions. All of the survey items analyzed using inferential statistics were tested at $\alpha = .05$ in order to reduce the possibility of making a Type II error. The Bonferroni correction for the alpha level was applied during post hoc testing in order to decrease the probability of a Type 1 error.

The two primary measures analyzed were the students' demonstrated and perceived knowledge. They are presented first in terms of the students' overall scores in each and then in relation to the experience variables of education background, doctorate exposure,

and interest. Within each of the experience variables and their components, results for the measure of demonstrated knowledge proceeds results for the measure of perceived knowledge.

## Overall Demonstrated and Perceived Knowledge

A total of 770 participants responded to questions regarding their demonstrated and perceived knowledge of the PhD in CSD. The overall mean rating for demonstrated knowledge was 2.25 (*SD* = 1.31) (on a scale from 0 to 7, where 0 signified none of the target features identified and 7 all of the features identified). The distribution of students as they rated themselves on their level of perceived knowledge was no knowledge = 63, almost no knowledge = 248, limited in knowledge = 337, somewhat knowledgeable = 113, and very knowledgeable = 9. The mean demonstrated knowledge score for each level of perceived knowledge was no knowledge = 1.46 (*SD* = 1.37), almost no knowledge = 1.90, (*SD* = 1.23), limited in knowledge = 2.46 (*SD* = 1.22), somewhat knowledgeable = 2.79 (*SD* = 1.29), and very knowledgeable = 2.33 (*SD* = 1.66).

The result of an ANOVA indicated that there were significant differences between the students' levels of perceived knowledge, $F(4, 765) = 18.60$, $p < .001$, $\eta = 0.09$. Post hoc *t* tests (Table 1) revealed that participants who rated themselves as having no knowledge of the PhD had significantly lower demonstrated knowledge scores than those who rated themselves as being limited in knowledge and somewhat knowledgeable ($p < .001$ and $p < .001$, respectively). Significant differences in knowledge scores were also found between students who rated themselves as having almost no knowledge and limited in knowledge ($p < .001$) and those who rated themselves as having almost no knowledge and somewhat knowledgeable ($p < .001$). None of the other post hoc comparisons reached significance.

## Education Background

To address the second research question, we compared the students' demonstrated knowledge and perceived knowledge to the general education background information that was provided by the participants. The general education background information analyzed included current year enrolled, type of degrees offered by their programs, and GPA. Results from one-way ANOVAs comparing each of these variables with sudents' demonstrated knowledge are described in the following paragraphs. Likewise, results from chi-square comparisons of these variables with students' ratings of their perceived knowledge are described in the following paragraphs.

***Year enrolled.***

*Demonstrated knowledge*. The first analysis compared each knowledge level with the participants' current year enrolled. The mean demonstrated knowledge scores for each of the current years enrolled were as follows: freshman = 1.38 (*SD* = 1.07), sophomore = 1.81 (*SD* = 1.25), junior = 2.09 (*SD* = 1.22), senior = 2.51 (*SD* = 1.32), and postbaccalaureate = 2.90 (*SD* = 1.27). The result of a one-way ANOVA, year enrolled (7 levels) by demonstrated knowledge score for 786 participants, was significant, $F(4, 763) = 16.94$, $p < .001$, $\eta = 0.08$. Post hoc *t* testing, as shown in Table 2, revealed that freshmen had significantly lower demonstrated knowledge scores than juniors ($p = .005$), seniors ($p < .001$), and postbaccalaureates ($p < .001$); sophomores had significantly lower demonstrated knowledge scores than seniors ($p < .001$) and postbaccalaureates ($p < .001$); and juniors had significantly lower demonstrated knowledge scores than seniors ($p = .001$) and postbaccalaureates ($p < .001$). Demonstrated knowledge score comparisons between all other current-years-enrolled levels were not significant.

*Perceived knowledge*. A comparison between the participants' current year enrolled and their perceived knowledge of the PhD is provided in Table 3. The result of a chi-square analysis of 978 participants, comparing current year of enrollment and perceived knowledge, was significant, $\chi^2(16, N = 978) = 43.60$, $p < .001$. Standard residuals indicated that freshmen who had no knowledge (s.r. = 3.0), seniors who had no knowledge (s.r. = –2.0), and postbaccalaureates who were very knowledgeable (s.r. = 2.3) were significant contributors to the overall chi-square results.

***Program type, highest degree offered.***

*Demonstrated knowledge*. The university programs that the participants reported being enrolled in varied by the highest degree they offered. Some programs awarded only undergraduate degrees, others also included a master's, and a third group also offered doctoral degrees. The second analysis examined students' knowledge levels associated with the highest degree offered at their program. The following mean scores were found for the demonstrated knowledge of the 685 participants by the different program types: bachelor's only = 2.01 (*SD* = 1.30); bachelor's and master's = 2.27 (*SD* = 1.29); and bachelor's, master's, and doctoral = 2.36 (*SD* = 1.31). The participants' demonstrated knowledge was found to differ significantly depending on the types of degrees their CSD program offered, $F(2, 682) = 3.00$, $p = .05$, $\eta = 0.01$. As shown in Table 4, post hoc *t* tests revealed that the demonstrated knowledge of students in

**Table 1.** Means, standard deviations, and results for post hoc *t* tests of students' perceived knowledge by their demonstrated knowledge.

| *Perceived knowledge* | M | SD | df | t | p |
|---|---|---|---|---|---|
| No knowledge | 1.46 | 1.37 | | | |
| Almost no knowledge | 1.90 | 1.23 | | | |
| Limited in knowledge | 2.46 | 1.22 | | | |
| Somewhat knowledgeable | 2.79 | 1.29 | | | |
| Very knowledgeable | 2.33 | 1.66 | | | |
| No knowledge × almost no knowledge | | | 309 | –2.49 | .124 |
| No knowledge × limited in knowledge | | | 398 | –5.86 | <.001 |
| No knowledge × somewhat knowledgeable | | | 174 | –6.40 | <.001 |
| No knowledge × very knowledgeable | | | 70 | –1.75 | .508 |
| Almost no knowledge × limited in knowledge | | | 583 | –5.43 | <.001 |
| Almost no knowledge × somewhat knowledgeable | | | 359 | –6.23 | <.001 |
| Almost no knowledge × very knowledgeable | | | 255 | –1.02 | 1.000 |
| Limited in knowledge × somewhat knowledgeable | | | 448 | –2.44 | .163 |
| Limited in knowledge × very knowledgeable | | | 344 | 0.30 | 1.000 |
| Somewhat knowledgeable × very knowledgeable | | | 120 | 0.99 | 1.000 |

***Note.*** $\alpha = 0.05$.

**Table 2.** Means, standard deviations, and results for post hoc *t* tests of year enrolled by demonstrated knowledge.

| *Year enrolled* | M | SD | df | t | p |
|---|---|---|---|---|---|
| Freshman | 1.38 | 1.38 | | | |
| Sophomore | 1.81 | 1.25 | | | |
| Junior | 2.09 | 1.22 | | | |
| Senior | 2.51 | 1.32 | | | |
| Postbaccalaureate | 2.90 | 1.27 | | | |
| Freshman × sophomore | | | 147 | –2.04 | .529 |
| Freshman × junior | | | 290 | –3.71 | .005 |
| Freshman × senior | | | 358 | –5.58 | <.001 |
| Freshman × postbaccalaureate | | | 106 | –6.57 | <.001 |
| Sophomore × junior | | | 345 | –1.91 | .635 |
| Sophomore × senior | | | 413 | –4.68 | <.001 |
| Sophomore × postbaccalaureate | | | 161 | –5.34 | <.001 |
| Junior × senior | | | 556 | –3.84 | .001 |
| Junior × postbaccalaureate | | | 304 | –4.62 | <.001 |
| Senior × postbaccalaureate | | | 372 | –2.15 | .259 |

***Note.*** $\alpha = 0.05$.

bachelor's-only programs was significantly lower than that of students in programs that offer bachelor's, master's, and doctoral degrees ($p = .048$). All other comparisons were not significantly different.

