THE RELATION BETWEEN TASK CHARACTERISTICS, CULTURE AND COMPUTER SELF-EFFICACY

One of the streams of research on individual differences within the IS field is the malleability of computer self-efficacy. This paper reviews past literature on the determinants on computer self-efficacy and explores the potential links relating task characteristics (task complexity, ambiguity, and novelty), culture and computer self-efficacy.

Introduction

The study of individual differences and reactions to computer technologies have received substantive research attention (Compeau, Higgins, & Huff, 1999). Much of this stream of research attempts to improve our understanding of the mechanisms used by individuals in order to develop their computer-related skills (Vessey & Galletta, 1991). One of the core concepts of this stream of research is computer self-efficacy. Computer self-efficacy is defined as a judgement of one’s capabilities to competently use computers (Compeau & Higgins, 1995a).

Because computer self-efficacy is a strong determinant of computer performance (Marakas, Yi, & Johnson, 1998), it appears fundamental to explore the methods and variables that play a role in enhancing computer self-efficacy. However, research on the determinants of computer self-efficacy has reported inconsistent and contradictory results (Jawahar & Elango, 2001; Marakas et al., 1998). Moreover, the variance of computer self-efficacy explained by the independent variables varies widely across studies, sometimes reaching only seven percent (Compeau & Higgins, 1995a). As a result, it is imperative to improve our understanding of the determinants of computer self-efficacy, especially when an individual’s lack of confidence with information technology may hinder his/her career success (Smith, 2002a). Therefore, one purpose of this paper is to review the empirical literature on the constructs that influence self-efficacy. Furthermore, this paper develops propositions around other predictors of computer self-efficacy, specifically task characteristics and culture, which have been poorly investigated in the past. For example, Marakas et al. (1998) acknowledge that the literature has been silent with respect to task characteristics’ impacts on computer self-efficacy, and Sheng, Pearson and Crosby (2003) stress the lack of research on cultural influences on CSE and the necessity to further explain them.

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2 Acknowledgements. I would like to thank Satyendra Singh for his valuable comments on this paper. His reviews have provided this paper with more insight. I would also like to express my gratitude to Dr. Jane Webster for her advice for the paper as well as for her guidance when developing it.
The clarifications provided by this literature review have important implications. First, it analyzes and synthesizes the accumulated body of research that exists on the influences on computer self-efficacy. This provides researchers with directions when conducting research on prior experience, vicarious experience, and computer self-efficacy. Second, this paper develops theory by identifying new constructs that appear to influence computer self-efficacy. Third, the literature review contributes to the research community by identifying more opportunities for research in the computer self-efficacy area.

This research has implications for practitioners as well. First, if task characteristics influence computer self-efficacy, practitioners could facilitate technological designs that will reduce the level of difficulty perceived by the users. Finally, the fact that computer self-efficacy may be shaped by cultural issues will make practitioners aware of the fact that managerial techniques need to be congruent with individuals’ cultural backgrounds and experiences.

**Review of the Literature**

Computer self-efficacy derives from the construct of self-efficacy, which is a key element of a widely accepted psychological theory, SCT (Bandura, 1986). SCT defines human functioning as a triadic, dynamic, and reciprocal interaction of cognitive and personal factors, behavior, and the environment (Bandura, 1977, 1986). In SCT, self-efficacy is defined as: “people’s judgements of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986, p. 391). Within the computer environment, computer self-efficacy refers to an individual’s judgment of his/her capabilities to successfully use computers (Compeau & Higgins, 1995b). Marakas et al. (1998) drew the distinction between general computer self-efficacy (GCSE) and task specific-computer self-efficacy (CSE). Thus, CSE is defined as “the perceptions of ability to perform specific computer-related tasks in the domain of general computing” (Agarwal, Sambamurthy, & Stair, 2000, p.419). On the other hand, GCSE is defined as individual’s self-efficacy beliefs across multiple computer related domains (Marakas, 1998). This review primarily focuses on CSE.

