EFFECTIVENESS OF AN ONLINE GRADUATE PREPARATION PROGRAM

By

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To my Parents
# Table of Contents

LIST OF TABLES.................................................................................................................. 6

ABSTRACT .......................................................................................................................... 7

CHAPTER

1 INTRODUCTION............................................................................................................... 8

2 LITERATURE REVIEW .................................................................................................. 11
   
   Graduate Admissions ..................................................................................................... 11
   Student Awareness about Graduate Admissions ......................................................... 13
   Student Preparedness ................................................................................................. 15
   "Getting into Graduate School" Meetings .................................................................. 17
      Graduate Preparation Books and Web Resources .................................................. 17
      Graduate Preparation and Career Courses ............................................................ 19
   Graduate Preparation Programs .................................................................................. 25
   Specific Aims .............................................................................................................. 26
   Hypotheses .................................................................................................................. 29

3 METHODS ..................................................................................................................... 31

   Participants .................................................................................................................. 31
   Procedure .................................................................................................................... 31
      (1) Treatment Group: ............................................................................................. 31
      (2) Website Wait-List Control Group: ................................................................. 32
      (3) Natural Wait-List Control Group: ................................................................... 32
   Measures ..................................................................................................................... 33
      Grad Prep Quiz (Neimeyer, 2003) ......................................................................... 33
      Psychology Majors Career Information Survey (Thomas & McDaniel, 2004) ... 34
      Psychology Majors Career Information Quiz (Thomas & McDaniel, 2004) ....... 34
      Career Decision Self-efficacy Scale- Short Form (Betz, Klein & Taylor, 1996) ... 35
      Career Exploration and Decidedness Inventory-Revised (Thomas, McDaniel & Wagner 2006) ................................................................. 35
      Virtual Advisor Module Quizzes (Neimeyer & Stevenson, 2008) ....................... 36
      Demographic and Self-Evaluation Instrument ....................................................... 36

4 RESULTS ....................................................................................................................... 38

   Demographics ............................................................................................................. 38
   Descriptive Statistics and Preliminary Analyses ....................................................... 40
   Manipulation Checks ................................................................................................. 43
Multivariate Test ......................................................................................................................... 43
Follow-Up Univariate Tests ....................................................................................................... 44
Behavioral Reports ...................................................................................................................... 48

5 DISCUSSION .............................................................................................................................. 51

Summary of the Results .............................................................................................................. 51
Behavioral Reports ...................................................................................................................... 53
Limitations ................................................................................................................................... 56
Implications and Future Directions ............................................................................................ 57
Conclusion ................................................................................................................................... 58

APPENDIX

A BAR CHART FOR GRAD PREP QUIZ SELF-EFFICACY AT PRE AND POST TEST ................................................................. 60

B BAR CHART FOR PSYCHOLOGY MAJORS CAREER SURVEY AT PRE AND POST TEST ................................................................. 61

C BAR CHART FOR PSYCHOLOGY MAJORS CAREER QUIZ (GRAD PREP KNOWLEDGE) AT PRE AND POST TEST .............................................................................................................. 62

D BAR CHART FOR CAREER DECISION SELF-EFFICACY AT PRE AND POST TEST .............................................................................................................. 63

LIST OF REFERENCES ................................................................................................................... 64

BIOGRAPHICAL SKETCH ............................................................................................................. 68
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1</td>
<td>Measures</td>
<td>33</td>
</tr>
<tr>
<td>4-1</td>
<td>Frequency by number of modules completed</td>
<td>39</td>
</tr>
<tr>
<td>4-2</td>
<td>Summary Statistics of Measures</td>
<td>41</td>
</tr>
<tr>
<td>4-3</td>
<td>Intercorrelations Among Variables</td>
<td>42</td>
</tr>
<tr>
<td>4-4</td>
<td>Means and Standard Deviations for Grad Prep Quiz Self-efficacy Subscale</td>
<td>45</td>
</tr>
<tr>
<td>4-5</td>
<td>Means and Standard Deviations for Psychology Majors Career Information Survey</td>
<td>46</td>
</tr>
<tr>
<td>4-6</td>
<td>Means and Standard Deviations for Psychology Majors Career Information Quiz</td>
<td>47</td>
</tr>
<tr>
<td>4-7</td>
<td>Means and Standard Deviations for Career Decision Self-efficacy Scale</td>
<td>48</td>
</tr>
<tr>
<td>4-8</td>
<td>Means and Standard Deviations for Career Exploration and Decidedness Inventory</td>
<td>48</td>
</tr>
<tr>
<td>4-9</td>
<td>Percentages by Group Endorsing Behavioral Report Items</td>
<td>50</td>
</tr>
</tbody>
</table>
EFFECTIVENESS OF AN ONLINE GRADUATE PREPARATION PROGRAM

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The present study provides a controlled study of the effectiveness of an online graduate preparation program, The Virtual Advisor. The effects of the Virtual Advisor were compared to a website control and a wait-list control group in relation to a range of graduate school preparation variables. Students who utilized The Virtual Advisor were expected to show (1) an increased level of knowledge and information about graduate preparation; (2) higher levels of confidence in relation to their ability to make career decisions; and (3) higher levels of achievement of their vocational identity. Results showed evidence confirming the first and second hypotheses, that using the Virtual Advisor significantly increases students’ confidence in their preparedness and knowledge about graduate school, and their belief in their ability to make career related decisions. The results did not show support for the hypothesis regarding vocational identity. Finally, the nature of these findings in relation to the literature on graduate preparation is discussed and limitations and future directions are noted.
This purpose of the current study is to evaluate the validity and effectiveness of an online graduate preparation program on undergraduate psychology majors. The need for such research is clear when looking at the demand placed on current advising structures within the psychology major. As a discipline, psychology has seen record increases in undergraduate majors, and correspondingly in graduate applications and degrees since the 1980’s. There has been a 59% increase in the number of bachelors degrees awarded in psychology since 1985, which is an average increase of 3,800 more graduates per year (McDonald, 1997). This trend has continued with a total of 85,614 bachelors degrees awarded in psychology in 2005 (National Center for Education Statistics, 2006). McDonald notes that what is most problematic about this trend is that there has not been a corresponding increase in psychology faculty (only 9.8% change since 1985) to deal with the increasing demands of enrollment in psychology courses. Student to faculty ratios have been estimated up to 50:1 and continue growing (Shepperd, 1991). Moreover, this exponential increase in psychology undergraduates has produced a parallel demand for graduate school advisement, with 23,936 graduate degrees conferred in 2005, compared to only 13,338 in 1985 (National Center for Education Statistics, 2006). This surge in graduate training has created a considerable demand on undergraduate programs to offer guidance and preparation for graduate study in psychology.

Due to the increasing competition for graduate admissions in psychology, students can benefit greatly from any involvement that helps facilitate the skills and knowledge to effectively deal with aspects of the application process (Buskist, 1999). While it is optimal to have faculty facilitating this mentoring process, the increasing numbers of psychology undergrads, and lack of concurrent increases in faculty, is placing considerable demand on existing mechanisms of
advisement; the resources simply do not exist to give individualized attention to students
(Satterfield & Abramson, 1998; Shepperd, 1993). In fact, this strain on resources has become so
severe that some have suggested specific criteria to limit the number of psychology majors
(Shepperd, 1993). Satterfield & Abramson (1998) note that many faculty tend to have very
minimal interaction with undergraduate students because their time is being spread so thinly
across teaching, research, publishing and their own graduate students. Accordingly, several
studies have found that, when asked, students often reported a desire for more information and
advising in career and graduate planning and preparation (Johanson and Fried, 2002; Ogletree,
1999; Sheehan, 1994; Sheehan and Granrud, 1995; Ware 1986).

A review of the literature shows that overall there is a paucity of research on graduate
preparation. Historically, ways for meeting this demand have not been thoroughly developed or
studied. Although there is fair amount of conceptual material available in the form of books and
 informational meetings, strikingly little empirical research exists to support the effectiveness of
such resources. There has been research in related areas; for example a number of studies have
looked at various issues in relation to graduate admissions standards, procedures and criteria
(Bonafazi, Crespy, & Rieker, 1997; Cashin & Landrum, 1991; Johanson & Fried, 2002; Keith-
Spiegel, Tabachnik, & Spiegel, 1994; Landrum, Jeglum & Cashin, 1994; Norcross, Haynch &
Terranova, 1996), but only a few have looked specifically at the mechanisms or outcomes
associated with graduate preparation.

To deal with the increasing demand for graduate preparation, several strategies have been
used, including: (1) informational meetings, (2) books and (3) courses/seminars designed to
teach about careers in psychology and/or graduate preparation. What follows is a comprehensive
review of literature on graduate admissions, preparation, and support for the effectiveness of
these current methods. The purpose of the present study is to examine the effectiveness of a novel mechanism for preparing undergraduates for admission to graduate programs in psychology. Specifically this study will be evaluating the validity and efficacy of an interactive online graduate preparation program.
CHAPTER 2
LITERATURE REVIEW

This chapter provides a review of the literature on graduate preparation. First, current research findings on graduate admissions criteria will be discussed. What follows is a review of the literature on how much students know about graduate admissions and how prepared they are for the graduate admission process. Finally, the literature on current strategies for graduate preparation will be explored. The review will conclude with the specific aims and predictions put forth in this study.

Graduate Admissions

Research has shown that there are many criteria that are important in the graduate admissions process. The main selection criteria used by graduate admissions committees are usually cited as GPA’s, GRE scores and letters of recommendation (Keith-Spiegel, 1991). Landrum, Jeglum and Cashin (1994) surveyed 55 doctoral programs in psychology and their results reaffirm that GPA, GRE and letters of recommendation are among the most heavily weighted criteria. In addition, the personal statement and research experience were also found to be highly important. Of lesser, but still moderate importance, were specified courses, clinical experience, and interviews.