*Perceived knowledge*. A chi-square analysis of perceived knowledge ratings by the highest degree offered at the participants' universities (Table 5) found significant differences in the distribution of perceived knowledge, $\chi^2(8, N = 861) = 29.36$, $p < .001$. Just like ratings for demonstrated knowledge, participants' perceived knowledge level differed based on the number of degrees offered within their program. Participants from a program with all three degrees who perceived themselves as either having no knowledge (s.r. = –2.2) or being somewhat knowledgeable (s.r. = 3.2) were found to be significant contributors to the chi-square results.

***GPA.***

*Demonstrated knowledge*. GPA was the final measure that was evaluated for demonstrated and perceived knowledge levels. A Pearson product–moment correlation indicated that students' self-reported GPA ($M = 3.56$, $SD = .36$) was significantly correlated with their demonstrated knowledge, $r(750) = 0.201$, $p < .001$, $r^2 = 0.04$. In other words, participants with higher GPAs were more likely to have

**Table 3.** Frequency count of students' perceived knowledge rankings by year enrolled.

| *Year enrolled* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| Freshman | 15* | 25 | 21 | 4 | 0 |
| Sophomore | 18 | 51 | 52 | 14 | 2 |
| Junior | 39 | 114 | 112 | 35 | 2 |
| Senior | 29* | 111 | 182 | 66 | 6 |
| Postbaccalaureate | 4 | 17 | 31 | 17* | 1 |

*Significant contributors to the overall $\chi^2$ analysis, based on standardized residuals > |2|.

**Table 4.** Means, standard deviations, and results for post hoc *t* tests of program degrees by demonstrated knowledge.

| *Types of program degrees* | M | SD | df | t | p |
|---|---|---|---|---|---|
| Bachelor | 2.01 | 1.30 | | | |
| Bachelor & master | 2.27 | 1.29 | | | |
| Bachelor, master, & doctoral | 2.36 | 1.31 | | | |
| Bachelor × bachelor & master | | | 458 | –1.94 | .163 |
| Bachelor × bachelor, master, & doctoral | | | 358 | –2.40 | .048 |
| Bachelor & master × bachelor, master, & doctoral | | | 548 | –0.76 | 1.000 |

***Note.*** Alpha = 0.05.

**Table 5.** Frequency count of students' perceived knowledge rankings by program degrees.

| *Type of program degree* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| Bachelor only | 23 | 51 | 79 | 14 | 2 |
| Bachelor & master | 52 | 154 | 161 | 48 | 6 |
| Bachelor, master, & doctoral | 17* | 79 | 116 | 57* | 2 |

*Significant contributors to the overall $\chi^2$ analysis, based on standardized residuals ≥ |2|.

higher demonstrated knowledge of the doctoral degree than those with lower GPAs. The degree of association between GPA and demonstrated knowledge, however, was 4%, which is generally considered to be a weak relationship (Creswell, 2012).

*Perceived knowledge*. The mean GPA for each perceived knowledge level was as follows: no knowledge = 3.48 (*SD* = 0.40), almost no knowledge = 3.56 (*SD* = 0.37), limited in knowledge = 3.55 (*SD* = 0.35), somewhat knowledgeable = 3.56 (*SD* = 0.38), and very knowledgeable = 3.36 (*SD* = 0.41). For the 943 participants, a one-way ANOVA revealed that GPA did not differ significantly across the students' levels of perceived knowledge, $F(4, 938) = 1.67$, $p = .155$.

## Exposure to the PhD

Students' demonstrated and perceived knowledge were compared to their experiences related to the PhD and its associated professional duties. These experiences included if the participant had ever actively searched for information about the PhD, the adults with whom they discussed the PhD, and direct experiences that participants had with teaching and/or research.

***Actively sought information.***

*Demonstrated knowledge*. The first experience factor analyzed was whether the participant actively sought out information about the PhD The mean demonstrated knowledge score of the 120 participants who reported having searched for doctoral information was 2.61 (*SD* = 1.42). The mean demonstrated knowledge score of the 650 participants who stated that they had not searched for information was 2.18 (*SD* = 1.28). According to the results of an independent-samples *t* test, the demonstrated knowledge of participants who had actively searched for information was significantly higher than the demonstrated knowledge of participants who had not actively

searched for information, $t(768) = -3.34$, $p = .001$, $\eta = 0.01$.

*Perceived knowledge*. A chi-square test (Table 6) indicated that students' perceived knowledge differed significantly based on their levels of having actively searched for information on the PhD, $\chi^2(4, N = 979) = 140.26$, $p < .001$. Among those who reported having searched for information, significant contributions to the chi-square result came from students who reported self-perceptions of having no knowledge (s.r. = –2.5), almost no knowledge (s.r. = –5.2), being somewhat knowledgeable (s.r. = 8.6), and very knowledgeable (s.r. = 3.6). For students who had not searched for information, perceptions of having almost no knowledge (s.r. = 2.1) or being somewhat knowledgeable (s.r. = –3.5) influenced the overall pattern of difference from those who had searched for information.

***Individuals discussing the doctorate.***

*Demonstrated knowledge*. The next experience feature examined in relation to the two knowledge levels was the training of individuals who discussed the PhD with the participant (e.g., CSD personnel or non-CSD personnel). The distribution of individuals who discussed the PhD with participants was as follows: 383 no one, 189 CSD personnel, 65 non-CSD personnel, and 133 CSD and non-CSD personnel. The participant mean demonstrated knowledge ratings were no one = 2.01 (*SD* = 1.29), CSD personnel = 2.49 (*SD* = 1.19), non-CSD personnel = 2.14 (*SD* = 1.37), and CSD and non-CSD personnel = 2.63 (*SD* = 1.35). The results of a one-way ANOVA indicated that the demonstrated knowledge significantly differed based on the training of the individuals who discussed the degree with the participants, $F(3, 766) = 10.86$, $p < .001$, $\eta = 0.04$. Post hoc *t* tests (Table 7) indicated that participants who had no conversations about the PhD scored significantly lower than participants who had spoken to either CSD department personnel ($p < .001$) or CSD department personal plus non-CSD individuals ($p = .010$). No additional significant differences were found between any other levels.