To review the literature, past research on the malleability of CSE was located and analyzed. The reviewed studies can be found in the Appendix. The four major determinants of CSE are: enactive mastery, vicarious experience, verbal persuasion, and emotional arousal. Enactive mastery or prior experience is the most powerful source of self-efficacy (Bandura, 1977, 1986, 1997; Wood, & Bandura, 1986). Enactive mastery refers to past performance accomplishments or beliefs about past performance (Bandura, 1977, 1986, 1997). Within the framework of IS, enactive mastery refers to prior experience and past performance with computers (Olivier & Shapiro, 1993). An overwhelming majority of studies where enactive experience was assessed, a significant relation was found with CSE (e.g., Gist & Mitchell, 1989; Henry & Stone, 1994a; Johnson & Marakas, 2000; Staples, Hulland, & Higgins, 1999). According to SCT, the second source of information affecting self-efficacy is vicarious experience (Bandura, 1977, 1986). Several studies have confirmed the importance of vicarious experience for the manipulation of CSE (e.g., Compeau & Higgins, 1995a; Gist, Schwoerer, & Rosen, 1989; Johnson & Marakas, 2000). The third source for forming self-efficacy beliefs is verbal persuasion (Bandura, 1977, 1986). Verbal persuasion involves individual perceptions about others’ suggestions and encouragement of his/her capabilities (Olivier & Shapiro, 1993). Within the IS literature, there are several studies that report a positive relation between verbal persuasion and CSE (e.g., Butch, 1995; Martocchio & Dulebohn, 1994; Martocchio & Webster, 1992). Emotional arousal is the fourth factor affecting self-efficacy beliefs. It includes the physiological and psychological states of the individual (Bandura, 1977), such as the anxiety
experienced by an individual when using computers. Previous research confirms the impact of emotional arousal on CSE (e.g., Smith, 2002b; Staples et al., 1999; Thatcher & Perrewé, 2003).

The review of past literature provided in Appendix A identifies some key gaps. For example, although Marakas et al. (1998) identified task characteristics as potential determinants of CSE, few empirical studies have incorporated them. Moreover, research linking culture and CSE appears to be non-existent. Within the broader notion of self-efficacy, Erez and Earley (1993) and Earley (1994, 1999) seem to be two of the few studies linking culture with self-efficacy. As a result, the remainder of the paper focuses on the role played by task characteristics and culture in improving our understanding of the malleability of CSE. A graphic summary of these relations is depicted in Figure 1.

**Figure 1**

**Conceptual Model of Computer Self-Efficacy**

![Conceptual Model of Computer Self-Efficacy](image)

**Task Characteristics**

According to Gist and Mitchell (1992) one of the assessment processes that appears to be involved in forming self-efficacy is the analysis of the task characteristics. This assessment is complemented and related to personal factors, such as skill level and self-efficacy (Gist & Mitchell, 1992). Task attributes include complexity, ambiguity and novelty (Marakas et al., 1998).

**THEORETICAL MODEL of TASKS**

Tasks are defined taking two different approaches: “as a pattern of stimulus impinging on the individual” (Wood, 1986, p. 61) and in terms of the behavioral acts that a person emits in order to attain some specific level of performance (Wood, 1986). According to Wood (1986, p.64), “all tasks contain three essential components; products, acts, and information cues” (see Figure 2). Acts and information cues are categorized as task inputs. Products are entities that can be described and observed separately of the behaviors that created them (Wood, 1986). That is, products are the assessable outcomes of acts (Naylor, Pitchard, & Ilgen, 1980). A product is an abstract attribute of a task and is distinct from the objectives and intentions of the individuals who
accomplish or assess the task (Wood, 1986). Furthermore, “the task product must be described before the required acts and information cues are identified as task inputs” (Wood, 1986, p.64). A product only refers to one entity or event (Wood, 1986). Thus, when the attributes of a product change, a different set of behavioral requirements is generated and therefore, a new task has emerged (Wood, 1986).

Figure 2

Task’s Components (Wood, 1986)

The required acts for the creation of a product can be defined with levels of abstraction, from a very specific activity to a more complex one (Wood, 1986). According to Wood (1986, p. 65), a “required act is a task component and not a property of an individual or his/her behavior”. Therefore, the specific activity executed when an act is accomplished is described separately from the individual who accomplishes the act and the context within which the act is performed (Wood, 1986). The direction of an act is generally implicit in the verb used when referring to the act, and separates one act from another (Wood, 1986).

The last component of a task is the information cues. Information cues are bits of information upon which an individual bases the required decisions made when performing a task (Wood, 1986). Information cues concern information about the attributes of stimulus objects not raw data of the stimulus (Wood, 1986). As a result, not all stimuli are cues and not all cues are information cues. Only information that is used to make discriminations and choices during the accomplishment of a task and that can be processed to make judgments are cues (Wood, 1986).