In reality these criteria only represent a portion of what these committees are looking for and Keith-Spiegel, Tabachnick and Spiegel (1994) developed a survey to explore how graduate programs (clinical and nonclinical) would rank the relative importance of various second order criteria. Those criteria that were ranked the highest included research experience, a publication or professional presentation, degree of fit between applicant and program, clarity and focus of personal statement, and writing skills among many others. The authors support the conclusions of Landrum et al (1994) noting that due to the increasing volume of applicants, admissions
committees are relying more heavily on these second-order criteria as it becomes harder to
discriminate amongst so many applicants based solely on GPA and GRE scores.

Similarly, in a survey of 2,023 graduate psychology programs (terminal masters and
doctoral) Norcross, Haynch and Terranova (1996) reported on the required and average GRE
scores and GPA’s, as well as how programs ranked the importance of certain non-objective
criteria. Programs ranked the following items (in order of importance): (1) personal statement,
(2) letters of recommendation (3) research experience (4) interview (5) work experience (6)
clinically related volunteer work and (7) extracurricular activities. Previous studies support these
findings (Eddy, Lloyd & Lubin, 1987; Smith, 1985). Doctoral programs rated the importance of
research heavier than terminal masters programs. Finally, the authors conclude by noting the
many robust differences among doctoral versus masters programs, including more costly
applications, earlier deadlines, higher requirements for GPA and GRE scores, more weight given
to nonobjective criteria especially research experience, and more financial support. More
specifically, Mayne, Norcross and Sayette (1994) noted that amongst clinical psychology
doctoral programs there are differences in admissions criteria depending on the level of research
versus practice emphasis. All clinical programs surveyed had similar expectations for
undergraduate coursework, but differences emerged with research-oriented programs having on
average higher GRE scores and GPA’s and offering more financial support. Finally, Bonafazi et
al. (1997) did a study indicating that Clinical Ph.D. programs view applying with a master’s
degree more negatively than PsyD’s, counseling, and school psychology programs. Additionally,
clinical Ph.D. programs rated research experience higher with less emphasis on work or life
experience in comparison to the PsyD programs. Counseling and school psychology programs
rated both as important.
Student Awareness about Graduate Admissions

The main concern associated with graduate admissions is whether students are aware of the relative importance placed on various admissions criteria. In attempting to explore this question, Cashin and Landrum (1991) surveyed 36 psychology undergraduates examining what criteria they perceived as most important in graduate admissions. Findings showed that while 97% endorsed GPA as important, little more than half of the participants recognized the importance of letters of recommendation (58%) and GRE scores (56%), and even fewer identified the importance of research experience (31%), the personal statement (11%) and fit with the graduate program (11%).

More recently, Brihl (2001) supported these findings with sample of 90 undergraduate psychology majors, 75% of which reported that they planned to go to graduate school. Similarly, the results indicated that undergrads were aware of most of the major criteria such as minimum GPA and GRE scores, but were still not as aware of the importance placed on earlier mentioned second order criteria such as letters of recommendation, personal statement, research experience and interviews. Moreover, students tended to underestimate average GPA and GRE scores of accepted applicants yet overestimated starting salaries of recent graduates.

This work is further supported by Neimeyer et al. (2004) whose findings indicated that undergraduate psychology majors displayed only modest amounts of knowledge on the graduate preparation process. The majority of the sample (248 undergraduates) was unaware of average GPA and GRE scores of successful graduate applicants even when asked in multiple choice format. It should be noted that in this study seniors showed a higher level of grad prep knowledge than underclassmen which suggests that students may become more knowledgeable and prepared as they approach graduation.
Keith-Spiegel et al. (1994) note that some students may be distressed when they learn of certain second order criteria and realize that it is too late in the process to fill in those gaps. At the same time, it is critical that they realize that they can still focus their energy on other second order criteria whose importance is often underestimated. “…Even late starters can assure that the statement of purpose is exceptionally well crafted and select graduate schools carefully, keeping a keen eye to goodness of fit” (Keith-Spiegel et al., 1994, p. 81).

Taking these findings into account, it is understandable that both current and former students have reported a desire for more assistance and information in the preparation of post-graduate plans (Johanson and Fried, 2002; Ogletree, 1999; Sheehan, 1994; Sheehan and Granrud, 1995; Ware 1986). Ware (1986) surveyed students at a small university and found that they rated courses in career development and field placement for psychology as the most valuable sources of career information. Those were followed by psychology advisors, instructors and departmental presentations on careers. In response to an open-ended question about what additional support students desired, the most commonly cited themes were more information about graduate school and career opportunities and more help in career planning.

More specifically, in an assessment evaluating student satisfaction with an undergraduate psychology program, Sheehan and Granrud (1995) found that both students and alumni reported the lowest satisfaction in areas such as faculty assistance with postgraduate career planning and opportunities to be involved in research projects. In fact, when asked for suggestions on ways of improving the program, both groups recommended offering students more advising on careers and graduate school options in psychology. Likewise, in an assessment of another undergraduate psychology program, Ogeltree (1999) found similar concerns when surveying recent graduates;
overall students rated assistance in future planning and career advising as the areas that needed the most improvement.

**Student Preparedness**

In order to assess what is needed in the area of graduate preparation it is first important to gain a clear understanding of what students are currently doing to prepare for graduate study.

Ogeltree (1999) assessed what career information resources recent graduates reported using and what they perceived as being most helpful. The most commonly reported sources were the psychology department faculty (29%), followed by the department chair (25%), a “guide for psychology majors” office booklet (25%), psychology advisors (22%), books (18%), programs through Psi Chi (13%), and careers in psychology speaker series (13%). All of these resources had average helpfulness ratings ranging from 2.06 to 2.44 on a scale of 1 to 3 (little help to great help). Additional resources utilized such as career services (20%), career advising sessions (13%), and the Psychology career advising center (4%) all had lower helpfulness ratings averaging a score of 1.75.

Expanding upon this, Lee and Neimeyer (in press) surveyed 590 undergraduate psychology majors from across the nation to examine the range of graduate preparation resources being utilized. Findings indicated the main resources for obtaining graduate school guidance were through visiting a departmental advisor and talking with a professor on a few occasions which were both endorsed by 69% of the participants. In addition, 50% reported having an ongoing relationship with a faculty mentor, 42% read graduate preparation books, 25% went to a career resource center, 25% attended a getting into graduate school seminar, and 5% reported taking a graduate preparation course. Within this sample, seniors not only displayed higher levels of knowledge about graduate preparation, but also reported engaging in more graduate preparation activities. Additionally, those students approaching graduation reported higher levels
of confidence in relation to the graduate preparation process. These results replicate earlier findings by Neimeyer et al. (2004).

This study also evaluated the types of academic and extracurricular involvements in which students were participating to better prepare them for graduate school. Sixty-eight percent reported doing at least one semester of research, 52% were members of Psi Chi, 45% had written or planned to write a senior thesis, 29% participated in some kind of mental health volunteer work, 17% had presented at a conference, and 5% had a publication. Additionally, there were significant differences in the types of activities engaged in based on type of degree being pursued by the participant (Masters, PsyD or PhD). For example, while all three engaged in a high rate of research and volunteer work, those pursuing Ph.D.’s were more likely to have done a senior thesis, to have a publication, and to have presented at a conference.

In conclusion, it is clear that graduate admissions are a nuanced process that students may find difficult to navigate without the proper advising and/or resources. An American Psychological Association (1983) survey of department chairs highlighted the need for improvements in career advising for psychology students. Out of 100 department chairs interviewed by phone, 40% endorsed this as a problem facing their department and 26% felt that APA should provide more information on careers and graduate school opportunities for psychology majors. Accordingly, recent studies continue to support this conclusion with repeated findings that students would like more advisement on careers and graduate preparation. Results from certain studies have suggested that part of the problem is that students underutilize and/or lack awareness of all of the career resources that are available to them (Lunnenborg, 1986; Ogeltree, 1999), raising questions concerning the goodness-of-fit between the mechanisms available for graduate school advisement (e.g., meetings with advisors) and common
mechanisms or contexts for contemporary learning on the part of aspiring graduate students (e.g. the Internet). A number of strategies have evolved to try to assist students with their graduate student preparation and application process, and these include a range of conventional and more contemporary mechanisms.

**“Getting into Graduate School” Meetings**

Traditionally, one of the most commonplace methods for disseminating information about graduate school has been the “getting into graduate school” meeting which is typically some kind of lecture or panel discussion hosted by a local Psi Chi or psychology club chapter, faculty, or graduate students (Buskist, 1999). Satterfield and Abramson (1998) discuss how one of the main benefits of a psychology club is to host workshops on the graduate preparation process including information on how to write a vita and personal statement and advice on how to choose the appropriate type of grad programs.

In a study of 590 psychology majors, 25% endorsed having attended a getting into graduate school seminar (Lee & Neimeyer, in press). While such meetings can clearly be helpful, they also have many limitations such as limited time, typically lasting 1-2 hours, inadequate individualized attention, and little or no follow up (Buskist, 1999). Moreover, there has been no documented evidence to substantiate whether this type of format is comprehensive enough to fulfill the growing demands of all that is involved in the graduate admissions process.

**Graduate Preparation Books and Web Resources**

Another common way for students to gain information on graduate study is through graduate preparation books. Titles include *Getting In: A Step-by-Step Plan for Gaining Admission to Graduate School in Psychology* (APA, 2007), *The Complete Guide to Graduate School Admission: Psychology and Related Fields* (Keith Speigel & Wiederman, 2000) and *Preparing for Graduate Study in Psychology: 101 Questions & Answers* (Buskist & Burke,
2006) among many others. Common topics covered in these guides are various careers in psychology as well as different areas of specialization, assessing the fit of a graduate degree in psychology, and looking at the different types of degrees and training models. Additionally, another large focus is deciding which programs to apply to, information about the various criteria that are used in the admissions process, information on filling out the applications and tips on writing your vitae, essays, asking for letters of recommendation and the interview process. Additionally some books such as *The Insiders Guide to Graduate Study in Clinical and Counseling Psychology* (Norcross, Sayette & Mayne, 2008) include all this information in addition to the most current data on more than 300 accredited programs (i.e. training model, descriptions of specializations or tracks, listing of specific acceptance and attrition rates).