*Perceived knowledge*. As shown in Table 8, the training of individuals who discussed the PhD with participants had a significant impact on the participants' selected level of perceived knowledge, $\chi^2(12, N = 980) = 172.34$, $p < .001$. Thirteen of the 20 factors in this analysis were significant contributors to this result. These included students who had rated themselves with either no or almost no knowledge (regardless of who they had conversed with); students who were limited in knowledge and spoke with no one, CSD personnel, or non-CSD personnel (but not both); and students who were somewhat knowledgeable and had spoken to no one or both CSD and non-CSD personnel (s.r. from |2.0| to |5.2|).

***Direct experiences.***

*Demonstrated knowledge*. The last experience component examined across both levels of knowledge was the level of direct experience with either teaching or research. There were 421 participants with no direct experience, 139 participants with research experience only, 116 participants with teaching experience only, and 94 participants who reported both research and teaching experience. The mean demonstrated knowledge score for each type of experience was no direct experience = 2.09 (*SD* = 1.32), research experience only = 2.56 (*SD* = 1.34), teaching experience only = 2.20 (*SD* = 1.23), and research and teaching experience = 2.53 (*SD* = 1.22). Results from a one-way ANOVA of 770 participant responses showed that demonstrated knowledge of the PhD significantly differed by participants' direct experiences in research and/or teaching, $F(3, 766) = 6.40$, $p < .001$, $\eta = 0.02$. Post hoc *t* tests, as shown in Table 9, revealed that participants who had no direct experience had lower demonstrated knowledge scores than those who had only research experience ($p = .001$) as well as those who had research and teaching experience ($p = .017$). No other significant differences were revealed.

*Perceived knowledge*. A chi-square test indicated that direct experiences also significantly affected students' perceived knowledge, $\chi^2(12, N = 979) = 61.67$, $p < .001$. As shown in Table 10, participants who had no direct experience and perceived having no knowledge (s.r. = 2.4) or being somewhat knowledgeable (s.r. = –2.0) of the PhD were significant contributors. Participants who had research experience only and

**Table 6.** Frequency count of students' perceived knowledge rankings by those who actively searched for information.

| *Actively searched for information* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| No | 100 | 307* | 350 | 80* | 5 |
| Yes | 5* | 10* | 59 | 57* | 6* |

*Significant contributors to the overall $\chi^2$ analysis, based on standardized residuals $\geq |2|$.

**Table 7.** Means, standard deviations, and results for post hoc *t* tests of individuals discussing the PhD by demonstrated knowledge.

| *Individuals discussing the doctorate* | M | SD | df | t | p |
|---|---|---|---|---|---|
| No one conversed | 2.01 | 1.29 | | | |
| CSD personnel conversed with me | 2.49 | 1.19 | | | |
| Non-CSD personnel conversed with me | 2.14 | 1.37 | | | |
| Both Individuals conversed with me | 2.63 | 1.35 | | | |
| No one conversed × CSD personnel conversed with me | | | 570 | –4.33 | <.001 |
| No one conversed × non-CSD personnel conversed with me | | | 446 | –0.75 | 1.000 |
| No one conversed × both Individuals conversed with me | | | 514 | –4.75 | <.001 |
| CSD personnel conversed with me × non-CSD personnel conversed with me | | | 252 | 1.98 | .335 |
| CSD personnel conversed with me × both individuals conversed with me | | | 320 | –0.98 | 1.000 |
| Non-CSD personnel conversed with me × both individuals conversed with me | | | 196 | –2.41 | .068 |

***Note.*** $\alpha = 0.05$.

**Table 8.** Frequency count of students' perceived knowledge rankings by individuals discussing the PhD.

| *Individuals discussing the PhD* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| No one conversed | 94* | 217 | 161* | 40 | 2 |
| CSD personnel | 8 | 52 | 121* | 41 | 3 |
| Non-CSD personnel | 2* | 16 | 52* | 9 | 2 |
| Both individuals | 2* | 32* | 75 | 47* | 4 |

*Significant contributors to the overall $\chi 2$ analysis, based on standardized residuals > |2|.

almost no knowledge (s.r. = –2.5) or being somewhat knowledgeable (s.r. = 2.9); as well as students who had both research and teaching experience and perceived having no knowledge (s.r. = –2.5), almost no knowledge (s.r. = –2.0), and being very knowledgeable (s.r. = 2.5) were also found to be significant contributors.

## Interest

***Demonstrated knowledge.*** The final variable analyzed was the participants' level of interest in the PhD. The distribution of participants per their level of interest in the PhD included strongly uninterested = 107, uninterested = 199, neither interested nor uninterested = 270, interested = 137, and strongly interested = 58. The mean demonstrated knowledge score by level of interest is as follows: strongly disinterested = 2.13 (*SD* = 1.10), disinterested = 2.27 (*SD* = 1.27), neither interested nor disinterested = 2.16 (*SD* = 1.31), interested = 2.37 (*SD* = 1.46), and strongly interested = 2.47 (*SD* = 1.44). The level of interest in a PhD in relation to students' demonstrated knowledge was measured using a one-way ANOVA. No significant difference was found between level of interest and demonstrated knowledge, $F(4, 766) = 1.266$, $p = .282$, for 771 participants.

***Perceived knowledge.*** Level of interest was compared to perceived knowledge level for 981 participants. Unlike the level of interest and demonstrated knowledge analysis results, perceived knowledge was found to differ significantly based on students' level of interest in a PhD, $\chi^2(16, N = 981) = 94.05$, $p < .001$ (Table 11). Standard residuals analysis indicated that significant contributors to this distribution were as follows: (a) Participants who were strongly uninterested in the PhD perceived themselves as being limited in knowledge (s.r. = –2.1), (b) participants who were neither interested nor uninterested in the PhD perceived themselves as having no knowledge (s.r. = 2.6), (c) participants who were interested in the PhD perceived themselves as having no knowledge (s.r. = -2.2), and (d) participants who were strongly interested in the PhD perceived themselves as having almost no knowledge (s.r. = –2.6), being somewhat knowledgeable (s.r. = 5.0), and being very knowledgeable (s.r. = 4.7).

# DISCUSSION

The purpose of this research was to determine undergraduates' knowledge of and interest in the PhD in

**Table 9.** Means, standard deviations, and results for post hoc *t* tests of direct experience by demonstrated knowledge.

| *Direct experience* | M | SD | df | t | p |
|---|---|---|---|---|---|
| No direct experience | 2.09 | 1.32 | | | |
| Research only | 2.56 | 1.34 | | | |
| Teaching only | 2.20 | 1.23 | | | |
| Research and teaching | 2.53 | 1.22 | | | |
| No direct experience × research only | | | 558 | –3.66 | .001 |
| No direct experience × teaching only | | | 535 | –0.81 | 1.000 |
| No direct experience × research and teaching | | | 513 | –2.99 | .001 |
| Research only × teaching only | | | 253 | 2.24 | .158 |
| Research only × research and teaching | | | 231 | –0.17 | 1.000 |
| Teaching × research and teaching | | | 208 | –1.96 | .385 |

***Note.*** $\alpha = 0.05$.

**Table 10.** Frequency count of students' perceived knowledge rankings by direct experience.

| *Direct experience* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| No direct experience | 79* | 201 | 212 | 60* | 3 |
| Research only | 10 | 35* | 82 | 37* | 2 |
| Teaching only | 14 | 57 | 59 | 18 | 2 |
| Research and teaching | 3* | 23* | 56 | 22 | 4* |

*Significant contributors to the overall $\chi 2$ analysis, based on standardized residuals > |2|.