The three components (products, required acts, and information cues) can be used to describe any task (Wood, 1986). However, there are two requirements to describe a task in terms of these components. First, the task must “involve at least one behavioral act” (Wood, 1986, p.66). Second, a product can be identified independently of the act that produces it (Wood, 1986). Wood (1986) used this theoretical framework to define task complexity, as it will be explained in the following section. However, as pointed out by Wood (1986, p.64), this theoretical model of tasks “could be used to define other task characteristics”. Therefore, task ambiguity and task novelty will be defined taken into consideration this theoretical framework.
**TASK COMPLEXITY**

The acts and information cues involved in a task are essential task inputs since they set up the knowledge and skills individuals need to successfully accomplish a task (Wood, 1986). Task complexity characterizes the relations between task inputs (Wood, 1986). There are three types of task complexity: component complexity, coordinative complexity and dynamic complexity (Wood, 1986).

First, component complexity refers to the number of different acts that are required to be accomplished, and the number of information cues that are required to be processed in order to carry out the required acts (Wood, 1986). When there are various information cues and various acts involved in performing a task, an individual’s self-efficacy may lower. This is because the individual may think that there are too many activities that need to be properly accomplished (Wood, 1986) as well as feel overwhelmed by the amount of information available. Second, coordinative complexity deals with the relations between task inputs (required acts and information cues) and task products (Wood, 1986). The sequencing of inputs as well as the configuration and firmness of the relations between task inputs and task products are attributes of coordinative complexity (Wood, 1986). The number of interrelated steps and the amount of information about how to conduct a computational task may affect an individual’s computer self-efficacy. This is because the individual needs more skills in order to properly accomplish all the activities in the appropriate order as well as to apply each piece of information adequately at each stage of the performance (Wood, 1986). Therefore, the increase in skill and knowledge requirements may make the individual feel anxious and unsure about his ability to accomplish the task competently. Finally, dynamic complexity refers to the changes in the chain of acts for performing a task (Wood, 1986). An individual must adapt to changes that affect the relations between task inputs and products (Wood, 1986). In a dynamically complex task the relations between task inputs and products are unstable (Wood, 1986). Therefore, changes in the required acts and information cues, and in the relations between them and products create changes in the skills and knowledge required to successfully perform a task. Again, the dynamic complexity of a task may influence an individual’s self-efficacy beliefs.

Overall, the complexity of a task is a function of its component, coordinative, and dynamic complexity (Wood, 1986). As explained earlier, when a task presents component, coordinative, and/or dynamic complexity, the skills and knowledge required to competently perform the task increase. As a result, the individual may experience low self-efficacy beliefs since he/she needs to perform more acts to successfully accomplish the task, the interdependence of the acts and the information cues are more difficult to follow, and the changing nature of the requirements are more difficult to adapt to.

Furthermore, task complexity is strongly related with the theory of goal setting and task performance (Locke & Latham, 1990). According to goal setting theory, a goal needs two requirements to be accomplishable (Locke & Latham, 1990). First, the goal should not to be too easy or too complex (Locke & Latham, 1990). Second, the goal needs to be in accordance to an individual’s ability to achieve it (Locke & Latham, 1990). The previous statement stresses a clear link between the complexity of a goal and the individual’s ability to achieve it. This is again related to self-efficacy. For example, Locke and Latham (1990) found a higher correlation between the performance of physical activities and self-efficacy than between the performance of cognitive task and self-efficacy, because physical tasks “are usually less complex […] thus making it easier to form a clear picture of one’s capabilities” (p.71). Accordingly, there is a link between the complexity of a task and the individual’s self-efficacy beliefs to successfully perform it.
More specifically, there is empirical evidence suggesting that the number of steps involved in performing a task successfully directly influence self-efficacy perceptions (Campbell, 1988). For instance, Campbell (1988) found that while self-efficacy beliefs worsen when an individual is asked to perform the most complex parts of a task, self-efficacy perceptions improve when the more ‘doable’ parts of the task are requested. Further, Mitchell, Hopper, Daniels, George-Falvy, and James (1994) found that the complexity of a computational task influenced the formation of CSE beliefs. This influence decreased over time as the individual acquired more knowledge and received more training for carrying out the computational task (Mitchell et al., 1994). As a result, the following proposition is suggested:

**Proposition 1.** Higher levels of task complexity will result in lower levels of CSE.

**TASK AMBIGUITY**

Using Wood’s (1986) theoretical model of tasks, task ambiguity can be defined in terms of required acts, information cues, and products. Thus, task ambiguity is defined as a task whose products are ill defined, whose required acts are not completely known, and/or whose information cues are vague. For example, when a software application displays an error message on the screen with only a number on it, the task to fix the problem may be seen as an ambiguous task. In this particular case, the product of the task is defined in general terms as to ‘fix the error’. The information cues with regards to the task are vague since they consist of only a number that does not provide any useful meaning to an individual. Finally, the required acts to fix the error are unknown because the cause of the application’s crash is also unidentified. Thus, when there are task ambiguities, an individual is unable to determine how much effort it takes to perform it, how long it will take to achieve it, and when to readjust the strategy taken to conduct it (Bandura, 1986). As a result, an individual’s CSE may lower due to the ambiguity of the task. Therefore, according to Marakas et al. (1998), when there is ambiguity, estimations of CSE not only may lower but they may also be unrealistic. Hence, individuals need to have an idea of the performance they need to achieve when carrying out a task (Bandura, 1986) in order to increase their CSE beliefs.

Furthermore, goal setting theory (Locke & Latham, 1990) states that there are situational constraints that can limit the degree to which accomplishments occur. One such constraint is completeness of task information (Locke & Latham, 1990) and therefore, task ambiguity. Thus, incomplete information about a task may prevent the goal to be attainable (Locke & Latham, 1990). When a task is not perceived to be attainable due to the information incompleteness, the self-efficacy beliefs of the individual in charge of the task may lower. This is because the ambiguity and lack of information makes the individual wonder if he/she has the abilities required to perform the ill defined task.

Therefore, an individual’s CSE may lower when there is high task ambiguity. Due to the lack of information with respect to the required acts to perform the target computer behavior, the individual may feel that he/she does not have control over the task and therefore, he/she may feel less confident about achieving it properly. On the other hand, when the task is accurately defined, the individual understands the necessary skills and knowledge to accomplish the task properly and therefore, he/she feels more confident and in control about his/her abilities to carry out the desired task properly. Therefore, I propose that:

**Proposition 2.** Higher levels of task ambiguity will result in lower levels of CSE.
**TASK NOVELTY**

Task novelty is defined using the theoretical foundations provided by Wood (1986). A novel task consists of products that have not been created before by an individual. Furthermore, the individual is not used to the new information cues he/she is provided with nor with the required acts to perform the target. Therefore, the three components of the task are novel. Hence, an individual may feel inexperienced when facing a novel task. Just as prior experience enhances self-efficacy (Bandura, 1977, 1986), a lack of experience when performing a task may lower self-efficacy beliefs. Furthermore, when tasks are novel a more critical and detailed analysis of one’s self-efficacy is likely to occur (Gist & Mitchell, 1992). In contrast, judgments about self-efficacy become more routinized as a person gains experience performing new tasks (Gist & Mitchell, 1992), and confidence in his/her abilities (Agarwal et al., 2001).

There is very scarce research regarding the relation between task novelty and self-efficacy. In one of the studies exploring such a relation, Mitchell et al. (1994), reported that although task novelty affected self-efficacy beliefs, its influence decreased over time as a person got more experienced and received more training. This is consistent with SCT. Since prior experience positively affects self-efficacy, a novel task implies a lack of experience, and therefore, has a negative impact on self-efficacy beliefs.

For example, an individual who has never used the Internet before may feel inexperienced about doing a search in the Internet. In this case, the product of the task is to get the required information from the Internet. The information cues are all sort of screen information. A type of information cue would be the changes that occur to the mouse icon on the screen when placing the mouse in different places of the screen. These changes in the icon of the mouse tell the user where there is a link to another webpage or where there is just information on the screen. However, the individual may not interpret these new information cues in the proper way at the beginning, and he/she may learn them with time. The required acts to complete the task are all the steps of actions involved in the search of the target information, from the opening of the browse to the printing of the appropriate information. An individual who is challenged with this new task that includes many unfamiliar elements may judge his/her capabilities to perform the task from a critical point of view. This is because the individual does not have any past experiences related to the task to refer to when building judgments about his/her skills to successfully perform the task. Under these circumstances, computer self-efficacy beliefs may lower. On the other hand, as the individual gains experience in performing the target task, his/her computer self-efficacy may increase and stabilize due to his/her gain of familiarity and experience with the task. As a result:

**Proposition 3.** Higher levels of a task novelty will result in lower levels of CSE.

**Culture**

Before proposing some potential relations between culture and self-efficacy, it is paramount to understand what culture means. In Table 1, some definitions of culture are provided. While these definitions differ in certain ways, a closer interpretation of them discloses the commonality of the notion of sharing (Hatch, 1997). Sharing acts in two ways. First, sharing involves the relation between individuals in a manner that emphasizes their similarities (Hatch, 1997). Second, sharing also refers to the division of something into bits that are distributed among individuals, emphasizing separateness among them (Hatch, 1997). Therefore, the concept of culture is dynamic and “depends upon both community and diversity” (Hatch, 1998, p. 206).
The notion of sharing is strongly related to Bandura’s (1977, 1986) reciprocal determinism between the individual, the individual’s behavior, and the environment. As explained before, SCT states that “behaviour, cognitive and other personal factors, and environment influences all operate interactively as determinants of each other” (Bandura, 1986, p.23). Thus, one way that self-efficacy is shaped is through environmental and social influences (Bandura, 1986). Self-efficacy is partly socially constructed (Bandura, 1986), and such construction may differ as a function of (national) culture (Earley, 1994). As a result, cultural values affect how efficacy beliefs are developed. Further, people maintain self-related concepts, such as self-efficacy, in ways that are connected with their relationships within the social groups to which they coexist (Hofstede, 1980; Triandis, McCusker & Hui, 1990).

### Table 1

<table>
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<tr>
<th>Author</th>
<th>Definition of Culture</th>
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<tr>
<td>Herskovits (1955)</td>
<td>Culture is the man-made part of the environment.</td>
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<td>Triandis (1972)</td>
<td>Culture is a subjective understanding of the human evaluation of the environment. The subjective parts of a culture involve the categories of social stimuli, associations, beliefs, attitudes, norms and values, and roles that individuals share.</td>
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<tr>
<td>Pettigrew (1979) p.574</td>
<td>“Culture is a system of publicly and collectively accepted meanings operating for a given group at a given time. This system of terms, forms, categories, and images interprets a people’s own situation to themselves”.</td>
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<td>Hofstede (1980)</td>
<td>Culture consists of a collection of mental programs that determine an individual’s responses within a context.</td>
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<td>Schein (1985) p.6 (from Hatch, 1997)</td>
<td>“The pattern of basic assumptions that a given group has invented, discovered, or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid, and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to these problems”.</td>
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<td>Van Maanen (1988) p.3 (from Hatch, 1997)</td>
<td>“Culture refers to the knowledge members of a given group are thought to more or less share; knowledge of the sort that is said to inform, embed, shape, and account for the routine and not-so-routine activities of the members of the culture…A culture is expressed (or constituted) only through the actions and words of its members …Culture is not itself visible, but is made visible only through its representation”.</td>
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</table>
A theory that relates SCT, self concepts and culture is Cultural Self-Representation Theory (CSRT) (see Figure 3: Erez & Earley, 1993). This theory consists of four factors. The first factor encompasses the cultural values and norms which dominate the external and the internal work environment. The managerial practices and motivational techniques in a particular work environment are the second factor. The third factor consists of self beliefs, which are modified and influenced by culture and work practices. Finally, employees’ work motivation and work behavior are the fourth component of the CSRT (Erez & Earley, 1993). The whole notion of CSRT is organizational culture. According to Earley, Gibson and Chen (1999), just as nations provide culture for citizens, organizations provide cultural contexts for employees. Therefore, it seems logical that this theory can be extrapolated to other contexts, such at the environment or society. In this case, the unit of analysis remains the individual, and culture and work practices are extrapolated to cultural and societal practices. Within this scenario, cultural and societal practices are the factors which influence and partly determine self beliefs, including self-efficacy. This is consistent with SCT: self-efficacy is shaped by the environment where one lives, and culture is an important part of that environment (Bandura, 1986).

