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Stemming the tide: Predicting women engineers' intentions to leave ☆

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ABSTRACT

This investigation adapts and extends the Social Cognitive Career Theory (SCCT) by integrating it with central constructs from turnover theory. The extended model proposes that domain specific self-efficacy and outcome expectations predict job satisfaction and organizational commitment — the two key job attitudes that have been established as influential predictors of turnover cognitions and behaviors. Further, we proposed that one form of organizational supports, specifically developmental opportunities at work, are sources of self efficacy and outcome expectations, and that the relationship between organizational supports and job attitudes is mediated by self-efficacy and outcome expectations. The proposed model was tested on a national sample of 2,042 women engineers. Overall, the results provided support for our newly developed model. Implications for theory, research, and practice are discussed.

1. Introduction

Engineering is one of the most sex-segregated professional occupations in the United States today. Many millions of dollars in federal and private funding have focused on remedying that fact. In 2011, the President's Committee on STEM Education was charged with identifying and cataloging federal funding for Science, Technology, Engineering, and Math (STEM) education. They found that $3.4 billion dollars were spent by various federal agencies on STEM education, with about a third of that ($1,086 million) focused on increasing all underrepresented groups' participation in STEM careers and about 10% of that funding ($13.28 million) explicitly directed towards girls and women in STEM education (CoSTEM, 2011). Most of that funding has focused on intensive early education initiatives to help promote girls' interests in math and science and introducing them to engineering as a career. The results have been successful: more women are majoring in engineering, and today, 18% of engineering graduates are women (NSF, 2012). However, only 11% of engineers are women (NSF, 2011), a rate that has been relatively constant for over two decades and the limited evidence in this area also notes that organizations are having a tough time retaining their female engineers (Society of Women Engineers, 2007). Thus, half of women who are trained to be engineers leave the field, while only 10% of men leave the field (Society of Women Engineers, 2007).

We argue that it is critical to examine factors related to women's decisions to leave engineering organizations to determine critical intervention points, and the locus of potential interventions. Because voluntary departure from an organization (and by

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extension, the profession; Blau, 2007; Rhodes & Doering, 1983) is first predicted by the deliberate consideration to leave, it is important to examine the turnover intentions of women who are still employed as engineers. Thus, this study examined influences on the organizational turnover intentions of women engineers as a first step in understanding the reasons for their high departure rate from the engineering profession.

Understanding the reasons for the loss of women who are trained as engineers is more than an academic question. The skills that engineers have brought to US manufacturing and technology have played a large role in US economic prosperity (West, 2011). A 2005 National Academies report entitled "Rising above the gathering storm," pointed out the critical relationship between technical innovation and economic prosperity. However, while the report briefly notes that U.S. women and minorities are underrepresented in science and technology, it does not address the additional loss of women from technology careers post-degree, which represents a substantial loss of talent from the technical workforce.

Psychologists have studied only aspects of this problem. For example, vocational psychologists have extensively examined how women choose to enter STEM careers and a number of educational psychologists have examined factors involved in promoting women's preparation for STEM careers (Eccles (Parsons) et al., 1983; Eccles, 2007). However, while models have been proposed and interventions developed to promote women's entry in to engineering, no one has comprehensively investigated factors related to women's decisions to leave (or conversely, to stay) in engineering organizations. Social Cognitive Career Theory (SCCT; Lent, Brown, & Hackett, 1994) one of the dominant career theories that has guided research in this area, has examined choice behavior and models that predict level of performance in an occupation, but has not examined the choice to leave an organization. The SCCT predicts that individuals' self-efficacy beliefs and outcome expectations influence their choice actions by acting indirectly on individuals' interests and choice goals; contextual supports and barriers influence the choice-making process at different stages (Lent, 2013; Lent, Brown, & Hackett, 2002; Lent, Hackett, & Brown, 2008). Sources of self-efficacy and outcome expectations include performance accomplishments, vicarious learning, verbal persuasion, and physiological arousal. Lent et al. (1994, 2003) and Lent (2013) proposed that a social cognitive career perspective would help explain career development and choices across the lifespan. However, SCCT theorists and researchers employing this perspective have seldom considered the decision to leave one's organization as a significant career choice despite SCCT's well-established validity in predicting overall student attrition from academic fields (Harvey & McMurray, 1994), and specifically, female students' barriers to consideration of STEM and other non-traditional academic fields (Fouad et al., 2010).

At the same time, the prevailing view in turnover literature is that job attitudes, in the form of dissatisfaction with one's job and lack of commitment to the organization, are positively related to intentions to leave the organization. However, turnover theory and research, while predicting withdrawal, has not included psychological factors such as self-efficacy and outcome expectations, or specific contextual supports or barriers which have been found to be instrumental in predicting career choices in general (Lent, 2013; Lent et al., 1994, 2003) and have recently been proposed to play a key role in newcomer employees' organizational attrition (Hom, Leong, & Golubovich, 2010).

Based on SCCT's established validity in predicting students' attraction to, attrition from, academic and STEM fields (Fouad et al., 2010; Harvey & McMurray, 1994), we argue that predictions of women engineers' intentions to leave engineering organizations may be most fruitfully examined by adapting the SCCT to incorporate key elements from the turnover theories in order to provide deeper insights into the turnover intentions of a highly skilled group of professionals.

This study integrates two widely prevailing theoretical perspectives that are rarely considered together (for an exception, refer Hom et al., 2010) to expand our understanding of the manner in which organizational supports influence employees' self-efficacy beliefs and outcome expectations and further act in unison to affect their job attitudes and subsequent turnover intentions. We specifically examined the role of self-efficacy and outcome expectations as possible mediators of the relationship between organizational supports and job attitudes, which in turn are expected to be related to turnover intentions.

We developed a model (see Fig. 1) by integrating key components from the SCCT and turnover models, and in doing so, we sought to deepen our understanding of each theoretical tradition in several ways. First, we aim to contribute to research on turnover intentions by explicating the mechanisms that link key SCCT psychological variables such as self-efficacy and outcome expectations with turnover intentions. Self-efficacy behaviors have been hypothesized to influence work satisfaction (Lent &

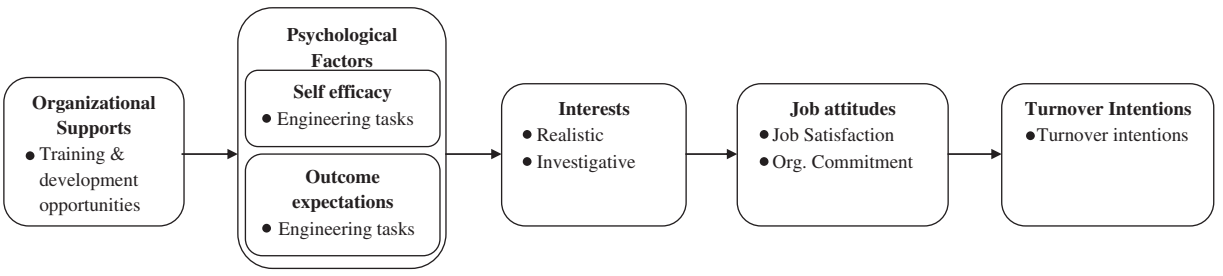

Fig. 1. Adapted SCCT model predicting turnover intentions.