Perhaps one of the most commonly used books, APA’s “Getting In”, has recently become available for online access as an “e-book.” In addition, a multitude of websites and web resources have become available which also cover the gamut of career related and graduate preparation information for psychology majors.

While books and web resources are certainly are helpful, the question remains, are they sufficient? One study found that 41% of 590 participants endorsed reading a book on preparing for school (Lee & Neimeyer, in press). Yet there is still little research on whether books or internet websites are adequately addressing student’s needs in relation to the graduate preparation process. For this reason, some institutions have created seminars or courses which address graduate preparation. Buskist (1999) notes that while there is considerable written information on graduate preparation, this does not negate the added benefits that a seminar can offer to students.
Graduate Preparation and Career Courses

Buckalew and Lewis (1982) were among the first to publish on a seminar for senior psychology majors that they describe as going beyond the traditional psychology curriculum and addressing “life preparation.” Topics of this course included career opportunities in psychology as well as alternative careers, graduate preparation, personal and fiscal development, management, resumes, correspondence, ethics and selected topics. While this is one of the first documented courses that addressed graduate preparation, it was one area of focus out of an otherwise varied number of topics. This course did not represent a comprehensive format for graduate school preparation but was a precursor to other courses which built upon this format but specified their content to graduate preparation.

Many of these seminars are designed as career development courses specifically for psychology majors that offer a component of graduate school preparation and information on graduate school options. In these cases though, it is one topic of many and is usually not the focus. One such course developed for upperclassmen by Ware (1988) included the objectives of increasing students’ knowledge about the self, job and graduate school opportunities and to teach job-search skills. The section which explores graduate school options addressed psychology in addition to related professions such as medicine, dentistry and law. Course activities included inviting speakers from various fields to speak on their area, level of satisfaction, and graduate preparation. Additionally, this course presented a videotape called “Pursuing Graduate Study in Psychology” as well as a booklet with additional information on the process. Several studies were conducted to assess the effectiveness of this course. The results showed that students had higher ratings on self-knowledge, career maturity and vocational identity indicating that overall the course helped to increase knowledge about one’s self. Additionally there were increases in decisiveness and knowledge about the job world and job search skills and a reduction in career
related anxiety. Findings were general and did not specifically address the effectiveness of the graduate preparation component.

Davis (1988) created a course designed specifically to introduce student to the profession of psychology which was open to junior and senior psychology majors. A one credit course which included weekly presentations and discussions on topics including: (1) “Resume Preparation” (2) “Becoming Involved: Professional Organizations and Research” (3) “Graduate Training? Where? What kind?” (4) “Employment? Where? What level? Strategies?” And (5) “Future of the Field.” Additionally, course requirements included completing a resume and a statement of goals and purposes and several short answer exams aimed at integrating the material.

Dodson, Chastain and Landrum (1996) describe a seminar for upper division psychology majors designed to teach students about both career and graduate school options in psychology. The authors note that this endeavor grew out of the awareness that many students did not seem aware of the various career opportunities available to them. Furthermore, they seemed even less knowledgeable about the various elements involved in applying to graduate school. They developed a pass-fail three credit course which involved weekly journal entries with personal reactions to class activities. No exams or formal papers were required and no textbook was used. The journal entries allowed the instructors to receive feedback on presentations and activities and to monitor areas of confusion for students. The authors conducted a pre and post course survey on the forty two enrolled students to examine how student’s responses changed after completing the course. Results showed that the students tended to have changes in relation to the level of degree they planned to pursue (e.g. those who initially reported desiring a doctoral degree were now planning on pursuing a masters degree) as well as how they planned to finance graduate
school. Overall on a scale of 1-10 the students reported overall satisfaction with the course as a 9.5 and instructor effectiveness of 9.65. Thus the instructors concluded that the course was an effective way to inform students about career options and graduate study in psychology.

A similar course developed by Buskist (1999) was designed solely to prepare undergrads for graduate school in psychology. This was a two credit course intended to help students become more informed about the entire graduate school application process as well as to begin creating their application materials. Activities included two graded written assignments, a letter of intent and a vita, on which were they were given feedback and could turn back in as many times as necessary to receive an A. There were also non-graded components including figuring out which area of specialty within psychology most fit with their goals, creating a list of their top 10 grad programs, completing a mock interview, and becoming familiarized with the GRE. The first few classes were centered on general information about grad school and questions. Later in the course Buskist has several guest speakers come and address various questions about graduate admissions in their specified field. In a mailed follow up survey, 11 out of 28 respondents had applied to graduate school of which 10 were accepted (6 to masters programs and 4 to doctoral programs). The average number of programs applied to was 5 with a range of 1 to 11. These 11 students rated the course as a 4.4 out of 5 (1 = not very helpful; 5 = very helpful). According to Buskist (1999) “the advantage of this seminar is that it provides students with a structured, systematic approach to learning about graduate school and the application process as well as a supportive environment...”(p.287).

The most comprehensive study on this type of course to date was conducted by Thomas and McDaniel (2004), who present empirical support for the effectiveness of a required career planning course for psychology majors. This one-credit graded course included lectures,
discussions, small group activities and guest speakers and was a requirement for all psychology majors. This course was designed to meet three objectives, (1) to increase knowledge about career opportunities for psychology majors (including information on careers, graduate preparation and on other related helping disciplines such as social work, etc.); (2) to increase students confidence in making career decisions (through exploring career related interests, skills and values); and (3) to help student’s achieve their vocational identities. The sample consisted of 165 students, 85 of whom took the careers course and the other 80 (sampled from the prior years required research methods course before the career course was implemented) who served as a control group. The authors tested the student’s knowledge about psychology careers with a measure they developed for the study call the Psychology Majors Career Information Survey (PCMIS); results indicated that those who took the career planning course significantly increased their self-perceived knowledge in relation to career options. Additionally findings indicated that those same students also had increased levels of confidence in their career decision-making abilities (as measured by the Career Decision Self-efficacy Scale-Short Form) and movement toward achieving their vocational identity (as measured by the one item Brief Evaluation of Vocational Identity BEVIS). The authors noted several limitations of the study, including the fact that the PCMIS measure perceived rather than actual knowledge; also the BEVIS only included one item which combined two aspects of vocational identity achievement, exploration and contemplation, rather than separating them.

Building upon this work in a second study, Thomas and McDaniel (2004) sought to replicate these results and address some of the aforementioned limitations by creating more comprehensive measures. This study had a sample of 72 students enrolled in the careers course and included all of study 1’s measures in addition to two new measures the author’s created. The
first measure was the Psychology Majors Career Information Quiz (PMCIQ) which was a true/false measure designed to tap into actual knowledge about psychology careers. The second was the Career Exploration and Decidedness Inventory (CEDI) which had two subscales that separately measured career exploration (exploring career options) and decidedness (making a career choice). The results replicated study 1 and also showed support for increases in actual knowledge about psychology careers as well as changes in both career exploration and decidedness. The authors note that their course succeeded in meeting its goals and highlight the importance of the finding that the careers course was able to increase student’s confidence in their ability to make appropriate career related decisions. Finally, the authors conclude by asserting that career courses are “an effective way for psychology departments to help students make a successful transition from college into the world of work and professional careers” (p.26).

While the aforementioned courses are not necessarily a common component of academic curriculum, a growing number of Universities have been offering careers in psychology courses, graduate preparation courses or both. A recent request to the Teaching of Psychology listserv, yielded a number of responses from faculty who are teaching this type of course. Some of the courses focus more on identifying career opportunities and choices. Others combined both components of career planning and graduate preparation. Common components of the syllabi from these courses included: Differentiating between types of degrees and programs in psychology, assessing career goals, creating a curriculum vitae, how to secure strong letters of recommendation, writing a personal statement and researching and identifying graduate programs.
Many have noted that when these courses are designed for upper division students it can often be too late for them to implement what they have learned before they graduate (Dodson et al, 1996; Murray, 1999). In response to such criticisms Dillinger and Landrum (2002) have suggested an introduction to psychology course which they refer to as IPM or “Introduction to the Psychology Major,” that would be a 1 credit pass-fail course required for incoming freshmen. This course would cover various topics including career options, whether psychology is a “good fit”, benefits of research, and ethics; ideally it would allow students a place to make a preliminary assessment of what they think they would like to do after graduation. The authors did a pre- and post test of 190 students enrolled in the IPM and found significant differences in student’s levels of awareness about the field of psychology and the various opportunities available to them. Therefore, they conclude that the IPM is an effective way to introduce students early on to the profession of psychology.

As beneficial as these courses may prove to be, they are only offered at a limited number of academic institutions. In a survey of 357 psychology departments only 34.2% reported offering some type of introduction to psychology course (Landrum, Shoemaker & Davis, 2003). Additionally, in a study of 590 psychology majors, only 4.9% reported having taken a graduate preparation course (Lee & Neimeyer, in press).

Ultimately, both types of courses have their advantages. Courses taken later offer students a chance to have matured and gained more knowledge and focus about their goals. Courses offered earlier in freshman or sophomore year can help students to be more informed early on about potential career choices and what relevant extracurricular activities (i.e. research, volunteer work etc.) are necessary for them to achieve future goals (Lloyd, 2002).
Graduate Preparation Programs

While a few studies have shown preliminary evidence that courses on preparing for graduate school are effective, overall there is still a paucity of research in this area. Furthermore, many schools do not offer such a course which invariably leaves some students at a disadvantage. Neimeyer et al (2004) argue that the current resources are not adequately meeting the growing demand and that many graduate students are left poorly informed in relation to graduate preparation.