Figure 3

Cultural Self-Representation Theory (Erez & Earley, 1993)

To better understand the notion of culture, it is useful to examine the dimensions of culture. Hofstede (1991) identified five dimensions of culture: power distance, uncertainty avoidance, individualism/collectivism, masculinity, and long/short time orientation. First, power distance refers to the extent to which the members of a cultural organization (e.g., a nation) accept an unequal allocation of power (Hofstede, 1980). Within the management environment, this means that if an organization that assumes strong hierarchical forms attempts to establish its structure in low power distance cultures, difficulties may arise (Hatch, 1997). The second dimension of culture is uncertainty avoidance, which is the degree to which members of a nation
or a cultural environment deal with uncertainty (Hofstede, 1980). For example, while there is high uncertainty avoidance in Japan, there is low uncertainty avoidance in Singapore (Hofstede, 1980).

Third, individualism refers to the extent to which individuals act independently of other members of the same cultural environment (Hofstede, 1980). In individualistic cultures individuals are expected to be autonomous, while collectivistic societies are formed by cohesive loyal groups that support the security and belonging of each individual (Hatch, 1997). Fourth, masculinity is defined as the extent to which gender roles are separated in society (Hofstede, 1980). In cultures with low masculinity, gender differences are less pronounced than in cultures with high masculinity (Hatch, 1997). Finally, long/short term orientation refers the extent which people favor a pragmatic, future-oriented perspective over short term thinking (Hofstede, 1991).

Global classifications of culture overlook much diversity and variability (Bandura, 1997). Even within the same culturally oriented country, the dimensions of culture are quite different between different locations (Bandura, 1997). Hence, even members of the same national culture adopt different orientations depending on social circumstances (Bandura, 1997). As a result, cultural dimensions and orientations need to be treated as dynamic influences with multiple facets in order to properly explore how efficacy beliefs regulate human functioning within autonomous and interdependent social systems (Bandura, 1997).

Therefore, within SCT, people are neither completely independent nor entirely socially interdependent (Bandura, 1997). Within any given national boundary, there are many subcultures; and within a subculture, there are many individual divergences (Earley, 1994). As a result, not everybody belonging to the same culture shares the same scores on each of the cultural dimensions or the same cultural values and norms (Bandura, 1997). Further, as explained before, culture emphasizes both similarities and separateness among individuals (Hatch, 1997). Therefore, although shaped by the environment, each individual assimilates cultural and external influences in an unique way. That is why in this section, persons are treated not as belonging to a determined culture, but as having their own dimensions of culture. Past research has also taken this approach when exploring cultural and individual differences (e.g., Earley, Gibson & Chen, 1999).

Although SCT and CSRT provide an appropriate theoretical framework for research, little research has been conducted with respect to culture and computer self-efficacy (Jawahar & Elango, 2001). This paper focuses on individualism and uncertainty avoidance because both intuitively seem to have links with self-efficacy. For example, individualism and collectivism have been identified as possible antecedents of self-efficacy because of the different perceptions about capabilities that individualists collectivists experience when performing tasks independently or within a group (e.g., Bandura, 1997; Earley, 1994). Thus, the potential relations between individualism, uncertainty avoidance, and computer self-efficacy are explored within the following sections.

**INDIVIDUALISM and COLLECTIVISM**

According to SCT and CSRT, efficacy beliefs contribute to the productivity of members of both collectivistic and individualistic cultures (Bandura, 1997, Erez & Earley, 1993). Societies favoring individualism provide substantial opportunities for personal development, reward personal success, and often promote self-initiative (Bandura, 1997). On the other hand, collectivistic oriented social systems often subordinate self-interest to the overall welfare of the group while encouraging shared responsibility. These socialization experiences shape individual’s self-efficacy beliefs (Bandura, 1997). Furthermore, CSRT states that individualists use independent referenced information in establishing their self-efficacy, while collectivists use
shared referenced information (Erez & Earley, 1993). As a result, individuals with an individualistic orientation would perceive high self-efficacy beliefs when working independently, whereas collectivists would experience higher self-efficacy beliefs when working as a group (Bandura, 1997). As an example, Earley (1994) found that individualists increased their self-efficacy to higher levels with individual-focused training, whereas group-focused training resulted in higher self-efficacy beliefs for collectivists. However, it appears that there is no direct association between individualism/collectivism and self-efficacy either theoretically or empirically.