**Table 11.** Frequency count of students' perceived knowledge by their level of interest.

| *Level of interest* | *No knowledge* | *Almost no knowledge* | *Limited in knowledge* | *Somewhat knowledgeable* | *Very knowledgeable* |
|---|---|---|---|---|---|
| Strongly uninterested | 18 | 51 | 40* | 20 | 0 |
| Uninterested | 18 | 74 | 117 | 26 | 2 |
| Neither interested nor uninterested | 56* | 128 | 140 | 39 | 3 |
| Interested | 9* | 50 | 87 | 26 | 1 |
| Strongly interested | 5 | 11* | 25 | 26* | 5* |

*Significant contributors to the overall $\chi 2$ analysis, based on standardized residuals > |2|.

CSD. It was encouraging to see the large amount of responses (>950) to the survey. This suggests that the topic of undergraduates' knowledge of and interest in the PhD in CSD is of interest to departmental chairs, undergraduate coordinators, and undergraduate students. The responses the students provided revealed interesting results on the main research topics of their depth of knowledge of the PhD in CSD, the influences of background information and educational experiences on this knowledge, and their level of interest in the degree. These findings also have potential implications for ongoing attempts to decrease the potential doctoral shortage through improved undergraduate training.

## Knowledge of the PhD

Two types of knowledge of the PhD were analyzed and compared: demonstrated and perceived. The overall mean demonstrated knowledge score was 2.25. This was quite low, given that the scale ranged from 0 to 7. Across all of the variables for which demonstrated knowledge was analyzed, none of the groupings achieved a score of 3 or higher (the two highest mean scores were for participants who rated their perceived knowledge as somewhat knowledgeable and postbaccalaureate students, $M = 2.79$ and 2.90, respectively). These results may have been unduly influenced by the method that was used (i.e., scoring of open-ended questions). It is likely that the

participants' scores would have been higher if closed questions such as forced- or multiple-choice items had been used. These results, however, appear to reflect students' true knowledge about the PhD in CSD, as evidenced by similar low levels of knowledge within their responses to the perceived knowledge question. Here, 85% of the participants described their knowledge of the PhD as limited or lower.

Students' demonstrated and perceived knowledge about the PhD varied according to their educational histories and their experiences with the degree. In general, students with greater knowledge of the degree were further along in their education, attended programs that offered degrees at all levels, had higher GPAs, actively searched for information about the PhD, spoke with CSD faculty, and/or had research experience. Although these results appear to be fairly predictable, some specific findings were unexpected. For example, there was a lack of significant difference found between the demonstrated knowledge of the undergraduate seniors and that of the postbaccalaureates. One might have hypothesized that seniors would have had more knowledge about the PhD in CSD because they had spent multiple years in the major, as opposed to postbaccalaureates who had taken fewer classes within the discipline. This raises a question about the relevance of being in a CSD program toward knowledge of the PhD. This lack of difference was likely a result of the seven criteria that were selected for the knowledge score: highest degree, research, teaching, service, dissertation, knowledge, and expertise/specialization. Because none of these are specific to the PhD in CSD, postbaccalaureate students may have used their knowledge of PhDs in general or from other fields.

The relationship between GPA and the two knowledge scores was also surprising. Although GPA did have a significant positive correlation with demonstrated knowledge, the association was low. The $R^2$ value for this correlation was 0.04, indicating that GPA explained only 4% of the variation in demonstrated knowledge. In terms of perceived knowledge, GPA was also shown not to have a strong relationship. Students with higher GPAs were no more prone to rank themselves at a certain level of knowledge than students with lower GPAs. Taken together, it appears that GPA did not have a meaningful influence on these students' knowledge of the PhD in CSD.

The influence of students' prior experiences with activities related to academic careers (research and teaching) provided a third unexpected result. The connection between direct research experience and knowledge was expected, but the lack of influence of prior teaching experiences was not. The knowledge scores of students who had teaching but not research experiences were no better than the scores of students with neither teaching nor research experiences and were significantly lower than those of students who had participated in research. This suggests that undergraduate students do not understand connections between teaching and the PhD. Although it is true that not all CSD professionals with PhDs teach, and not all instructors have the degree, teaching is a part of most doctoral training programs and academic positions for professionals with the PhD.

## Interest in the PhD

Approximately 38% of the participants expressed some interest in pursuing a PhD in CSD, another 37% were ambivalent, and close to 25% were not interested in the degree. A significant relationship between interest in the degree and demonstrated knowledge was not found. In other words, an individual's knowledge about the PhD did not have a major impact on his or her interest in the degree. It is true that knowledge does not necessarily lead to interest. For example, an undergraduate may have accumulated enough knowledge about the PhD to make an informed decision that it is not right for him or her. This, however, does not appear to be the case for the undergraduates in this study, because their low levels of perceived knowledge suggest that they do not know enough about the PhD to make an informed decision. Students who perceived themselves to be less knowledgeable tended to report ambivalent interest in the PhD, whereas those with higher levels of perceived knowledge expressed positive interest. This implies that the belief of knowing a great deal about the PhD relates to more interest in obtaining the degree in the future.

## Implications for the Projected Doctoral Shortage

The results of this survey cannot be used to directly measure the success of past or current attempts to reduce the impact of the projected doctoral shortage. Instead, this was the first attempt to examine students' knowledge and interest in the PhD. Interestingly, the two major findings of this study do not bode well for current attempts to reduce the projected doctoral shortage. First, students displayed very little knowledge of the PhD in CSD. Although it is possible that these students know more about the PhD in CSD than students in the past, their knowledge is limited. This is concerning because it suggests that students do not have enough information about the PhD and its associated professional duties to make informed decisions regarding their potential as doctoral candidates. Second, students' knowledge about

the PhD had little meaningful relationship with their interest in pursuing it. This is troublesome because many of the attempts that have been made to address the potential shortage of doctoral students have been directed at increasing interest in the degree by improving students' knowledge of it. Taken together, these results support a prediction that students will not turn to PhDs in CSD in any greater numbers than they have in the past, at least in the short term.

The majority of attempts to address the projected doctoral shortage have come through the discipline's governing bodies and at a national level. These efforts appear to be positive and should be continued. The results of this survey, however, suggest that these efforts may not be providing significant education to undergraduates about the PhD. Students may benefit from shifting the focus of these attempts more toward the individual program level. For example, programs could help address the shortage by emphasizing student interest in the PhD over simply knowledge of the degree through activities such as highlighting the influences of research on clinical practice and including the PhD in all conversations about professional applications.