Only one study to date has examined a different type of graduate preparation intervention. Neimeyer et al. (2004) examined the effectiveness of an audio-taped graduate preparation program which included six 1 hour tapes titled “Successful Strategies for Getting Into Graduate School in Psychology”; “Ten Critical Things You Need to Know Before Applying to Graduate Study in Psychology”; “Distinguishing Clinical and Counseling Psychology”; “All About Personal Statements, Resumes, and Letters of Recommendation”; “Effective Interviewing for Graduate Schools in Psychology”; and “Expert Advice: Questions and Answers.” Eighteen undergraduates were randomly assigned to either a treatment or wait-list control group. All participants first met and completed the Grad Prep Quiz, then the treatment group listened to the audiotape series over a two week period and both groups then retook the Grad Prep Quiz. The Grad Prep Quiz measures student’s degree of knowledge and level of preparedness in relation to graduate study in psychology (Neimeyer, 2003). Results showed that as predicted, participants in the treatment group who listened to the full grad preparation program had significantly increased their Grad Prep Quiz scores at follow up while the control groups scores did not significantly change. Additionally, consistent with the findings of Dodson et al. (1996), 38% of participants in the treatment group changed their graduate degree plans compared to only 11% in the control group. “These findings support the potential usefulness of a low-cost, portable, and
flexible intervention (i.e., an audiotape program) as an effective mechanism for supplementing conventional approaches for providing graduate school preparation…” (p. 31).

It must be noted that this study has several limitations including first and foremost a very small sample size. Additionally, the results offer only proximal indicators of the actual level of graduate school readiness or effectiveness in the application process. Likewise, the data was self report with a lack of any concomitant behavioral indicators of success. The hope of the current study is to build upon this work with a new and improved version of a graduate preparation program as well as to address some of the aforementioned limitations.

**Specific Aims**

The Program being evaluated in this study is *The Virtual Advisor: Successful Strategies for Getting into Graduate School in Psychology* (Neimeyer & Stevenson, 2008) which is broken down into five different modules each of which includes video and/or PowerPoint audio presentations (totaling approximately 9 hours), in addition to written resources, interactive exercises, self-assessments, and weblinks. Below in bulleted format are the titles of each module, followed by a listing of the presentations within that module:

- **Module 1: Exploring Careers in Psychology**
  - (1) Introduction to the Virtual Advisor
  - (2) Areas of Psychology
  - (3) Levels of training: Masters vs. Doctoral programs
  - (4) Counseling & Clinical Psychology: How special are these specialties?
  - (5) Your financial future: Making dollars and sense.

- **Module 2: Preparing for Careers in Psychology**
  - (1) Preparing inside the classroom
• (2) Preparing outside the classroom and
• (3) Finding the best program.

• Module 3: Applying to Graduate Schools in Psychology
  o (1) Objective components of the graduate application such as GPA and GRE scores
  o (2) Subjective components such as the personal statement, curriculum vitae, and letters of recommendation.

• Module 4: Interviewing for Graduate Schools in Psychology
  o (1) Interviewing isn’t everything, it’s the only thing
  o (2) The 10-point performance check
  o (3) Graduate school interview
  o (4) Evaluating the interview.

• Module 5: Putting it All Together (serves as a conclusion and integration of the material)
  o (1) Deciding, notifying and celebrating
  o (2) Transitioning to graduate school
  o (3) Overall summary

Additionally, each module concludes with a section titled “Extra Advisement” which includes various links to web resources, self-assessments, sample personal statements, vitas and letters of recommendation along with many other additional resources.

The advantage of such a program is that it available to all students at any time during their education. Moreover the program offers flexibility in that it is portable and it can be completed at each individual’s convenience. This study proposes that such a program not only
can supplement current resources but can also help fill in the gap for students whose institutions offer fewer graduate preparation resources.

In sum, it is clear that the number of applicants to graduate programs in psychology continues to grow and the need for graduate preparation is increasing rapidly. Yet, the empirical study of the mechanisms of graduate preparation is developing at a gradual pace in an unprogrammatic way. Essentially, the literature on graduate preparation is in its infancy. There is a scarcity of systematic empirical work and a lack of standardized measurements or controlled research. What is available is limited by reliance primarily on anecdotal accounts, with little if any empirical data and, when present, these data are based on pre-post (or sometimes posttest only) non-randomized samples of convenience. The confounds associated with studies of this type are legion, including selection biases, demand characteristics, the absence of control groups, and the use of questionnaires without known psychometrics, among others.

As with the graduate preparation courses described earlier, The Virtual Advisor is designed to provide assistance in the graduate preparation process as well as to enhance students’ clarity regarding their career goals and aspirations. Based on the work previously done by Thomas and McDaniel (2004), this study purports similarly that systematic efforts to measure the effectiveness of The Virtual Advisor would likely have an impact on three areas. The first and most obvious area of impact would be confidence in and knowledge about the graduate preparation process; this would be measured by the Grad Prep Quiz and the Psychology Majors Career Information Survey and Quiz. Additionally, because the virtual advisor has two modules that tap directly into exploring and preparing for careers in psychology, it is also expected that completion of this program would have an impact on student’s confidence in their career decision making abilities. This would be measured by the Career Decision Self-efficacy Scale-
Short-Form. Career decision self-efficacy is defined as “an individual’s degree of belief that he or she can successfully complete tasks necessary to making career decisions” (Betz & Luzzo, 1996, p.415). Finally, we would expect that the wealth of career-related and graduate preparation information in The Virtual Advisor would likely have some impact on overall vocational identity. Vocational identity is described as being comprised of career exploration (exploring career options) and career decidedness (making a career choice) so that increases in both of these areas indicate achievement of one’s vocational identity (Thomas, McDaniel & Wagner, 2005). Achievement of vocational identity will be measured with the Career Decidedness and Exploration Inventory-Revised (CEDI-R).

Vocational identity is distinguished from career decision self-efficacy in that it is directly tied to actions, for example questions begin with “I have….” In contrast, career decision self-efficacy is not tied to action, rather to a person’s level of confidence or belief in his or her ability to successfully perform a career related action; accordingly, each question begins with “how much confidence do you have that you could….” The decidedness subscale of the CEDI-R is positively correlated ($r = .61$) with the Career Decision Self-efficacy Scale, because those who are career decided are likely to have more confidence in their ability to make career decisions. Although, just because a person has confidence in their ability to make career decisions does not necessarily mean that they are career decided. Additionally, the career exploration subscale of the CEDI-R is also positively correlated with the Career Decision Self-Efficacy Scale ($r = .36$) because students who have done more career exploration are likely to be more confident in their ability to make a career decision.

**Hypotheses**

**Hypothesis 1:** The current study hypothesizes that those students who utilize The Virtual Advisor will have an increased level of graduate preparation self-efficacy and knowledge.
**Hypothesis 2:** The current study hypothesizes that students who utilize The Virtual Advisor will report higher levels of confidence in relation to their ability to make career decisions.

**Hypothesis 3:** The current study hypothesizes that students who utilize The Virtual Advisor will report higher levels of achievement of their vocational identity.
CHAPTER 3
METHODS

Participants
Participants were 308 college students from across the nation (representing 34 different states) and came from online sampling. Participants were solicited through an email that was sent to all Psi Chi chapter Presidents in the United States. The email encouraged the Psi Chi Presidents to forward it to the students in their chapter as well as psychology majors at their college.

Procedure
An internet survey was conducted that took participants approximately 20 minutes to complete. The soliciting email contained a link that directed participants to a website where they read and electronically signed the informed consent. Participants were then directed to a link where they completed a demographics section and the pre-test questionnaires. At the end of the survey students submitted their answers electronically to an online database. Upon completion they were randomly assigned to one of three groups: (1) the treatment group, (2) the website wait-list control group, or (3) the natural wait-list control group.

(1) Treatment Group:
Upon completion of the pre-test survey, participants in the treatment group were given an access code that allowed them immediate access to The Virtual Advisor for a period of three weeks. Participants were given the following instructions: “It is up to you how you break up the time over the next three weeks and how much time you spend reviewing each module. But you should plan on spending 2-3 hours per week (for the following three weeks) reviewing The Virtual Advisor materials. At the end of this study you will be asked to report the amount of time you spent on each of the five modules in the program.” In addition, they were asked to
characterize anything else that they did to find out about graduate preparation and application over the course of the time they were completing the study.

(2) Website Wait-List Control Group:

Participants in this group were informed that they would be given access to The Virtual Advisor in three weeks time, upon completion of the post-test questionnaires. Additionally, during the interim, these participants were instructed to visit and explore a specified website titled “Career Related Information.” This site includes 4 major topic areas which are titled: (1) career related resources, (2) graduate school preparation resources, (3) organizations and the major subfields in psychology, and (4) resources for psychology undergraduates. Each topic is linked to a page with multiple different web resources and related links for specified information on that subject. Participants were given the following instructions “It is up to you how you break up the time over the next three weeks and how much time you spend reviewing the websites. But you should plan on spending 2-3 hours per week (for the following three weeks) reviewing the websites. At the end of this study you will be asked to report the amount of time you spent reviewing the various web resources.” In addition, they were asked to characterize anything else that they did to find out about graduate preparation and application over the course of the time they were completing the study.

(3) Natural Wait-List Control Group:

Participants in this group were informed that they would be given access to The Virtual Advisor in three weeks time, upon completion of the post-test questionnaires. Participants in the wait-list control group were not given any instructions for what to do during the interim between pre and post test. However, in the post-test, the natural wait list control participants were asked to characterize everything that they had done to find out about graduate preparation and application over the course of the time the study was running.
After three weeks from the date that the pre-test questionnaires were completed, all participants were solicited by email to complete the post-test questionnaires following the same procedure. Upon completion of the post-test, participants in both control groups were given access to The Virtual Advisor for three weeks.

