Assessing Self-Efficacy Among University Students:

Development and Validation of a Specialized Scale

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Abstract

Self-efficacy has significant impacts on university students' academic performances, motivational goals, and mental health outcomes. While previous studies have established validated scales to measure university students' self-efficacy, most convergently focused on academic self-efficacy, ignoring other domains such as general and social self-efficacy. This study developed and validated a new measure of university students' self-efficacy (USSE) by including three domains: General, academic, and social self-efficacy, while reducing the number of items to facilitate response efficiency and lower participant fatigue.

A convenience sample of 17 students from the University of Chicago participated in the pilot study. The results indicated strong reliability of the USSE, with a Cronbach's alpha of 0.95 for the overall scale and high alphas for individual items. Concurrent validity was supported by a moderate correlation between USSE and the General Self-Efficacy Scale (GSE). Convergent validity was acceptable given the moderate correlation with the short Academic Motivation Scale (SAMS), while discriminant validity was evidenced by a weak negative correlation with the Interpersonal Reactivity Index (IRI) that measures empathy.

This study contributes to valuable insights of the scale development and validation of university students' self-efficacy, providing significant implications for psychologists and educators to consider a more comprehensive and accurate measurement of self-efficacy in higher education, which will ultimately lead to more informed interventions and support systems.

Introduction

Imagine sitting in a packed lecture hall, heart racing as the professor announces a surprise quiz. While some students calmly pull out a pen, others freeze with panic written all over their faces. This difference can be attributed to individuals' belief in their capabilities to achieve specific performances, known as self-efficacy. Self-efficacy is not only positively related to academic achievements and motivations, but also favorably predicts mental health outcomes in higher education. Thus, validated measurement of self-efficacy is essential for psychologists to formulate coping strategies that improve university students' self-efficacy. This study developed and validated a more comprehensive and concise scale to measure university students' self-efficacy, aiming to provide practical insights in higher education.

Literature Review

Self-Efficacy: Definition, Impacts, and Research Importance

Bandura (1997) defined self-efficacy as personal confidence in the ability to control one's behavior and environment to achieve specific attainments in different circumstances. While general self-efficacy refers to the perceived general ability to cope with difficult conditions, specific self-efficacy further captures perceived capabilities to achieve outcomes in different domains, such as academic and work performances, social relationships, and emotional management (Luszczynska et al., 2005). This study focuses specifically on self-efficacy's role in the context of higher education since university students face unique challenges in different domains that require a particular set of beliefs in their capabilities.

The research of self-efficacy among university students is important due to its far-reaching impacts on various aspects of student life and success. First and foremost, self-

efficacy is positively correlated with university students' academic performances. For instance, prior studies have found that high self-efficacy positively predicted GPA among university students (e.g., Robbins et al., 2004; Travis & Bunde, 2022). Furthermore, Schunk (1991) showed that higher academic self-efficacy could result in more motivation and higher persistence toward specific academic goals, while students with lower self-efficacy had less academic motivation (Komarraju & Dial, 2014). Apart from academic outcomes, high self-efficacy also contributes to positive and supportive social relations among university students (Dwyer & Cummings, 2001), which enhances individuals' stress and emotional management capabilities (Galindo-Domínguez & Bezanilla, 2021). By focusing on self-efficacy in the university context, researchers and educators can gain valuable insights into how to enhance student success, leading to more targeted interventions and support systems.

Self-Efficacy: Established Measurement Scales and Limitations

Schwarzer and Jerusalem (1995) developed the General Self-Efficacy Scale (GSE), which is acknowledged as the 'Gold-standard' measurement of perceived self-efficacy among the general adult population. The construct is measured using a set of ten items. Each item is crafted to assess the individual's ability to handle challenges under adversity, including problem-solving, coping obstacles, dealing with unexpected events, and goal-pursuing. The scale possesses robust internal reliability as the Cronbach's alphas ranged between .76 and .90, with most of them higher than .80. Additionally, it shows strong construct validity since it is correlated with multiple psychological constructs, including optimism, job satisfaction, etc. It is also negatively related to several mental health outcomes, such as depression and anxiety. Nevertheless, GSE is primarily used to measure general self-efficacy,

limiting its power in assessing domain-specific self-efficacy. For instance, it may lack the content validity of measuring university students' academic self-efficacy.