The results of this survey show that knowledge does not equate to interest. This, of course, does not mean that there is not a place for increased knowledge. Rather, factual knowledge about the degree should not be the sole emphasis. CSD programs should work instead to inspire students about doctoral education. Such programmatic changes are supported by the literature on recruiting graduate students within other health-related fields. Melillo, Dowling, Abdallah, Findeisen, and Knight (2013) and Evans (2013), for example, reported success with interactive workshops and open house events at high schools and universities to get minority students interested in and spread awareness of nursing careers. Likewise, Haskins and Kirk-Sanchez (2006) found that physical therapy graduate programs that even visit elementary schools or participate in health fairs were successful in recruiting minority students.

CSD programs may also consider infusing information about the PhD across the undergraduate experience. Many CSD students receive their initial exposure to the PhD during an introductory course to the field, often within one section of a lecture or by reading about different jobs within the field. After this, students may not hear much about the PhD until the end of their undergraduate training. Contrast this with the number of times across their coursework that students are exposed to the roles of clinicians and it is no surprise that students have very limited knowledge about the PhD. Clinical and doctoral aspects of the field do not have to be equally balanced, but programs could be more conscious and proactive with exposing students to doctoral careers across the undergraduate experience. The goal here is for the PhD to be embedded in the culture of student education so that students see it as a viable option for their careers from the start of their education.

Programs and faculty may also choose to share individual stories about their own academic pursuits and why they remain in academic positions. Evans (2013) examined factors that influence the recruitment and retention of nursing educators and found that approximately 70% of respondents were attracted to becoming nurse educators because nurse faculty were role models. Exposing students to the multiple aspects of working with a PhD, including the joys of questioning and discovering and the achievements of student learning, should go a long way toward piquing their interest.

### Conclusion

This survey was created in response to the shortage of professionals who are acquiring a PhD in the field of CSD. The undergraduates who participated in this study demonstrated limited knowledge about the PhD. Their general education backgrounds and prior experiences related to the degree influenced their knowledge of the PhD. Interest in pursuing the PhD, however, did not appear to relate to the students' demonstrated knowledge of the degree. Bringing awareness of doctoral opportunities to undergraduate students is important for continuing efforts to decrease the impact of the predicted doctoral shortage in the field. Because CSD programs have the closest contact with these students, these programs should focus their efforts on increasing student interest in the PhD and infusing information about it across the curriculum. It is hoped that such promotion will encourage undergraduate students to see doctoral opportunities as viable career options.

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## APPENDIX (p. 1 of 9). SURVEY

### Section I: Background Information

1. I am 18 years old or older. ($N$ = 983)
   (Y/N) (If Y = continue to #2, No = skip to pg. Thank You)

   (Yes) (100%) (No) (0 %)

2. I attend a university in the state of… ($N$ = 973)
   (This will be a drop down list of all states, Select one)

| | | | | | |
|---|---|---|---|---|---|
| Alabama | (1.44%) | Alaska | (0%) | Arizona | (0%) |
| Arkansas | (1.54%) | California | (1.44%) | Colorado | (2.06%) |
| Connecticut | (0.05%) | D.C. | (0%) | Delaware | (0%) |
| Florida | (4.73%) | Georgia | (1.03%) | Hawaii | (0%) |
| Idaho | (0.31%) | Illinois | (7.1%) | Indiana | (1.54%) |
| Iowa | (0%) | Kansas | (0.21%) | Kentucky | (1.44%) |
| Louisiana | (0.92%) | Maine | (0.21%) | Maryland | (3.8%) |
| Massachusetts | (0%) | Michigan | (7.4%) | Minnesota | (0.72%) |
| Mississippi | (1.03%) | Missouri | (1.95%) | Montana | (2.06%) |
| Nebraska | (0.31%) | Nevada | (0.41%) | New Hampshire | (0%) |
| New Jersey | (2.57%) | New Mexico | (0.41%) | New York | (5.45%) |
| North Carolina | (2.36%) | North Dakota | (0.51%) | Ohio | (12.33%) |
| Oklahoma | (3.19%) | Oregon | (1.03%) | Pennsylvania | (7.91%) |
| Rhode Island | (0%) | South Carolina | (0.72%) | South Dakota | (1.44%) |
| Tennessee | (0.82%) | Texas | (4.52%) | Utah | (7.4%) |
| Vermont | (0%) | Virginia | (0.72%) | Washington | (0.21%) |
| West Virginia | (0%) | Wisconsin | (6.27%) | Wyoming | (0%) |

3. I attend a Communication Sciences and Disorders (CSD) Program that is…
   (Select one) ($N$ = 983)

   ☐ Clinically Based (28.38%)
   ☐ Research Based (1.42%)
   ☐ Clinic and Research Based (45.37%)
   ☐ Don't Know (24.82%)
   ☐ I do not attend a CSD program (0%)
   (If selected skip to pg. Thank You)

4. I attend a Communication Sciences and Disorders Program that offers…
   (Select all that apply) ($N$ = 865)

   ☐ Bachelor's Degree ($N$ = 865, 87.7%)
   ☐ Master's Degree ($N$ = 803, 81.6%)
   ☐ Doctoral Degree (Research – e.g., PhD) ($N$ = 235, 23.9%)
   ☐ Doctoral Degree (Clinical - e.g., AuD) ($N$ = 229, 23.2%)

5. I am currently enrolled as a…
   (Select one) ($N$ = 982)

   ☐ Freshman ($N$ = 65, 6.6%)
   ☐ Sophomore ($N$ = 137, 14%)
   ☐ Junior ($N$ = 313, 31.9%)
   ☐ Senior ($N$ = 397, 40.4%)
   ☐ Post-baccalaureate (Bachelor's degree in another field) ($N$ = 70, 7.1%)
   ☐ None of the Above (If selected, skip to pg. Thank You) ($N$ = 0, 0%)

6. I scored the following on my university entrance examination(s)…
(Select and List) ($N$ = 956)

☐ ACT (Written Responses = 515) ($N$ = 535, 55.96%)

| Score: | | | |
|---|---|---|---|
| | 15: $N$ = 2, 0.39% | 23: $N$ = 41, 7.96% | 30: $N$ = 28, 5.44% |
| | 17: $N$ = 2, 0.39% | 24: $N$ = 62, 12.04% | 31: $N$ = 24, 4.66% |
| | 18: $N$ = 8, 1.55% | 25: $N$ = 45, 8.74% | 32: $N$ = 11, 2.14% |
| | 19: $N$ = 18, 3.5% | 26: $N$ = 49, 9.51% | 33: $N$ = 6, 1.17% |
| | 20: $N$ = 11, 2.14% | 27: $N$ = 43, 8.35% | 34: $N$ = 4, 0.78% |
| | 21: $N$ = 48, 9.32% | 28: $N$ = 41, 7.96% | 35: $N$ = 1, 0.19% |
| | 22: $N$ = 28, 5.44% | 29: $N$ = 42, 8.16% | 36: $N$ = 1, 0.19% |