**Measures**

Measures of graduate preparation knowledge and self-efficacy, career decision self-efficacy and vocational identity were used in this study. Table 1 depicts each measure included in this study and the relevant hypotheses. All measures included are administered at both the pre-test and post-test.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grad Prep Quiz: efficacy subscale</td>
<td>Hypothesis 1: measures self-efficacy in graduate preparation knowledge</td>
</tr>
<tr>
<td>Grad Prep Quiz: knowledge subscale</td>
<td>Hypothesis 1: measures actual graduate preparation knowledge</td>
</tr>
<tr>
<td>Psychology Majors Career Information Survey</td>
<td>Hypothesis 1: measures self-efficacy in graduate preparation knowledge</td>
</tr>
<tr>
<td>Psychology Majors Career Information Quiz</td>
<td>Hypothesis 1: measures actual graduate preparation knowledge</td>
</tr>
<tr>
<td>Career Decision Self-efficacy Scale-Short Form</td>
<td>Hypothesis 2: measures career decision self-efficacy</td>
</tr>
<tr>
<td>Career Decidedness &amp; Exploration Inventory</td>
<td>Hypothesis 3: measures vocational identity</td>
</tr>
<tr>
<td>Virtual Advisor Modules Quiz</td>
<td>Manipulation Check: measures how well participants comprehend the material presented in the Virtual Advisor.</td>
</tr>
</tbody>
</table>

**Grad Prep Quiz (Neimeyer, 2003)**

The GPD is a 25 item self-report measure which is used to assess student’s degree of knowledge and preparedness in relation to graduate study in psychology. This measure includes a subscale with 10 questions which are designed to measure self-efficacy and knowledge. The self-efficacy questions are measured on a scale of 1 (not confident) to 5 (highly confident); an
example is “I know how to assess my strengths and to find the best graduate program for my particular interests.” Additionally there is a subscale with 15 knowledge questions which are given in multiple choice format; an example is "Which of the following best describes the difference(s) between a PhD and a PsyD? a) the PhD is a research degree and a PsyD is a practice degree, b) a PhD program can be APA-approved whereas a PsyD cannot, c) a PhD can be licensed to practice psychology but a PsyD cannot, d) all of the above. Accordingly the GPD produces two separate subscale scores: (1) the self-efficacy score (ranging from 0 to 50) which indicates degree of confidence in graduate preparation; (2) the knowledge score (ranging from 0 to 15) which measures level of knowledge about and preparedness for graduate school. Internal reliability of this scale has been demonstrated with an alpha coefficient of .89. Additionally, validity of this measure has been demonstrated by showing that it accurately discriminates between undergraduate and graduate students (Neimeyer et al., 2004).

Psychology Majors Career Information Survey (Thomas & McDaniel, 2004)

The PCMIS includes six items which measure student’s perceived knowledge in relation to career possibilities for psychology majors. Questions are rated on a five point likert scale (1 = strongly disagree; 5 = strongly agree.) A sample item is “I can identify several different fields of study that would allow me to do counseling/therapy and I understand what each of these involves.” Internal reliability of this scale is demonstrated with an alpha coefficient of .87.

Psychology Majors Career Information Quiz (Thomas & McDaniel, 2004)

The PMCIQ was developed to measure psychology student’s actual career-related knowledge by tapping into common misconceptions held by psychology majors in relation to careers. The measure includes 15 items which are rated on a likert scale ranging from 1 (confident it is false) to 5 (confident it is true). The goal of using the likert scale was to be able to
discern between students who were guessing the answers from those who were confident in their answers. Internal consistency for this scale was shown with an alpha coefficient of .55.

Career Decision Self-efficacy Scale- Short Form (Betz, Klein & Taylor, 1996)

The CDSE-SF was developed to measure “an individual’s degree of belief that he or she can successfully complete tasks necessary to making career decisions” (Betz & Luzzo, 1996, p.415). The measure consists of five subscales (five questions each) including (1) accurate self-appraisal (2) gathering occupational information (3) goal selection (4) making plans for the future; and (5) problem solving. Each of the 25 items begins with “How much confidence do you have that you could” for an example “Find information about graduate or professional schools.” Each item is rated on a likert scale ranging from 1 (no confidence at all) to 5 (complete confidence). Betz et al., 1995 demonstrated internal consistency reliability for this measure with alpha coefficients for the subscales ranging from .73 for Self-Appraisal to .83 for Goal Selection and .94 for the total score. Additionally, Betz & Taylor have established comprehensive support for the construct, content, and concurrent validity of the CDSE-SF.

Career Exploration and Decidedness Inventory-Revised (Thomas, McDaniel & Wagner 2006)

The CEDI-R was designed to measure two essential components of career development described as exploration (exploring career options) and decidedness (making a career choice). The measure includes 22 items divided into three subscales: (1) decidedness (9 items), (2) career exploration (7 items) (3) self-exploration (6 items). Each item is measured on a likert scale ranging from 1 (not at all like me) to 5 (very much like me). A sample item from the career exploration subscale is “I have struggled to make a decision about what career is right for me.” The CEDI has shown internal reliability with alpha coefficients of .96 for the decidedness subscale, .85 for the career exploration subscale and .78 for the self-exploration subscale.
Additionally, concurrent validity of the CEDI-R has been demonstrated with correlations ranging from .50 to .61 with the Career Exploration survey and the Career Decision Self-Efficacy Scale. Additionally it has shown an inverse relationship with the indecision subscale of the Career Decision Scale (r = -.78) and the Career Decision-Making Difficulties Questionnaire (r = -.76).

**Virtual Advisor Module Quizzes (Neimeyer & Stevenson, 2008)**

Each module in the virtual advisor program has a “test your knowledge” quiz which is designed to check for comprehension of the material provided. There are five quizzes with 5 multiple choice questions each (scores ranging from 0 to 5). A sample item is “Which of the following represent(s) important ways that you can start preparing for graduate school outside the classroom?”

**Demographic and Self-Evaluation Instrument**

This measure includes general demographic items such as age, gender, ethnicity, year in school, major university attended and overall GPA, as well as questions intended to gain information about participants’ interest in, and experiences related to, graduate school preparation. Some of the questions examine graduate school plans such as: whether they were planning to go to graduate school in psychology, the degree they planned to pursue (e.g. M.A. or M.S., Ph. D, Psy. D) and their intended area of study (e.g. clinical, social, etc.). Other items assess the mechanisms utilized by students in their graduate school preparation, such as whether or not they had taken a graduate preparation course, seminar, or preparation meeting, what kind of services they had utilized in preparing for graduate school in psychology (e.g. talked to a professor). This instrument also included measures of behavior exploring what activities undergraduates might be involved in to improve their chances of admission. These items included whether they had researched graduate programs, begun writing a personal statement, begun writing a C. V., decided on who their letter writers would be, asked their letter writers,
begun studying for the GRE, taken the GRE, talked with departmental advisors, talked with their professors about graduate school, visited the Career Center, had an ongoing mentor, became involved in Psychology club/Psi Chi, utilized a grad school prep book, visited a grad prep website, conducted research, volunteered in the community, wrote or planned to write a senior thesis and presented or made plans to present at a conference.
CHAPTER 4
RESULTS

The results section begins with demographic characteristics of the study participants. The next section presents descriptive information and relationships among the primary variables of interest, together with the preliminarily analyses. Finally, a mixed factorial MANOVA was conducted to examine the relationship of all variables of interest with the various groups over time. This was subsequently broken down into a series of follow up univariate repeated measures ANOVAs performed on each dependent variable to examine the location of the significant effects.

Demographics

At the pre-test there were 180 participants in the treatment group, 183 participants in the website control group, and 172 participants in the wait-list control group. At the post-test, 86 participants remained in the treatment group (47.8% retention), 113 in the website control group (61.7% retention), and 130 in the wait-list control group (75.6% retention). Manipulation checks performed on the Virtual Advisor condition indicated that 21 of the participants reported spending one hour or less on The Virtual Advisor. This subgroup of participants was eliminated from subsequent analyses because on average they reported completing less than one full module of the Virtual Advisor’s five modules ($M = .81$). For the final analyses, participants in the Virtual Advisor condition were retained only if they completed a minimum of two hours of The Virtual Advisor, leaving 65 treatment group participants who reported spending an average of 6.15 hours reviewing the program ($SD = 4.3$) and completing, on average, 3 of the 5 program modules. See Table 2 for a frequency distribution of the number of modules completed for all treatment group participants.
Table 4-1: Frequency by number of modules completed

<table>
<thead>
<tr>
<th>Number of Modules Completed</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
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<tr>
<td>3</td>
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</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

The final sample consisted of 308 participants (Treatment = 65; Website Control = 113; Wait-List Control = 130). Among those who designated their demographic information, 87.5% were female and 12.5% were male with a mean age of 22 years (age range = 18 to 39). A Chi square analysis was conducted to see if gender was randomly distributed across groups and was found to be significant \( \chi^2(2) = 6.164, p = .046 \). This indicates that there was a slightly higher percentage of males in the control group than in the other two groups (Treatment = 10.8%; Website Control = 7.3%; Wait-list Control = 17.8%). Given this difference in gender distribution across groups, a MANOVA was conducted to examine if there were gender differences on the primary dependent variables at the pre-test and it was not found to be significant \( F[6, 296] = .952, p = .458, \eta^2 = .019, \) pillai’s trace = .019). Despite the moderate disparity in gender distribution, this confirms that this difference does not confound the current study’s results.

Concerning ethnicity, the majority of the participants in this study were Caucasian, 78.6% (N = 239), followed by Hispanic, 8.9% (N = 27), African American, 5.9% (N = 18), other, 3.6% (N = 11), and Asian American and Pacific Islander, 3% (N = 9). The majority of participants were seniors, 57.4% (N = 175), followed by juniors, 30.8% (N= 94), sophomores, 9.2% (N=28), and freshmen 2.6% (N=8). A Chi squared analysis was conducted to see if participants year in school was randomly distributed across groups and it was not found to be
significant \[ X^2(6) = 8.523, p = .202 \], indicating that year in school was randomly distributed across the groups. The average GPA of participants was 3.49 (SD = .40).

Among this sample, 37.9% of participants were in the process of applying to graduate school during the study. Of the remaining 62.1% of participants, 87% of those were planning to apply in the future. At the post-test, a substantial percentage of the participants reported that they planned to pursue a PhD, 49.3% (N = 142), followed by Masters Degree, 35.1% (N = 101), Psy.D, 12.8% (N=37), and undecided or other, 2.8% (N = 8).