It appears logical to extrapolate the previous reasoning to the computer environment. Accordingly, individualists will feel more confident when performing computational tasks independently, and when the computational tasks are exclusively dependent on their only performance. This is because they are used to take actions autonomously, feeling more comfortable when they control their actions and responsibilities. If individualists worked in a group, their computer self-efficacy may lower since the situation would be partly controlled by others and their initiatives would be subordinated to the group’s opinions, decisions, and overall goals. On the other hand, collectivists would experience better CSE when assigned to computational tasks that are interdependent with and that complement others’ computational tasks. This is because such interdependent tasks usually involve shared responsibility and interaction with others for the achievement of the group’s overall computational goal. Moreover, collectivists are not used to work independently and therefore, would feel more anxious when performing actions by themselves. This is because collectivists are used to the support of the group: without a group they would feel isolated with no people to share the performance issues associated with a task. Finally, it appears that there is no relation between individualism/collectivism and CSE when the approach (individual or group oriented) to conduct the computational task is not included. As a result, the proposition regarding individualism and collectivism is stated as moderating one:

**Proposition 4.** Individual-focused methods for performing a computational task will result in higher levels of CSE for individualists, whereas group-focused methods for performing a computational task will result in higher levels of CSE for collectivists.

**UNCERTAINTY AVOIDANCE**

According to Hofstede (1980), in cultures with low uncertainty avoidance, innovative ideas and atypical behaviors are more accepted, whereas in high uncertainty avoidance cultures, these are opposed. According to CSRT and SCT, a culturally low or high uncertainty avoidant society shapes to some extent the uncertainty attitudes and self-efficacy beliefs of its individuals. Thus, at the individual level of analysis, this means that an individual who does not seek to avoid uncertainties is more likely to tolerate new experiences and novel ideas than other people who prefer not to experience uncertainties. Consequently, low uncertainty avoidant people will not lower their CSE beliefs when performing a novel task to the same extent as people whose uncertainty avoidance scores are higher.

Although the literature in IS seems to be silent about the potential relation between uncertainty avoidance and CSE, there are other constructs related to uncertainty avoidance that have been associated with CSE. Such a construct is personal innovativeness. According to Thatcher and Perrewé (2002, p.384, from Hurt, Joseph, & Cooded, 1977), “personal innovativeness refers to individuals’ willingness to change”. Moreover, personal innovativeness also refers to individuals’ acceptance of risks (Tatcher & Perrewé, 2002, from Bommer & Jalajas, 1999). According to Thatcher and Perrewé (2002, p. 385, from Agarwal & Prasad, 1998) “if
individuals are more willing to take risks, they are more likely to engage in innovative behavior”. Parallel to this rationale is the fact that individuals who show low levels of uncertainty avoidance will be more likely to tolerate innovative ideas, and therefore novel tasks. Further, Thatcher and Perrewé (2002) found that computer anxiety was negatively associated with personal innovativeness, and that personal innovativeness affected CSE in a positive manner. This means that innovative individuals demonstrate more positive CSE beliefs when performing new tasks (Kegerreis, Engel, & Blackwell, 1970). Accordingly, individuals who are less avoidant of uncertainty feel more confident and therefore, demonstrate higher levels of CSE when facing a novel task than individuals who are more reluctant to experience uncertainties. This is because people who have low levels of uncertainty avoidance need less predictability, and therefore, feel more comfortable when facing changes and new situations (Hofstede, 1980). As a result, I proposed that:

Proposition 5: Higher levels of task novelty will result in lower levels of CSE for individuals with high uncertainty avoidance than for individuals with low uncertainty avoidance.

Conclusion

This literature review contributes to the research community by extending theory and identifying new opportunities for research. First, it builds on previous knowledge by synthesizing and summarizing previous research on the impacts of constructs such as prior experience and vicarious experience on CSE. Second, this literature review extends theory by identifying and justifying the impact of new constructs on CSE. To do so, it used Wood’s (1986) theoretical framework of tasks characteristics to extend social cognitive theory. Thus, this paper provides theoretical rationale for why task complexity, task ambiguity, and task novelty might influence CSE. On addition, it introduces culture as a potential determinant of CSE. The combination of SCT and CSRT is used to provide a rationale for associating individualism/collectivism and uncertainty avoidance with CSE.