☐ SAT (Written Responses = 112) ($N$ = 217, 22.7%)

| Score: | | |
|---|---|---|
| | (700–799: $N$ = 1, 0.89%) | (800–990: $N$ = 8, 7.14%) |
| | (991–1199: $N$ = 39, 34.82%) | (1200–1399: $N$ = 32, 28.57%) |
| | (1400–1499: $N$ = 8, 7.14%) | (1500–1599: $N$ = 4, 3.57%) |
| | (1600–1699: $N$ = 11, 9.82%) | (1700–1769: $N$ = 5, 4.46%) |
| | (1770–1799: $N$ = 0, 0%) | (1800–1899: $N$ = 14, 12.5%) |
| | (1900–2099: $N$ = 9, 8.04%) | (2100–2139: $N$ = 3, 2.67%) |
| | (2140–2199: $N$ = 0, 0%) | (2200–2289: $N$ = 1, 0.89%) |
| | (2290–2399: $N$ = 1, 0.89%) | (2400: $N$ = 0, 0%) |

☐ I do not remember ($N$ = 313, 32.74%)

7. My current overall GPA is… (Fill in the blank) ($N$ = 946)

Minimum: 1.95 Maximum: 4.0 Mean: 3.54

8. My family members have achieved the following levels of education
(Select one) ($N$ = 982)

| | High School Degree | Bachelors Degree | Masters Degree | Doctoral Degree | N/A | ($N$ =) |
|---|---|---|---|---|---|---|
| Father- | (37.76%) | (35.82%) | (16.12%) | (6.12%) | (4.18%) | (980) |
| Mother- | (38.61%) | (38%) | (18.6%) | (1.74%) | (3.86%) | (979) |
| Sibling- | (29.27%) | (28.25%) | (13.22%) | (4.86%) | (23.5%) | (885) |
| Guardian- | (3.52%) | (2.46%) | (0.7%) | (0.53%) | (92.78%) | (568) |

9. I am interested in becoming a: (Select one) ($N$ = 980)

☐ Speech-language pathologist (87.04%)
☐ Audiologist (6.12%)
☐ Speech/Language/Hearing Scientist (1.84%)
☐ Undecided (5%)

10. I plan on acquiring the following degrees. (Select all that apply) ($N$ = 984)

☐ Bachelors Degree ($N$ = 586, 59.0%)
☐ Masters Degree ($N$ = 881, 88.6%)
☐ Research Doctoral Degree ($N$ = 120, 12.1%)
☐ Clinical Doctorate Degree ($N$ = 192, 19.3%)

11. I am interested in becoming a: (Select all that apply) ($N$ = 975)

☐ Clinician (N = 943, 96.72%)
☐ Instructor (N = 279, 28.62%)
☐ Researcher (N = 162, 16.62%)
☐ Administrator (N = 123, 12.62%)

## Section II – Ph.D. Knowledge and Methods

12. I define a doctorate of philosophy degree (Ph.D.) as…
(Fill in the Blank) ($N$ = 985)

| | |
|---|---|
| Highest Degree | ($N$ = 132, 13.40%) |
| Research | ($N$ = 246, 24.97%) |
| Teaching | ($N$ = 79, 8.02%) |
| Service | ($N$ = 5, 12.62%) |
| Dissertation | ($N$ = 44, 4.47%) |

13. Difference(s) between a Ph.D. and a medical degree (M.D.) are….
(Fill in the Blank) ($N$ = 985)

| | |
|---|---|
| Highest Degree | (N = 5, 0.51%) |
| Research | (N = 216, 21.93%) |
| Teaching | (N = 38, 3.86%) |
| Service | (N = 8, 0.81%) |
| Dissertation | (N = 15, 1.52%) |

14. Individuals choose to pursue a Ph.D. because….
(Fill in the Blank) ($N$ = 985)

| | |
|---|---|
| Highest Degree | ($N$ = 16, 1.62%) |
| Research | ($N$ = 275, 27.92%) |
| Teaching | ($N$ = 174, 17.66%) |
| Service | ($N$ = 10, 1.02%) |
| Dissertation | ($N$ = 2, 0.20%) |

15. The job duties of Ph.D.–level professionals working in CSD include...
(Fill in the Blank) ($N$ = 985)

| | |
|---|---|
| Highest Degree | ($N$ = 1, 0.10%) |
| Research | ($N$ = 423, 42.94%) |
| Teaching | ($N$ = 294, 29.84%) |
| Service | ($N$ = 123, 12.49%) |
| Dissertation | ($N$ = 13, 1.32%) |

16. On average, it takes this many years from starting a Ph.D. program to acquiring a Ph.D. degree.
(Select from drop down list) ($N$ = 856)

- ☐ 1 (0.5%)
- ☐ 2 (19.8%)
- ☐ 3 (21.6%)
- ☐ 4 (35.7%)
- ☐ 5 (8.7%)
- ☐ 6 (6.2%)
- ☐ 7 (2.5%)
- ☐ 8 (5.0%)

17. Questions that I have about the Ph.D. degree in CSD include…
(Fill in the Blank) (*N* = 317)

| | |
|---|---|
| Benefits | (*N* = 151, 37.1%) |
| Requirements | (*N* = 149, 33.6%) |
| Job Duties | (*N* = 85, 20.9%) |
| Specialization | (*N* = 10, 2.5%) |
| Pre-doctoral Opportunities | (*N* = 4, 1%) |
| Funding Available | (*N* = 8, 2%) |

18. My current level of knowledge about the Ph.D. in the field of CSD can best be described as… (Select one) (*N* = 981)

| | |
|---|---|
| ☐ Very Knowledgeable | (1.1%) |
| ☐ Somewhat Knowledgeable | (14.0%) |
| ☐ Limited in Knowledge | (41.7%) |
| ☐ Almost No Knowledge | (32.4%) |
| ☐ No Knowledge | (10.8%) |

19. I have actively searched for information about earning a Ph.D. (*N* = 981)
(Y/N) (Y = continue to # 20, N = skip to #23)

(Yes) (14.0%) (No) (86.0%)

20. I was able to find information regarding: (Select all that apply) (*N* = 112)

| | |
|---|---|
| ☐ What a Ph.D. is | (*N* = 112, 27.4%) |
| ☐ How to get a Ph.D. | (*N* = 107, 26.2%) |
| ☐ Funding available for Ph.D. students | (*N* = 42, 10.3%) |
| ☐ How long it takes to get a Ph.D. | (*N* = 88, 21.5%) |
| ☐ Why SLPs and Audiologists should or should not get a Ph.D. | (*N* = 60, 14.7%) |