**Descriptive Statistics and Preliminary Analyses**

Table 3 includes the summary statistics for all of the measures. This includes the scales measuring graduate preparation self efficacy, graduate preparation knowledge, career decision self-efficacy, and vocational identity at both pre-test and post-test. Grad prep self-efficacy is measured with the self-efficacy questions from the Grad Prep Quiz and the Psychology Majors Career Information Survey. The grad prep knowledge variable is measured with the multiple choice knowledge questions from the Grad Prep Quiz and the Psychology Majors Career Information Quiz. Career Decision self-efficacy is measured by the Career Decision Self-efficacy Scale- Short Form. Vocational Identity is measured by the Career Exploration and Decidedness Inventory-Revised. All scores were normally distributed. All measures displayed skewness and kurtosis values in the acceptable range for appropriate distribution. All scales, except for the Grad Prep Quiz knowledge subscale, had moderate to high reliability coefficients. Due to its inadequate reliability coefficient, The Grad Prep Quiz knowledge subscale was eliminated from the primary analyses in the study.

Table 4 depicts the Pearson Product-Moment correlation coefficients for all variables of interest.
Table 4-2: Summary Statistics of Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>N of Items</th>
<th>Alpha</th>
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<tbody>
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<td></td>
<td></td>
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<tr>
<td>Pre-test</td>
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<td>Post-test</td>
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<td>-.18</td>
<td>.41</td>
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<td>.87</td>
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<td>2. Psych Career Survey:</td>
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<tr>
<td>Pre-test</td>
<td>17.01</td>
<td>5.07</td>
<td>-.14</td>
<td>-.61</td>
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<tr>
<td>Post-test</td>
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<td>Pre-test</td>
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<td>Post-test</td>
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<tr>
<td>Pre-test</td>
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<td>Post-test</td>
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<td>Post-test</td>
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</table>

Note. Grad Prep Quiz Eff = Grad Prep Quiz self-efficacy subscale; Psych Career Survey = Psychology Majors Career Information Survey; Grad Prep Quiz Know = Grad Prep Quiz knowledge subscale; Psych Career Quiz = Psychology Majors Career Information Quiz; Career Decision Eff = The Career Decision Self-efficacy Scale-Short Form; Career Decide & Exp: The Career Exploration & Decidedness Inventory-Revised.
Table 4-3: Intercorrelations Among Variables

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<td>.23</td>
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<td>.77**</td>
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<td>.15*</td>
<td>.24**</td>
<td>.19**</td>
<td>.07</td>
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<td></td>
<td></td>
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<td>4. PCST2</td>
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<td>.27**</td>
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<td>.51**</td>
<td>.61**</td>
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<td>5. GPKT1</td>
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<td>6. GPKT2</td>
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<td>7. PCQT1</td>
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<td>8. PCQT2</td>
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<td>.73**</td>
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<td>10. CEDT2</td>
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<td>11. CSET1</td>
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<td>12. CSET2</td>
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<td>13. TIMSP</td>
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</table>

*Note. GPE = Grad Prep Quiz self-efficacy subscale; PCS = Psychology Majors Career Information Survey; GPK = Grad Prep Quiz knowledge subscale; PCQ = Psychology Majors Career Information Quiz; CED = The Career Exploration & Decidedness Inventory-Revised; CSE = The Career Decision Self-efficacy Scale-Short Form; TIMSP = Time participants spent reviewing either the Virtual Advisor or the assigned web-resources; For all T1 = Pre-test, T2 = Post-test.  
* p > .05  ** p < .01
Manipulation Checks

As a manipulation check, a repeated measures ANOVA was conducted on the Virtual Advisor Module quizzes. This measure was comprised of questions that came from the quizzes within The Virtual Advisor program and therefore are derived specifically from the material covered in the five modules of the program. Significant main effects for were found for time ($F[1, 305] = 20.629, p < .001, \eta^2 = .063$) and group ($F[2, 305] = 9.072, p < .001, \eta^2 = .056$). These were qualified by a significant interaction for time by group ($F[2, 305] = 39.114, p < .001, \eta^2 = .092$). To adjust for familywise error, Bonferroni adjusted post-hocs were performed and revealed that all three groups were equal on their scores on The Virtual Advisor module measure at the pre-test. At post-test, the treatment group differed significantly from the website control group and the wait-list control group. Examination of the means revealed that at the posttest, participants in the Virtual Advisor condition scored significantly higher on the Virtual Advisor module quiz than those in both the website control group and the wait-list control group (Treatment $M = 9.22$, Website Control $M = 7.44$, Wait-List Control $M = 7.72; p < .001$). This confirms that the treatment group answered more questions correctly on this measure which demonstrates their understanding of the material provided in The Virtual Advisor.

Multivariate Test

In order to test the primary hypotheses of the current study, a mixed factorial MANOVA was conducted. The overall repeated measures multivariate analysis of variance found significant main effects for time (pre-test vs. post-test) ($F[1, 305] = 169.165, p < .001, \eta^2 = .357$, pillai’s trace = .357) and measure (the dependent variables) ($F[3, 303] = 2319.686, p < .001, \eta^2 = .958$, pillai’s trace = .958). These main effects were qualified by significant interactions of time by group ($F[2, 305] = 26.023, p < .001, \eta^2 = .146$, pillai’s trace = .146), time by measure ($F[3, 303] = $)}
Follow-Up Univariate Tests

For the purposes of this study, we are only interested in examining the time (pre-test vs. post-test) by group interaction for each dependent variable. Therefore, follow-up univariate ANOVAs were conducted separately for each dependent variable, to examine the location of the significant effects. See appendices for bar charts of each variable by group at pre-test and post-test.

**Hypothesis 1: The current study hypothesized that those students who utilized The Virtual Advisor would have an increased level of graduate preparation self-efficacy and knowledge.**

Graduate preparation self-efficacy measures students’ level of self-efficacy and belief in their knowledge and preparedness for applying to graduate school. Grad prep self-efficacy is measured in two ways; with the efficacy subscale of the Grad Prep Quiz and the Psychology Majors Career Information Survey. The grad prep knowledge variable is assessing students’ actual levels of knowledge on graduate school related information. Grad prep knowledge is measured with the Psychology Majors Career Information Quiz.

A repeated measures ANOVA was conducted on the Grad Prep Quiz self-efficacy measure and significant main effects for were found for time \((F[1, 305] = 444.484, p < .001, \eta^2 = .593)\) and group \((F[2, 305] = 13.736, p < .001, \eta^2 = .083)\). These were qualified by a significant interaction for time by group \((F[2, 305] = 48.408, p < .001, \eta^2 = .241)\). To adjust for familywise error, Bonferroni adjusted post-hocs were performed and revealed that all three groups were
equal on grad prep self-efficacy at the pre-test (see Table 5). At post-test, the treatment group differed significantly from the website control group and the wait-list control group. Examination of the means revealed that at the posttest, participants in the Virtual Advisor condition scored significantly higher on grad prep self-efficacy than both the website control group and the wait-list control group participants (Treatment $M=36.20$, Website Control $M=32.50$, Wait-List Control $M=26.76$; $p<.001$). Additionally, the website control group scored significantly higher than the wait-list control group ($p<.001$). Finally, one tailed paired T-tests were conducted and confirmed that there was a significant change from pre-test to post-test for the treatment group ($t(64) = -11.992, p < .001$) and the website control group ($t(112) = -12.45, p < .001$).

Table 4-4: Means and Standard Deviations for Grad Prep Quiz Self-efficacy Subscale

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-List Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>$M = 22.79$</td>
<td>$SD = 6.34$</td>
<td>$M = 23.50$</td>
</tr>
<tr>
<td></td>
<td>$M = 23.25$</td>
<td>$SD = 7.44$</td>
<td>$SD = 6.43$</td>
</tr>
<tr>
<td>Post-test</td>
<td>$M = 36.20$</td>
<td>$SD = 7.75$</td>
<td>$M = 32.50$</td>
</tr>
<tr>
<td></td>
<td>$M = 26.76$</td>
<td>$SD = 7.62$</td>
<td>$SD = 6.66$</td>
</tr>
</tbody>
</table>

Another repeated measures ANOVA was conducted on the Psychology Majors Career Information Survey (another measure of grad prep self-efficacy) and significant main effects were found for time ($F[1, 305] = 308.491, p < .001$, $\eta^2 = .503$) and group ($F[2, 305] = 9.667, p < .001$, $\eta^2 = .060$). These were qualified by a significant interaction for time by group ($F[2, 305] = 341.543, p < .001$, $\eta^2 = .195$). To adjust for familywise error, Bonferroni adjusted post-hocs were performed and revealed that all three groups were equal on the Psychology Majors Career Information Survey at the pre-test (see Table 6). At post-test, the treatment group and the website control group both differed significantly from the wait-list control group. Examination of the
means revealed that at the posttest, participants in the Virtual Advisor condition and the website control condition, both scored significantly higher on this measure than the wait-list control group participants (Treatment $M = 23.79$, Website Control $M = 22.21$, Control $M = 18.57$; $p < .001$). The treatment group and website control group were not found to be significantly different. Finally, one tailed paired T-tests were conducted and confirmed that there was a significant change from pre-test to post-test for the treatment group ($t(64) = -11.524$, $p < .001$) and the website control group ($t(112) = -10.793$, $p < .001$).

Table 4-5: Means and Standard Deviations for Psychology Majors Career Information Survey

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-List Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-test</strong></td>
<td>$M = 16.99$</td>
<td>$SD = 4.74$</td>
<td>$M = 17.13$</td>
</tr>
<tr>
<td><strong>Post-test</strong></td>
<td>$M = 23.79$</td>
<td>$SD = 4.71$</td>
<td>$M = 22.21$</td>
</tr>
</tbody>
</table>
Career Quiz as a function of completing The Virtual Advisor. No significant differences were noted in the website control group or wait-list control group.