Overall, although research efforts to date into the determinants of CSE represent and provide a good understanding of the malleability of the construct, the conceptual model proposed by this study is offered as another step toward our awareness of the nature of CSE. Researchers are encouraged to continue this stream of research and to increase our knowledge of CSE.
Appendix

This appendix contains a concept matrix of past research on the determinants of computer self-efficacy (see next page).
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<td></td>
<td>Prior Experience</td>
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<td>Wood (1986)</td>
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<td>Hill et al. (1987)</td>
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<td>Gist &amp; Mitchell (1989)</td>
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¹ S refers to the type of self-efficacy: GSE (general self-efficacy) SE (task specific self-efficacy), GCSE (general computer self-efficacy), and CSE (task specific computer self-efficacy).
### Findings

Prior experience or mastery experiences are the most effective way of affecting self-efficacy. Modeling affects self-efficacy through a social comparison process. Prior experience directly affected the respondents’ sense of CSE.

### Other Variables

- Management support, ease of system use, outcome expectancy, system satisfaction.
- Organizational controllability, organizational complexity, personal goals and performance, managerial decision making.

### Literature Review

- **Earley (1994)**
  - Individual/group focused training influenced individualists’/collectivists’ self-efficacy.
  - Anticipated outcome, group efficacy, performance.
  - Effort, performance.

### Concepts

<table>
<thead>
<tr>
<th>Articles</th>
<th>Prior Experience</th>
<th>Vicarious Experience</th>
<th>Verbal Persuasion</th>
<th>Emotional Arousal</th>
<th>Task Characteristics</th>
<th>Culture</th>
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<tr>
<td>Wood &amp; Bandura (1989)</td>
<td>X</td>
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<td>S</td>
<td>Prior experience or mastery experiences are the most effective way of affecting self-efficacy. Modeling affects self-efficacy through a social comparison process.</td>
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<td>Harrison &amp; Rainer (1992)</td>
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<td>Prior experience directly affected the respondents’ sense of CSE.</td>
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<td>Earley (1993)</td>
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<td>X</td>
<td>Individualistic people perform best when working independently while collectivists performed best when being in a group.</td>
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<td>Olivier &amp; Shapiro (1993)</td>
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<td></td>
<td>C</td>
<td>It does not distinguish between CSE and GCSE. Further, there is little analysis and it does not provide a complete review of CSE.</td>
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<td>Articles</td>
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<td>Mitchell et al. (1994)</td>
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- **Findings:**
  - When people think about GCSE as an acquirable skill, GCSE beliefs increase as they gained experience. For people who think that GCSE is a fix ability, GCSE decreases with experience.
  - Prior experience was associated with CSE. Further, feedback relating performance to internal factors predicted higher CSE beliefs than feedback relating performance to external factors.
  - Task complexity, task difficulty, and task novelty influenced self-efficacy more highly at the early stages of training than at the later stages of training. Past performance was the factor making the greatest contribution to self-efficacy beliefs.
  - Past experience had a greater influence in CSE when respondents dealt with complex tasks.

- **Other Variables:**
  - Mood, goal commitment, knowledge, compilation.
  - Level of alertness, desire to do well, physical comfort, level of effort, current mood, work disturbances, available resources.
<table>
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<tr>
<th>Articles</th>
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<td>Prior Experience</td>
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<td>Compeau &amp; Higgins (1995a)</td>
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<td>Bolt et al. (2001)</td>
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### Findings

Although prior experience influenced CSE, the relation between vicarious experience and CSE was not significant. GCSE was affected by only two of the specific experiences by computers. Teamwork and information flow is positively associated with CSE. Moreover, some of the facets of organizational culture have a better impact on CSE. Prior experience influenced CSE. Computer self-efficacy was influenced by computer anxiety and personal innovativeness.

### Other Variables

Outcome expectancies, and information technology interest. Ease of system use, computer staff support, degree of system use, outcome expectancy, and organizational commitment. Negative affect, trait anxiety, personal innovativeness, computer anxiety.

### Articles

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<tr>
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<tr>
<td></td>
<td>Prior Experience</td>
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<td>Smith (2002b)</td>
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<td>Hasan (2003)</td>
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<td>Stone &amp; Henry (2003)</td>
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<td>Thatcher &amp; Perrewé (2003)</td>
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References