21. I used these methods to obtain information about the Ph.D. in CSD.
(Select all that apply) (*N* = 93)

| | |
|---|---|
| ☐ General Academic Advisor | (*N* = 14, 3.0%) |
| ☐ CSD Advisor | (*N* = 43, 9.3%) |
| ☐ CSD Faculty (i.e. Professors other than advisor) | (*N* = 57, 12.3%) |
| ☐ CSD Staff (i.e. Clinical Supervisors) | (*N* = 21, 4.5%) |
| ☐ Parents | (*N* = 21, 4.5%) |
| ☐ ASHA Website | (*N* = 80, 17.2%) |
| ☐ Video about Ph.D. on ASHA Website | (*N* = 7, 1.5%) |
| ☐ University Websites | (*N* = 92, 19.2%) |
| ☐ Career Services/Student Affairs offices | (*N* = 10, 2.2%) |
| ☐ Word of Mouth | (*N* = 56, 12.1%) |
| ☐ U.S. News and World Report | (*N* = 10, 2.2%) |
| ☐ Presentations/Published Articles | (*N* = 10, 2.2%) |
| ☐ Other internet resources | (*N* = 41, 8.8%) |
| o Please list websites | |
| ☐ Other print resources | (*N* = 2, 0.43%) |
| o Please list magazines, pamphlets, etc. | |

22. In obtaining information about the Ph.D. in CSD, I found this (these) method(s) to be the MOST helpful. (Select all that apply) (*N* = 60)

| | | |
|---|---|---|
| ☐ | General Academic Advisor | (*N* = 8, 2.9%) |
| ☐ | CSD Advisor | (*N* = 30, 11%) |
| ☐ | CSD Faculty (i.e. Professors other than advisor) | (*N* = 49, 18%) |
| ☐ | CSD Staff (i.e. Clinical Supervisors) | (*N* = 18, 6.6%) |
| ☐ | Parents | (*N* = 6, 2.2%) |
| ☐ | ASHA Website | (*N* = 59, 21.7%) |
| ☐ | Video about Ph.D. on ASHA Website | (*N* = 2, 0.74%) |
| ☐ | University Websites | (*N* = 55, 20.2%) |
| ☐ | Career Services/Student Affairs offices | (*N* = 7, 2.6%) |
| ☐ | Word of Mouth | (*N* = 12, 4.4%) |
| ☐ | U.S. News and World Report | (*N* = 2, 0.74%) |
| ☐ | Presentations/Published Articles | (*N* = 3, 1.1%) |
| ☐ | Other internet resources | (*N* = 16, 5.9%) |
| | o Please list websites | |
| ☐ | Other print resources | (*N* = 2, 0.74%) |
| | o Please list magazines, pamphlets, etc. | |

## Section III – Encouragement and Qualities

23. The following people have spoken to me about pursuing a Ph.D. in CSD. (Select all that apply) (N = 984)

| | | |
|---|---|---|
| ☐ | No conversation | (*N* = 516, 52.4%) |
| ☐ | CSD Personnel Spoke to Me | (*N* = 225, 22.9%) |
| ☐ | Non-CSD Personnel Spoke to Me | (*N* = 81, 8.2%) |
| ☐ | CSD and Non-CSD Personnel Spoke to Me | (*N* = 162, 16.5%) |

24. Based on their guidance, I feel the following about pursuing a Ph.D. (Select one) (N = 464)

| | | |
|---|---|---|
| ☐ | Strongly Encouraged | (9.7%) |
| ☐ | Encouraged | (30.4%) |
| ☐ | Neither Encouraged nor Discouraged | (54.7%) |
| ☐ | Discouraged | (4.1%) |
| ☐ | Strongly Discouraged | (1.1%) |

25. I am interested in getting a Ph.D. in CSD. (Select one) (*N* = 985)

| | | |
|---|---|---|
| ☐ | Strongly Agree | (13.5%) |
| ☐ | Agree | (24.2%) |
| ☐ | Neither Agree nor Disagree | (37.4%) |
| ☐ | Disagree | (17.7%) |
| ☐ | Strongly Disagree | (7.3%) |

26. I chose my answer to the last question because…(Fill in the blank) (*N* = 847)

| | |
|---|---|
| Tired of School/Ready to Work | (*N* = 64, 6.3%) |
| No Fully Aware of Ph.D. | (*N* = 91, 9%) |
| Interested in Job Duties/Benefits | (*N* = 185, 18.2%) |
| Undecided/Have Not Thought About It | (*N* = 252, 24.8%) |
| Work Clinically | (*N* = 233, 23%) |
| No Teaching/Research Interest | (*N* = 93, 9.2%) |
| Money/Difficulty/Time | (*N* = 97, 9.6%) |

27. I would be interested in entering a Ph.D. program… (Select one) (*N* = 873)

- ☐ As soon as I complete my bachelors CSD program (6.4%)
- ☐ As soon as I complete my master's CSD program (22.0%)
- ☐ After I work in the field for a few years (1-4) (43.0%)
- ☐ After I work in the field for 5 or more years (28.6%)

28. I think that people who are successful in obtaining a Ph.D. degree have the following qualities (Pick 5) (*N* = 815)

| | | | |
|---|---|---|---|
| Devoted | (N = 672, 8.9%) | Wise | (N = 190, 2.5%) |
| Motivated | (N = 795, 10.5%) | Humorous | (N = 45, 0.6%) |
| Optimistic | (N = 202, 2.7%) | Intelligent | (N = 719, 9.5%) |
| Helpful | (N = 135, 1.8%) | Unbaised | (N = 78, 1.0%) |
| Determined | (N = 663, 8.8%) | Empathic | (N = 61, 0.8%) |
| Open-minded | (N = 193, 2.6%) | Stubborn | (N = 46, 0.6%) |
| Hard-working | (N = 815, 10.8%) | Compassionate | (N = 207, 2.7%) |
| Trustworthy | (N = 105, 1.4%) | Egotistical | (N = 49, 0.6%) |
| Humble | (N = 49, 0.6%) | Curious | (N = 253, 3.3%) |
| Forgiving | (N = 28, 0.4%) | Dedicated | (N = 648, 8.6%) |
| Honest | (N = 118, 1.6%) | Inquisitive | (N = 352, 4.7%) |
| Cooperative | (N = 184, 2.4%) | Sympathetic | (N = 47, 0.6%) |
| Independent | (N = 353, 4.7%) | Perseverant | (N = 342, 4.5%) |
| Up-tight | (N = 48, 0.6%) | Callous | (N = 8, 0.1%) |
| Judgmental | (N = 25, 0.3%) | Idealistic | (N = 67, 0.8%) |
| Grouchy | (N = 4, 0.02%) | Argumentative | (N = 59, 0.8%) |

## Section IV – Research and Teaching

According to dictionary.com, a Doctor of Philosophy degree is "Also called doctorate. The highest degree awarded by a graduate school, usually to a person who has completed at least three years of graduate study and a dissertation approved by a board of professors." In CSD, individuals who achieve a Ph.D. often take up academic and research careers which involve conducting research, teach, and providing services to the community (Schuele, 2004). Please use this information for the remainder of the survey.