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-List Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-test</strong></td>
<td>$M = 49.58$</td>
<td>$SD = 4.50$</td>
<td>$M = 51.05$</td>
</tr>
<tr>
<td><strong>Post-test</strong></td>
<td>$M = 51.11$</td>
<td>$SD = 6.04$</td>
<td>$M = 50.62$</td>
</tr>
<tr>
<td></td>
<td>$M = 49.52$</td>
<td>$SD = 5.28$</td>
<td></td>
</tr>
</tbody>
</table>

**Hypothesis 2:** Students who utilized The Virtual Advisor would report higher levels of confidence in relation to their ability to make career decisions.

To address the second hypothesis, another repeated measures ANOVA was conducted on the career decision self-efficacy variable and a significant main effect was found for time ($F[1, 305] = 27.561, p < .001, \eta^2 = .083$). The main effect for group was not found to be significant ($F[2, 305] = .886, p = .413, \eta^2 = .006$). These effects were qualified by a significant interaction for time by group ($F[2, 305] = 9.634, p < .001, \eta^2 = .059$). To adjust for familywise error, Bonferroni adjusted post-hocs were performed and revealed that all three groups were equal on career decision self-efficacy at the pre-test (see Table 8). At the post-test, the treatment group and website control group both differed significantly from the wait-list control group. Examination of the means revealed that at the posttest, participants in the Virtual Advisor condition and the website control condition both scored significantly higher on career decision self-efficacy than the wait-list control group participants (Treatment $M = 103.43$, Website Control $M = 102.61$, Wait-List Control $M = 97.42; p < .05$). The treatment group and website control group were not significantly different on career decision self-efficacy. Finally, one tailed paired T-tests were conducted and confirmed that there was a significant change from pre-test to post-test for
the treatment group \(t(64) = -3.476, p < .001\) and the website control group \(t(112) = -5.714, p < .001\).

### Table 4-7: Means and Standard Deviations for Career Decision Self-efficacy Scale

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-List Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-test</strong></td>
<td>(M = 96.90) (SD=15.04)</td>
<td>(M = 96.25) (SD=15.49)</td>
<td>(M = 97.77) (SD=14.72)</td>
</tr>
<tr>
<td><strong>Post-test</strong></td>
<td>(M = 103.42) (SD=18.02)</td>
<td>(M = 102.61) (SD=15.24)</td>
<td>(M = 97.42) (SD=16.06)</td>
</tr>
</tbody>
</table>

**Hypothesis 3:** Students who utilized The Virtual Advisor would report higher levels of achievement of their vocational identity.

To address the final hypothesis, another repeated measures ANOVA was conducted on the Career Exploration and Decidedness Inventory-Revised (the measure of vocational identity) and a significant main effect was found for time \(F[1, 305] = 30.374, p < .001, \eta^2 = .091\). The main effect for group \(F[2, 305] = .2.649 p = .072, \eta^2 = .017\) and the interaction for time by group were not found to be significant \(F[2, 305] = 2.094, p = .125, \eta^2 = .014\). Table 9 lists the means and standard deviations at pre-test and post-test by group.

### Table 4-8: Means and Standard Deviations for Career Exploration and Decidedness Inventory

<table>
<thead>
<tr>
<th></th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-List Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-test</strong></td>
<td>(M = 83.19) (SD=14.86)</td>
<td>(M = 80.77) (SD=15.77)</td>
<td>(M = 79.80) (SD=16.08)</td>
</tr>
<tr>
<td><strong>Post-test</strong></td>
<td>(M = 88.48) (SD=16.06)</td>
<td>(M = 84.76) (SD=15.44)</td>
<td>(M = 81.75) (SD=15.22)</td>
</tr>
</tbody>
</table>

**Behavioral Reports**

The behavioral report items assessed the graduate school preparation behaviors that participants had engaged in during the interim since completing the pre-test (at least three weeks prior). Chi squared analyses were performed on each of the behavioral report variables to assess
whether there were differences in reports of grad prep related behaviors at the post-test across groups. As depicted in Table 10, the majority of the behavioral report items were not found to be significant. The few behavioral report items that were found to be significant were whether participants had begun reading a book on preparing for graduate school in psychology ($\chi^2(2) = 9.296, p < .01$), had visited a grad prep website ($\chi^2(2) = 21.804, p < .001$) and had begun volunteering in the community ($\chi^2(2) = 7.292, p < .05$). The treatment group was the group most likely to have begun reading a grad school preparation book (Treatment = 51.6%; Website control = 38.9%; Wait-List Control = 29.2%). The website control group participants were the most likely to have begun volunteering (Treatment = 12.5%; Website control = 16.2%; Wait-List Control = 5.5%) and to have visited a grad prep website (Treatment = 53.1%; Website control = 61.9%; Control = 32.6%). The finding in relation to visiting a grad prep website should be interpreted with caution as it is confounded by the fact that the website control group was specifically instructed to visit a grad prep website as part of the study.
Table 4-9: Percentages by Group Endorsing Behavioral Report Items

<table>
<thead>
<tr>
<th>Behavioral Report Items</th>
<th>Treatment</th>
<th>Website Control</th>
<th>Wait-list Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Began researching grad programs</td>
<td>75.4%</td>
<td>77%</td>
<td>69.2%</td>
</tr>
<tr>
<td>Began writing Personal statement</td>
<td>24.6%</td>
<td>21.4%</td>
<td>16.2%</td>
</tr>
<tr>
<td>Began writing C.V.</td>
<td>37.5%</td>
<td>38.9%</td>
<td>26.9%</td>
</tr>
<tr>
<td>Decided on letter writers</td>
<td>60.0%</td>
<td>67.0%</td>
<td>58.1%</td>
</tr>
<tr>
<td>Asking letter writers</td>
<td>33.8%</td>
<td>33.6%</td>
<td>24.8%</td>
</tr>
<tr>
<td>Began studying for the GRE</td>
<td>43.1%</td>
<td>40.7%</td>
<td>34.9%</td>
</tr>
<tr>
<td>Taken the GRE</td>
<td>16.1%</td>
<td>24.8%</td>
<td>18.5%</td>
</tr>
<tr>
<td>Visited a department academic advisor</td>
<td>60.0%</td>
<td>57.5%</td>
<td>48.1%</td>
</tr>
<tr>
<td>Read a grad prep book**</td>
<td>51.6%</td>
<td>38.9%</td>
<td>29.2%</td>
</tr>
<tr>
<td>Talked to a professor about grad school</td>
<td>64.1%</td>
<td>64.6%</td>
<td>54.7%</td>
</tr>
<tr>
<td>Visited career center</td>
<td>19.0%</td>
<td>25.9%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Cultivated a relationship with a faculty</td>
<td>70.8%</td>
<td>69.0%</td>
<td>63.1%</td>
</tr>
<tr>
<td>Visited a grad prep website***</td>
<td>53.1%</td>
<td>61.9%</td>
<td>32.6%</td>
</tr>
<tr>
<td>Began volunteering*</td>
<td>12.5%</td>
<td>16.2%</td>
<td>5.5%</td>
</tr>
<tr>
<td>New member of Psi Chi/Psych club</td>
<td>18.0%</td>
<td>14.7%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Decided to write a senior thesis</td>
<td>21.5%</td>
<td>18.6%</td>
<td>19.6%</td>
</tr>
<tr>
<td>Made plans to present at a conference</td>
<td>26.2%</td>
<td>17.3%</td>
<td>18.0%</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01 *** p < .001
CHAPTER 5
DISCUSSION

The discussion section begins with a summary of the results. Additionally, an interpretation of the findings in light of the literature on graduate preparation is presented. Next the limitations of the current study will be discussed. Finally, implications and future directions for this line of research will be provided.

Summary of the Results

The current study is the first randomized clinical trial with a national, non-convenience sample in the graduate preparation literature. The purpose of this study was to examine the validity and effectiveness of The Virtual Advisor, an online graduate preparation program; more specifically, to look at its effect on graduate preparation self-efficacy and knowledge, career decision self-efficacy and vocational identity. The strongest finding was that the treatment group’s graduate preparation self-efficacy was increased more robustly than both control groups as a function of completing The Virtual Advisor. Interestingly, the website control group’s grad prep self-efficacy was also significantly increased over the wait-list control group. This indicates that The Virtual Advisor was effective in increasing participant’s confidence and belief in their preparedness and knowledge about graduate school in psychology. Furthermore, being assigned to look over graduate preparation websites was also effective in increasing student’s self-efficacy in relation to graduate preparation. Therefore, the overall findings seems to suggest that engaging in either process of preparation increases ones’ self-efficacy in the graduate preparation process, with the Virtual Advisor nonetheless registering the greatest impact in this regard.

The findings that addressed actual graduate preparation knowledge were mixed. The Grad Prep Quiz knowledge subscale analysis had to be excluded due to low scale reliability and the Psychology Majors Career Information Quiz analysis suggested a moderate increase in
graduate preparation knowledge for those in the treatment group. Furthermore, although significant, the practical meaningfulness of this increase remains indeterminate. For this reason, conclusions based on this finding will be limited. The lack of robust grad prep knowledge effects may be tied to the fact that the Psychology Majors Career Information Quiz is a broad instrument designed to assess learning across a full, semester-long, careers in psychology course. Similarly, in this study, treatment group participants spent on average only 6 hours reviewing the program, completing on average only 3 modules. Therefore, it is reasonable that one would find stronger effects over the range of an entire careers course, as participants in this study spent substantially less time reviewing grad prep material than would be expected in a full semester course.

Additional findings suggest that in addition to grad prep self-efficacy and modest knowledge gains, the treatment group and website control group also reported increased career decision self-efficacy. Career decision self-efficacy is regarded as an individuals’ level of confidence or belief in his or her ability to complete the tasks necessary for making career decisions. This supports the conclusion that doing graduate preparation related activities, regardless of the format, is likely to improve student’s self-efficacy. Specifically, doing grad prep activities significantly increased participants belief in their ability to successfully complete the tasks involved in making career decisions.