Several scales have been established to measure self-efficacy among university students. Owen and Froman (1988) developed the College Academic Self-Efficacy Scale (CASES), incorporating 33 items that measure college students' self-efficacy regarding academic performances, socialization behaviors, and extracurricular activities by confidence rating on a 5-point Likert scale. According to Owen and Froman (1988), CASES has a strong internal consistency ($\alpha = .92$) and predictive validity as a significant predictor of GPA. However, several studies did not replicate this finding, as academic efficacy did not predict academic performances in these studies (e.g., Choi, 2005). Additionally, the socialization behaviors items in this scale do not measure students' social self-efficacy comprehensively as it is limited to the academic context (e.g., tutoring another student). Given this limitation, Solberg et al. (1993) developed the 20-item College Self-Efficacy Inventory (CSEI) to measure self-efficacy beliefs of the college experience, including subscales of course efficacy, roommate efficacy, and social efficacy. CSEI was found to have high internal reliability ($\alpha = .93$) and robust convergent and discriminant validities. Nevertheless, CSEI only applies to traditional college students with roommates, limiting its external validity. Recent years have witnessed newly-emerged scales that measure self-efficacy among university students. However, many of them convergently focused on academic self-efficacy, ignoring other self-efficacy domains (e.g., Greco et al., 2022). Lastly, many scales that measure university students' self-efficacy are lengthy with more than 30 items, which may result in participant fatigue and lower response quality.

Current Study: Develop and Validate a New Measurement Scale

The primary objective of this study is to develop and validate a comprehensive yet concise scale to measure self-efficacy among university students. This scale aims to address the limitations of existing measures by incorporating multiple domains of self-efficacy relevant to university students, including general self-efficacy, academic self-efficacy, and social self-efficacy. The proposed scale encompasses different dimensions related to self-efficacy, such as goal-pursuit, problem-solving, handling unexpected events, and resolving conflicts. This approach offers a more efficient tool by reducing the number of items, aiming to minimize participant fatigue and improve response quality.

Furthermore, this new scale aims to enhance applicability across diverse university student populations and increase its external validity. The conciseness of the scale will facilitate more effective data collection by shortening the response time. By developing this new instrument, this study aims to provide psychologists with a practical tool for assessing university students' self-efficacy. Ultimately, this scale will contribute to a more nuanced understanding of student self-efficacy and informed interventions to enhance student success.

Methodology

Participants

The pilot study recruited a convenience sample of 17 students from the researcher's graduate class of Survey Questionnaire Design at the University of Chicago. All participants were current university students, fitting the target population for the scale. As a selective and research-oriented institution, the University of Chicago provided a sample of students likely to be academically motivated and engaged in various aspects of university life.

All participants were informed about the purpose, procedures, benefits, and risks of the study. Consent was acquired from each participant, ensuring their voluntary involvement and understanding of the study's objectives. The small sample size of 17 was appropriate for this initial pilot phase as it allows for preliminary testing of the scale's properties and gathering insights for potential refinements before applying to a larger sample.

Measures

Based on the limitations identified in the literature review, this study developed a new 9-item scale with three sub-scales of general, academic, and social self-efficacy based on modifications of established scales that measure general, academic, and social self-efficacy, aiming to adapt to the general university student population. This scale aims to address the gaps in existing measures by incorporating multiple domains relevant to university students while maintaining conciseness to enhance the response quality.

The new University Student Self-Efficacy Scale (USSE) consists of 9 items across three subscales: General Self-Efficacy (3 items), Academic Self-Efficacy (3 items), and Social Self-Efficacy (3 items). Sample items include: "I believe I can overcome obstacles through my own effort" (General), "I am capable of solving difficult academic problems if I invest enough effort" (Academic), and "I feel confident in my ability to build new friendships, even in unfamiliar social settings" (Social). Participants respond to each item on a 7-point Likert scale ranging from 1 (Not at all true) to 7 (Exactly true). Instructions ask respondents to indicate their level of agreement with each statement based on their current beliefs about these statements (see Appendix).

To assess concurrent validity of the new scale by testing the correlation with a

previously validated measure, this study included the General Self-Efficacy Scale (GSE) in the literature review as the 'Gold-standard' measure and administered two scales at the same time. The GSE was chosen due to its widespread use and robust reliabilities and validities across various populations, making it the most cited self-efficacy measure in the literature.