29. I am interested in conducting research in CSD. (Select one) (*N* = 985)

- ☐ Strongly Agree (9.4%)
- ☐ Agree (29.7%)
- ☐ Neither Agree or Disagree (33.0%)
- ☐ Disagree (19.2%)
- ☐ Strongly Disagree (8.6%)

30. I have sought out research opportunities. (Y/N) (*N* = 983)

(Yes) (27.0%) (No) (73.0%)

31. I have been advised by CSD faculty/staff advised to become involved in research. (Y/N) (*N* = 982)

(Yes) (41.2%) (No) (58.8%)

32. I have been directed by CSD faculty/staff to research opportunities. (Y/N) (*N* = 980)

(Yes) (34.0%) (No) (66.0%)

33. I have taken an undergraduate CSD research class. (Y/N) (*N* = 983)

(Yes) (19.1%) (No) (80.9%)

## APPENDIX (p. 7 of 9). SURVEY

34. I have been a research assistant. (Y/N) ($N$ = 980)

(Yes) (14.7%) (No) (85.3%)

35. I have conducted research in CSD at my university. (Y/N) ($N$ = 983)

(Yes) (17.3%) (No) (82.7%)

36. I enjoy conducting research. ($N$ = 984)

- ☐ Strongly Agree (6.7%)
- ☐ Agree (19.1%)
- ☐ Neither Agree or Disagree (32.3%)
- ☐ Disagree (12.5%)
- ☐ Strongly Disagree (6.0%)
- ☐ N/A (23.4%)

37. I have presented research. ($N$ = 983)
(Y/N) (If Y- cont. to #38, if N- skip to #39)

(Yes) (16.6%) (No) (83.4%)

38. I have presented research at a(n)… (Select all that apply) ($N$ = 92)

- ☐ Local Conference ($N$ = 68, 73.9%)
- ☐ State Conference ($N$ = 23, 25.0%)
- ☐ National Conference ($N$ = 13, 14.1%)
- ☐ International Conference ($N$ = 4, 4.3%)

39. I am interested in teaching undergraduates and/or graduate students in the field of CSD. (Select one) ($N$ = 987)

- ☐ Strongly Agree (8.2%)
- ☐ Agree (22.3%)
- ☐ Neither Agree or Disagree (35.3%)
- ☐ Disagree (24.7%)
- ☐ Strongly Disagree (9.5%)

40. I have sought out peer tutoring opportunities at my university. (Y/N) ($N$ = 982)

(Yes) (27.3%) (No) (72.7%)

41. I have sought out teaching assistant opportunities at my university. (Y/N) ($N$ = 980)

(Yes) (16.3%) (No) (83.7%)

42. I have been directed to peer tutoring opportunities at my university. (Y/N) ($N$ = 980)

(Yes) (24.6%) (No) (75.4%)

43. I have been directed to teaching assistant opportunities at my university. (Y/N) ($N$ = 981)

(Yes) (15.4%) (No) (84.6%)

44. I have been a peer tutor. (Y/N) ($N$ = 980)

(Yes) (21.6%) (No) (78.4%)

45. I have been a teaching assistant. (Y/N) ($N$ = 981)

(Yes) (8.6%) (No) (91.4%)

## Section V – Future of CSD

46. According to the American Speech-Language Hearing Association, there is a potential shortage of professionals in CSD holding a Ph.D. degree. I have heard about the shortage before this survey.
(Y/N) (Y- continue to #47/N- skip to #48) ($N$ = 985)

(Yes) (44.2%) (No) (55.8%)

47. I found out about the shortage through… (Select one) ($N$ = 362)

- ☐ Classmates ($N$ = 76, 11%)
- ☐ Professors ($N$ = 362, 52.3%)
- ☐ ASHA ($N$ = 110, 15.9%)
- ☐ Other (Space to list other sources) ($N$ = 73, 10.5%)

48. Based on this shortage, I think the availability of jobs 10 year from now for Ph.D. professionals in CSD will be… (Select one) ($N$ = 981)

- ☐ Increased (67.6%)
- ☐ The Same (24.5%)
- ☐ Decreased (8.0%)

49. I think there will be consequences to me personally if there are less Ph.D. professionals in CSD. ($N$ = 985)

- ☐ Major consequences (18.6%)
- ☐ Minor consequences (39.9%)
- ☐ No consequences (12.6%)
- ☐ Not sure (28.9%)

(Major/Minor consequences- cont. to #50/No consequences/Not sure- skip to #51)

50. Please check the top 3 potential consequences you see as significantly impacting you personally if there are fewer Ph.D. professionals in CSD. ($N$ = 569)

- ☐ Reduced number of qualified professors ($N$ = 350, 18.6%)
- ☐ Reduced number of qualified clinicians ($N$ = 168, 9%)
- ☐ Reduced amount of quality research ($N$ = 391, 20.8%)
- ☐ Reduced number of field specializations ($N$ = 147, 7.8%)
- ☐ Reduced number of programs ($N$ = 162, 8.6%)
- ☐ Outdated procedures/methods/technology ($N$ = 276, 14.7%)
- ☐ Decline in evidence based practice ($N$ = 190, 10.1%)
- ☐ Reduced admissions into graduate programs ($N$ = 105, 5.6%)
- ☐ Erosion of knowledge base of profession ($N$ = 88, 4.7%)

51. I think there will be consequences to the field if there are less Ph.D. professionals in CSD. (Select one) ($N$ = 981)

- ☐ Major consequences (47.3%)
- ☐ Minor consequences (35.3%)
- ☐ No consequences (4.4%)
- ☐ Not sure (13.0%)

(Major/Minor consequences- cont. to #52/No consequences/Not sure- skip to pg. Thank You)

52. Please check the top 3 potential consequences you see as significantly impacting CSD if there are less Ph.D. professionals. (*N* = 563)

- ☐ Reduced number of qualified professors (*N* = 483, 18.7%)
- ☐ Reduced number of qualified clinicians (*N* = 241, 9.3%)
- ☐ Reduced amount of quality research (*N* = 563, 21.8%)
- ☐ Reduced number of field specializations (*N* = 191, 7.4%)
- ☐ Reduced number of programs (*N* = 198, 7.7%)
- ☐ Outdated procedures/methods/technology (*N* = 389, 15%)
- ☐ Decline in evidence based practice (*N* = 272, 10.5%)
- ☐ Reduced admissions into graduate programs (*N* = 123, 4.8%)
- ☐ Erosion of knowledge base of profession (*N* = 127, 4.9%)

## Section VI – Thank You

Thank you for participating in this survey!

Here are some helpful links from the 2008 Report by the Joint Ad Hoc committee on PhD Shortages in Communication Sciences and Disorders.

Video about the Ph.D. in CSD
http://asha.http.internapcdn.net/asha_vitalstream_com/www/phd_flash.swf

Considering a Ph.D. in CSD from ASHA-
http://www.asha.org/students/academic/doctoral/

Preparing for the Research Doctorate from ASHA-
http://www.asha.org/students/academic/doctoral/chap2.htm

Doctoral Program Search from ASHA- http://hes.asha.org:8080/EdFind/Doctoral/DoctSearch.aspx

Ph.D. Faculty Career Profiles-
http://www.asha.org/careers/professions/profiles/list.htm

Ph.D. Career Ladder about the Beginning and Advancing in CSD from ASHA-
http://www.asha.org/academic/career-ladder/