Finally, the hypothesis that doing grad prep activities would increase participants’ vocational identity was not supported. There are several explanations for the lack of effects in relation to vocational identity. The most relevant cause is likely tied to the fact that vocational identity is often conceptualized as a developmental process, and identity tends to unfold longitudinally. When Thomas and McDaniel (2004) examined this construct in relation to their careers for psychology majors’ course, they did find significant changes in vocational identity
(both exploration and decidedness). In this case, post-test measurement was after the culmination of an entire semester and therefore spanned a significantly longer time period than the current study. Therefore, it is possible that a graduate preparation program such as The Virtual Advisor could have more significant effects on vocational identity over a longer period of time. In addition, Thomas and McDaniel’s (2004) study included a convenience sample of those who chose to take the careers in psychology course. Examining those who chose to take a careers course may have biased the sample and selected for people more uncertain/undecided regarding their career directions at the outset of the course. Future research could better examine this relationship in the context of a longitudinal design.

In general it has been noted that there is a lack of systematic empirical research to support the validity and utility of the various graduate preparation resources available to students. The current study supports the findings of Thomas & McDaniel (2004) who showed that a careers for psychology majors course did effectively increase students’ confidence in their ability to make appropriate career related decisions. This study also supports and builds upon the work of Neimeyer et al. (2004) who found that a preliminary audiotape version of a graduate preparation program significantly increased student’s scores on the Grad Prep Quiz. The current study expands this work by taking a newer and more improved version of this graduate preparation program and testing it in a randomized clinical trial with a large national sample. Findings suggest that utilizing The Virtual Advisor significantly increases students’ confidence in their preparedness and knowledge about graduate school and their belief in their ability to make career related decisions.

**Behavioral Reports**

The majority of behavioral report items, I have begun writing my personal statement, taken the GRE, I have asked my letter writers, were not found to be significant at the post-test.
This is somewhat expected because these variables were constrained in many ways. First and foremost, many of the behavioral items are more or less relevant to students depending on what year a student is in school (i.e. freshman vs. senior). Therefore, many of these variables are more contingent on the participant’s level of development rather than on the group they were assigned to. In one study, Lee and Neimeyer (in press) found that seniors not only displayed higher levels of knowledge about graduate preparation, but also reported engaging in more graduate preparation activities. In support of this conclusion, a Chi-square analysis was conducted to assess whether students had begun writing their personal statement at the post-test depending on their year in school, and it was found to be significant ($\chi^2(3) = 30.720, p < .001$). As to be expected, the seniors were most likely have begun writing a personal statement (Seniors = 31.0%; Juniors = 5.3%, Sophomores = 7.2%; Freshman = 0%). For this reason, post hoc analyses were conducted on all of the behavioral report items separately for seniors and also for juniors by group. When examining just seniors by group, the only behavioral report item that became significant was whether the student had begun writing a curriculum vita (C.V.) ($\chi^2(2) = 6.021, p < .05$). For this analysis, the treatment group seniors were most likely to have started writing a C.V. (Treatment = 60%; Website Control = 53.6%; Wait-list Control = 37.3%). Similarly, when examining juniors by group, the only behavioral report item that became significant was whether the student had become a member of Psi Chi/Psychology club ($\chi^2(2) = 6.238, p < .05$). For this analysis, the treatment group juniors were most likely to have joined Psi Chi since beginning the study (Treatment = 30.4%; Website Control = 6.1%, Wait-list Control = 14.3%). This makes sense as one would assume that students who are seniors are much more likely to already be members of Psi Chi/Psychology club, thus constraining the amount of new membership that is possible.
Furthermore, these variables were measured during a time period ranging from approximately 3 weeks to 2 months, and several of the behavioral report items cannot be feasibly accomplished in that limited time period regardless of student motivation (i.e. made plans to write a senior thesis, made plans to present at a conference). Finally, it should be noted that a substantial percentage of the participants who volunteer to be in this type of study are likely to have already engaged in many of the relevant graduate preparation activities for their level of development. It is likely that there is self-selection of the most motivated students into this type of study; therefore, it is possible that only limited behavioral changes could be expected during a brief time period. This is supported by the findings of Lee and Neimeyer (in press) who showed that in a sample of 590 undergraduate psychology majors from across the nation, significant percentages of the participants were already engaging in graduate preparation activities. Specifically, some of the most endorsed activities included: visiting a departmental advisor and talking with a professor on a few occasions which were both reported by 69% of the participants; 50% endorsed having an ongoing relationship with a faculty mentor; 42% read graduate preparation books; 25% attended a getting into graduate school seminar. Additionally, 52% were members of Psi Chi, 45% had written or planned to write a senior thesis and 29% participated in some kind of mental health volunteer work.

Consistent with these assumptions, the few items that were found to be significant were less constrained by the aforementioned concerns and could be achieved in a short period of time, such as volunteering in the community, reading a grad prep book and visiting a grad prep website. Participants in the treatment group were most likely to have read a grad prep book. Participants in the website control group were most likely to have begun volunteering in the community. As one would expect, both of those groups were more likely than the wait-list
control group to have visited a grad prep website, as it was specifically assigned to them as part of the study. In order to better address possible behavioral effects of the Virtual Advisor, future work might take into consideration the specific target behaviors that would be expected to change as a result of completing a graduate preparation program.

**Limitations**

Overall this study adds to the literature on preparation for graduate school in psychology, although there are limitations. One important limitation of this study is the use of self-report measures and a lack of true behavioral indicators in interpreting the results. Self-report measures are susceptible to social desirability and misrepresentation. That is, how do we know that students are actually utilizing the Virtual Advisor or whether they are accurately reflecting the amount of time that they spent reviewing the program? Another thing to consider is the evaluative nature of graduate preparation; this could potentially cause participants to present as more prepared, efficacious, or involved in graduate preparation activities.

Additionally, the methodology of this study involved online sampling and, while there are several benefits to this technique, there are also limitations. For one thing, there is no control over the setting in which participants completed the survey. There is also no control over how long the treatment group and website control group actually spent reviewing their assigned materials. These limitations are counterbalanced by the ability to recruit non-convenience national sample of students and to be able to easily randomize participants to groups. Furthermore, the anonymity associated with online surveys may make participants feel more comfortable disclosing personal information (Gosling et al., 2004). Finally, research has failed to find differences in participant responses when comparing paper-pencil methods to online data collection methods (Gosling et al., 2004).
The current study is distinctive in that it involves a randomized national sample. At the same time, it has the potential for selection bias which has implications for the generalizability of findings. It is possible that this study had a biased sample of the most motivated students as well as those with enough free discretionary time to participate in a research survey. This could skew the results somewhat and create a ceiling effect for amount of improvement that can be achieved during a limited time period. Finally, Recruitment strategies for this study involved soliciting psychology club and Psi Chi members which limited our sample to predominantly psychology majors. While psychology majors represent the majority of those applying to graduate school in this field, there are also applicants to graduate schools in psychology from a variety of different disciplines, thus our sample was biased to psychology majors specifically.

Implications and Future Directions

Within the context of these limitations, the goal of this study has been to examine the validity and effectiveness of The Virtual Advisor for graduate preparation and to support further work in this area. The current study represents a significant contribution to an area of study with a paucity of systematic empirical research. In this same regard it is the first controlled, non-convenience randomized national sample for a study on graduate preparation. This study supports the validity and effectiveness of The Virtual Advisor as a tool for increasing students’ self-efficacy and confidence in grad school preparedness, grad school knowledge, and ability to complete the tasks necessary for making career decisions.

The Virtual Advisor is a unique grad prep resource that fits in nicely with the digital age and the current shift toward online resources; students are increasingly accustomed to utilizing information through this medium. Moreover, online programs such as this one have the advantage of accommodating to the busy schedules that students often have by allowing for flexibility and portability. Furthermore, students can complete the program at any time in their
education. Ideally it would be advisable for students who think early on that they might be interested in grad school to use this program so that they can be better prepared. In addition, online resources such as The Virtual Advisor are important because they help fill in the gap for students whose schools don’t offer as many grad prep resources. In this way, an online seminar can help level the playing field as research has shown a large discrepancy across schools in the amount of grad school prep resources available to students. Finally, The Virtual Advisor is a supplement to any current resources that are available to students.

In opting for breadth and scope in our sample we compromised greater control over whether participants completed the program fully, how much time they spent, level of depth and the setting. Accordingly, wide variability was reported in how long participants spent on the program. For this reason, it is possible that the current study is a somewhat conservative test of the hypotheses and future research could more effectively test the complete program.

Future research may also benefit from examining graduate preparation in the context of more behavioral indicators of success and not relying solely on self-report. It would have been helpful to have a closer inspection of the behaviors that student’s reported engaging in. Following up on student’s admissions offers was beyond the scope of this study, but is a natural next step in this line of research. Follow up studies which incorporated the perspective of students once they are admitted to graduate school would also be helpful in building the literature on graduate preparation.

**Conclusion**

Future work in this area of research may benefit from the findings of this study. Overall, significant effects were found for the treatment group in relation to increased graduate preparation self-efficacy and career decision self-efficacy, along with modest grad prep knowledge gains. While it is clear that exposure to graduate preparation websites for those in the
website control condition also reflected some changes in the aforementioned areas, the greatest effect was shown for those who were in the Virtual Advisor condition.
APPENDIX A
BAR CHART FOR GRAD PREP QUIZ SELF-EFFICACY AT PRE AND POST TEST
APPENDIX B
BAR CHART FOR PSYCHOLOGY MAJORS CAREER SURVEY AT PRE AND POST TEST

[Bar chart image]
APPENDIX C
BAR CHART FOR PSYCHOLOGY MAJORS CAREER QUIZ (GRAD PREP KNOWLEDGE) AT PRE AND POST TEST
APPENDIX D
BAR CHART FOR CAREER DECISION SELF-EFFICACY AT PRE AND POST TEST
LIST OF REFERENCES


Ware, M. E. (1986). Assessing student’s career needs at a small private university. *Teaching of Psychology*, 13, 185-188.

Ware, M. E. (1988). Teaching and evaluating a career development course for psychology majors. In P. J. Woods (Ed.), *Is psychology for them? A guide to undergraduate advising* (pp. 64-74).
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