To assess the construct validity of the new scale, this study included measures for both convergent and discriminant validity in the data analysis stage, drawing from selected 'Gold-standard' scales used by peer students in similar research contexts. For convergent validity, this study incorporated the short version of the Academic Motivation Scale (SAMS), which has 14 items with Cronbach's alphas ranging from .63 to .85 (Kotera et al., 2023). This measure was selected based on its use in parallel studies and its conceptual overlap with academic self-efficacy, which is particularly relevant to university student experiences.

To establish discriminant validity, this study included the Interpersonal Reactivity Index (IRI) that measures the construct of empathy (Davis, 1980), which consists of 28 items in four sub-scales: Perspective Taking, Fantasy, Empathic Concern, and Personal Distress, with Cronbach's alphas ranging from .68 to .79. This measure was chosen based on its focus on a construct theoretically distinct from self-efficacy. Empathy focuses on interpersonal understanding and emotional resonance, which is conceptually different from self-efficacy's emphasis on personal beliefs about one's capabilities, providing a good contrast.

Procedure

Face validity testing was conducted through a peer review session in the class. Peer students have provided critical feedback on the wording clarity, content relevance, and comprehensibility of each item of USSE. This step ensured refinements to make items appear

to measure what they were intended to measure from the perspective of potential respondents.

Following the refinement, the study proceeded with programming and data collection. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Chicago (Harris et al., 2009; Harris et al., 2019). REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies. The survey queue feature in the REDCap allowed this study to counterbalance the order effect by presenting half of the participants with GSE first, while the other half with USSE first. It is notable that this study was classified as 'not research' by the University of Chicago Institutional Review Board (IRB #24-2173). This classification was based on the educational nature of the project as a learning exercise within the graduate class.

Data Analysis

The raw data for USSE, SAMS, and IRI was imported into RStudio for data analysis. Duplicate responses were identified and removed for each scale based on the criterion that remaining the complete response (i.e., without missing values) or the first response if duplicate responses are complete. The scoring for GSE and USSE was summed by item scores. Regarding convergent and discriminant validity analyses, reverse coding was conducted on specific items to calculate the sum scores. Reliability test was performed in RStudio through the psych package using Cronbach's alpha (Revelle, 2024). Validity tests were performed through calculating the Pearson correlation coefficients between new scale scores (USSE) and 1) Concurrent validity: Gold standard scores (GSE); 2) Convergent validity: Academic motivation gold standard scores (SAMS); and 3) Discriminant validity: Empathy gold standard scores (IRI), accompanying with p-values to show statistical power.

Results

The average self-efficacy score for GSE among 17 participants was 29.59 out of a possible 40 (*SD* = 3.18), which constituted 74% of the full score. This indicated that participants perceived themselves as having a relatively high level of general self-efficacy on average. The relatively low standard deviation indicated a consistent perception of general self-efficacy among the participants. Regarding the new measure USSE, the average self-efficacy score was 45.29 (*SD* = 9.58), representing 72% of the full score of 63. This indicated a relatively high level of self-efficacy in the university contexts considering general, academic, and social domains. Nevertheless, the higher variability reflected a wider range of participants' perception of their self-efficacy beliefs as measured by the USSE.

The reliability test revealed a strong internal consistency among the items in USSE. Specifically, the overall reliability of the scale was excellent, with a Cronbach's alpha of 0.95. Additionally, the item-level analysis showed that the alpha values were consistently higher than 0.93 for individual items. Regarding the concurrent validity test, the correlation coefficient between USSE and GSE was 0.53 ($p = 0.028$), indicating a moderate to high concurrent validity of the new measure compared with the gold standard.

The convergent validity of the new measure was acceptable, as the correlation coefficient between USSE and SAMS was 0.35 ($p = 0.182$), indicating a moderately positive relationship between the two measures. In terms of discriminant validity, the correlation coefficient between USSE and IRI was -0.11 ($p = 0.68$), indicating a very weak negative relationship between the two scales. This provided good evidence that the USSE measured a construct distinct from empathy, supporting the discriminant validity of the new scale.

Discussion

Based on the research findings, USSE, the new measure of university students' self-efficacy developed in this study, showed strong reliabilities for both the overall scale and nine individual items, indicating that different items measured the same construct and relevant to each other. Compared with the gold-standard GSE, USSE has stronger internal consistency as the Cronbach's alphas were higher for USSE. The relatively high concurrent validity found from the correlation between USSE and GSE implied that the USSE is effective in measuring self-efficacy among university students based on the concurrent administration with the established and validated scale of GSE. This ensures that the new measure can be used interchangeably with the established measure, making it useful in situations where the established measure might not be available or practical to use.

Moreover, the USSE demonstrated acceptable convergent validity. While the correlation between USSE and SAMS was not statistically significant, it suggested that the new measure captured some aspects of self-efficacy related to academic motivation but also included other dimensions such as general and social self-efficacy, which may account for a more comprehensive measurements of university students' self-efficacy in different domains.

Given the weak correlation coefficient between USSE and IRI, the USSE exhibited strong discriminant validity. Both the weak correlation and insignificant p-value indicated that USSE is not correlated with the construct to which it is assumed to be dissimilar (i.e., the Empathy scale), further ensuring that the construct measures what it should measure.

In summary, the USSE showed high reliability and satisfactory validities, making it a promising tool for assessing university students' self-efficacy in different domains.

Limitations

While the findings of this study provide valuable insights into the development and validation of the self-efficacy measurement among university students, several limitations and potential biases should be considered. First, the sample size of 17 participants was relatively small. This limited sample size may lack the statistical power needed to detect more subtle effects. Additionally, the participants were primarily students from the Social Sciences department of University of Chicago, the findings may not be applicable to students from other departments or institutions, lacking generalizability and external validity. Second, the data collection was conducted through an online survey, which may introduce certain biases since participants completing the survey online might have lower levels of attention and engagement compared to in-person assessments, resulting in lower response quality. Last but not least, there is a risk of social desirability bias given the self-report nature, where participants might respond in a way they perceived as more favorable or acceptable. This could lead to inflated self-efficacy scores and affect the overall validity of the findings.

Future Directions

Future studies should aim to recruit a larger and more diverse sample of participants to enhance the statistical power and representativeness of research findings on university students' self-efficacy. Furthermore, future research should consider applying mixed methods for data collection, such as combining online surveys with in-person assessments to mitigate the lower attention in online responses. Lastly, combining self-report data with objective measures, such as academic performance records or peer assessments, can provide a more comprehensive evaluation of self-efficacy to counterbalance the social desirability bias.

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Appendix

University Student Self-Efficacy Scale (USSE)

The objective of this survey is to understand your feelings and thoughts about yourself. The data collected from the survey will be used only for academic purposes. Please read each statement carefully and indicate the extent to which the statement applies to you using the scale below. Please keep in mind there is no right or wrong answer.

Important: Please make each question a separate and independent judgment. Work at a fairly high speed through this questionnaire. It is your first impressions and the immediate feelings about the questions that we want. On the other hand, please do not be careless, because we want your true feelings. Please use the following scale to rate each statement:

- **1 = Not at all true**: This does not describe me at all.
- **2 = Hardly true**: This describes me only to a very small extent.
- **3 = Somewhat true**: This is true for me to a limited extent.
- **4 = Moderately true**: This is sometimes true for me.
- **5 = Often true**: This is often true for me.
- **6 = Mostly true**: This is true for me most of the time.
- **7 = Exactly true**: This describes me exactly.

Questions:

<u>General Self-Efficacy:</u>

1. I believe I can overcome obstacles through my own effort.

2. I feel confident to remain persistent when working toward my goals, even if the process is challenging.

3. I can achieve what I set out to do, even if I face setbacks along the way.

Academic Self-Efficacy:

4. I am capable of solving difficult academic problems if I invest enough effort.

5. I can efficiently handle unanticipated events (e.g., sudden schedule changes).

6. I can remain calm when faced with assessments (e.g., exams) because I believe I have sufficient knowledge to solve the problems.

Social Self-Efficacy:

7. I feel confident in my ability to build new friendships, even in unfamiliar social settings.

8. I can effectively resolve conflicts or misunderstandings when interacting with others.

9. I am capable of working collaboratively and making contributions in group settings.

Scoring:

The total score is calculated by the sum of nine items, ranging from 9 to 63. There is no reverse coded item in the scale.